

PALGRAVE
HANDBOOKS



THE PALGRAVE HANDBOOK OF MANAGING CONTINUOUS BUSINESS TRANSFORMATION

Edited by Horst Ellermann, Peter Kreutter,
and Wolfgang Messner



The Palgrave Handbook of Managing Continuous
Business Transformation

Reviews

“Businesses around the world have to cope with a continuously changing environment. This superb handbook provides a powerful collection of insights, concepts, and guidelines for a successful change strategy. It is the long-thought link between academic research and practical implementation of digitalization.”

Lutz Goebel – CEO, Henkelhausen; & President, Die Familienunternehmer,
Germany

“The new world of work requires organizations to invest in resilient and innovative business models. Taking examples from various industries, this handbook has distilled knowledge on achieving client centricity within a changing environment; it examines the impact of globalization and digitization on businesses embracing a client centric approach.”

Flocy Joseph – Human Capital Leadership Institute, Singapore Management
University, Singapore

“The world economy is transforming rapidly from an analogue to a digital-based technology-driven society; such a transformation requires businesses to move from a transactional relationship to one that is interactional. This handbook uses applied research and an interdisciplinary approach to better understand the salient components of managing change through transformation.”

Arthur M. Langer – Director, Center for Technology Management, Columbia
University, USA

“Keeping up in a steadily changing business environment is challenging – and sometimes exhausting. But businesses, small and big, domestic and international, need to learn how to change and adapt, not only once but many times. This well-organized and timely handbook brings together a wealth of practical and research experience.”

David Patient – Associate Professor of Organizational Behavior, Católica Lisbon
School of Business & Economics, Portugal

“Market- and environment-related forces constantly mete out new pressure for change in a tightly interwoven network of cause-and-effect relationships. Change will be the new normal in tomorrow’s business environment. This book is a good compass of how to establish a resilient business model, and how to cope with change, both expected and unexpected.”

Naveen Rajdev – Chief Marketing Officer, Wipro

“The impact of the current digitalization phenomenon on the business world is probably only comparable to the changes wrought by the industrial age. Now, many believe that we are undergoing a fourth industrial revolution. In such rapidly changing times, expert guidance, such as from this handbook, is highly appreciated.”

Michael Shepherd – Professor of Computing Science, Dalhousie University,
Canada

Horst Ellermann • Peter Kreutter • Wolfgang Messner
Editors

The Palgrave Handbook of Managing Continuous Business Transformation

palgrave
macmillan

Editors

Horst Ellermann
CIO Magazine / CIOmove
München, Bayern, Germany

Wolfgang Messner
Darla Moore School of Business
University of South Carolina,
Columbia, SC, USA

Peter Kreutter
WHU - Otto Beisheim School of
Management, Vallendar, Germany

ISBN 978-1-137-60227-5 ISBN 978-1-137-60228-2 (eBook)
DOI 10.1057/978-1-137-60228-2

Library of Congress Control Number: 2016960336

© The Editor(s) (if applicable) and The Author(s) 2017

The author(s) has/have asserted their right(s) to be identified as the author(s) of this work in accordance with the Copyright, Designs and Patents Act 1988.

This work is subject to copyright. All rights are solely and exclusively licensed by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Cover illustration: © PIER / Getty Images

Printed on acid-free paper

This Palgrave Macmillan imprint is published by Springer Nature
The registered company is Macmillan Publishers Ltd.

The registered company address is: The Campus, 4 Crinan Street, London, N1 9XW, United Kingdom

Preface

Managing change is probably the biggest challenge in today's business world. Market- and environmental-related forces are the driving forces behind these challenges. For instance, *globalization* is a key force that shapes strategy, structure, and operations of multinational and domestic companies alike. *Demographics* are shifting. While you are reading this, the world's population will rise by 145 within the next minute. By 2025, there will be about eight billion people on our planet—but with sharp regional variations. While Africa and Asia are growing, Europe is expected to shrink. For businesses that fail to respond adequately, these demographic shifts bring risks; but they also create big opportunities for forward-looking organizations. Growing population segments in the emerging markets develop their own dynamics driven by completely different customer needs, often at what we call the bottom of the pyramid. Organizations need to understand the discontinuity of customer requirements when transcending into global markets. At the same time, *technology* and *digitalization* remove existing constraints and open up previously unthought-of opportunities, affecting the lives of end-consumers and the way how organizations operate alike. Social media lets companies directly hear the voice of their customers, without having to wait for market researchers to send out questionnaires and compile their reports. Big data allows companies to understand their customers, make more accurate forecasts, and ultimately take better decisions.

Undoubtedly, to take advantage of these developments, managing change is at the core. And so, more than ever before, business transformation has a prominent place on corporate agendas, because an organization's future success strongly depends on it. Coping with ever more rapid and ongoing change is one of the predominant concerns of executives across industries and across

the world. Business transformation helps them to stay competitive amid a wide variety of internal and external challenges.

Transformational shifts in our economic, environmental, geopolitical, societal, and technological systems offer unparalleled opportunities, but at the same time threaten many traditional industries. Many of those shifts do not work in isolation and neither in tandem. Instead, they are a tight-knit web of complex and self-enforcing interconnections. They simultaneously and constantly mete out new pressure for change in a network of cause-and-effect relationships.

And because continuous change will be the new normal in tomorrow's market environment, business transformation can never be complete. It needs to be understood as a continuous process, right from realizing its triggers, defining a guiding policy as a transformation framework, all the way to coherent execution of change across all layers of business.

The Main Objectives of This Book

Therefore, *The Palgrave Handbook of Managing Continuous Business Transformation* offers a broad and comprehensive perspective of how to cope with change, both expected and unexpected. It brings together many years of experience, current perspectives, and future ideas of international business practitioners, academics, and market researchers. This book diagnoses the factors that trigger change and drive continuous transformation. In doing so, it takes an interdisciplinary approach, weaving together strategy with implementation, connecting people with information technology, and linking customers with the businesses they are buying from. While a lot of general business advice is published about change and transformation, several of these issues are, in the required depth for this important topic, not yet sufficiently covered by previous academic research.

By assessing existing research and current business trends, *The Palgrave Handbook of Managing Continuous Business Transformation* is intended to serve as a reference point for researchers studying continuous business transformation. With an applied research-driven philosophy, it provides firms and their managers with a sound foundation for managing change, and also proposes new directions. Case study material is added in order to help understand and teach issues and solutions to graduate and executive classes.

As editors, with the much appreciated help of our contributing authors, we put together this book for *academic researchers*, who wish to develop and focus new research in the fields of International Business and Management; Strategy, Entrepreneurship, and Innovation; Marketing; and Information

Management. It will also be useful for *business practitioners* who are interested and motivated to transfer academic research into real-life business strategy, for example, senior management and heads of strategy departments, senior management of professional service providers who want to position themselves higher up the value chain, and consultants working for strategy and management consultancies.

The Structure of the Book

This book presents a collection of chapters that deal with the topic of continuous business transformation in an international and cross-disciplinary manner. They are written by a team of 48 leading academics, experienced market researchers, and industry practitioners from Belgium, Germany, India, Japan, Romania, Singapore, Switzerland, UK, UAE, and USA. Many of the contributing authors are personally known to us through the networks of the *CIO* magazine, Darla Moore School of Business at the University of South Carolina, MYRA School of Business, WHU – Otto Beisheim School of Management, and the Wipro Center for Business Resilience.

After an Introduction, the book is organized around four main sections: Transformational Shifts, Achieving Customer Centricity, Dealing with New Technology, and Leading the Change. We endeavored to build a red thread from defining the book's topic of continuous business transformation (Part 1); understanding how transformational shifts pose challenges to today's businesses across vertical industries and geographies (Part 2); suggesting how companies can strategically respond by connecting its products, services, and solutions with its customers (Part 3); understanding how to create a technology strategy and integrate it into the existing landscape (Part 4); and, finally, creating the future, keeping the momentum, and staying ahead (Part 5). Part 5 also includes directions for future conceptual work and research.

Part 1: Introduction

The *Introduction* contains two chapters. The first chapter, *Continuous Business Transformation: What Is It All About?*, establishes that business transformation is not only a long and complex process, but also a term used in a wide variety of meaning by management consultants and strategy writers. Wolfgang Messner sorts through the chaos of opinion and hype; he proposes a two-dimensional framework evolving around the key issues of nature and scope of strategic

change. He makes the point that continuous business transformation occurs within the organization's existing paradigm, and because it never stops, it helps the organization to accelerate, build momentum, and deliver impact.

In *Industry Life Cycles as an Underlying Source of Continuous Change*, Peter Kreutter presents a literature overview on industry life cycle research. He offers theoretical ideas and valuable empirical results that explain evolutionary processes at industry level. This not only provides the reader with an improved understanding of entry, exit, firm growth, and survival during the course of an industry's evolution, but also shapes the inherent dynamics and the strategic implications at the firm level.

Part 2: Transformational Shifts

Part 2 is titled *Transformational Shifts*. By looking at how transformational shifts challenge many tradition-rich companies, it opens up the book's fundamental perspective.

The second part starts with a literature review *Lost in Transformation: Strategy Formulation in a Digitized World*, which discusses current challenges for strategic management, and illustrates a novel and practical approach of strategic renewal in a world lost in transformation. By assessing traditional industry analysis in the light of today's business reality, Nicole Gottschalck and Christina Günther provide insights into an alternative and practical framework for strategy formulation and implementation in a continuously changing digitalized world.

In *Leveraging Nature and Patterns in an Exponential World*, Hans-Martin Hellebrand argues that today's world is shaped by the impact of exponential technologies. To harvest their huge potential and to not be disrupted by their immense power, today's entrepreneurs and business leaders have to gain a solid understanding of exponentials, and how to design organizations around them. He provides solid advice on how to set up optimal structures and processes, which enable organizations to turn the potential of exponentials into company value.

In their chapter on *The Effect of Digitalization on the Labor Market*, Christian Bühner and Christian Hagist ask how digitalization will change the division of work, and which jobs are at stake. They make the point that societies will have to react differently, depending on their demographics and their education system. Rapidly ageing countries, like Germany and Japan, may even experience fewer problems with respect to their labor market.

Adam Bujak and Marcus Esser address the challenge of responding to change in a structured way. Relying on the Kondratieff cycle theory, their chapter *Outcome-Driven Transformation* reviews economic cycles, and the transformation pressures they inevitably exert. Based on five transformation levers, they demonstrate suggestions and practical findings ensuring smooth execution in a fast-moving environment. Their case study describes employee involvement stimulation, achieved through a targeted gamification approach.

Part 2 concludes with *Transformation of Banking Institutions: Comparing Germany and India*. Taruna Gautam and Michael G. Schmitt demonstrate that banks, which have their origins and a strong foothold in developed countries, should show increased interest in partnering with institutions from developing markets. While banks in India and Germany operate in very different environments, they face, to some extent, very similar challenges of global banking transformation.

Part 3: Achieving Customer Centricity

Part 3, titled *Achieving Customer Centricity*, departs from the insights developed in Part 2, and sketches strategies how firms can fundamentally align their products and services with the wants and needs of their most valuable customers.

In a conceptual chapter entitled *The Changing Face of Customer Centricity*, Rajesh Gaurav and G Shainesh assess the impact of macro-environmental factors on the evolving nature of customer centricity, and the need for firms to embrace it.

Shailesh Chopra and Premkumar Rajendran challenge how today's organizations deal with client centricity. While organizations believe they are client centric, only very few customers actually feel so. In their chapter *Rethinking Client Centricity to Reinvent Business Models*, they provoke readers to think through the deeper roots of client centricity and motivate them to unlearn and re-learn. Only focusing on client centricity in such a differentiated way will trigger an organization to continuously re-invent itself.

Because product line selection has been a complex problem for marketers across industries, *Transforming Product Line Selection Strategy* proposes a robust decision model for marketers in dynamic business environments characterized by uncertainty and lack of information. Subrat Sarangi considers a set of intra-firm, inter-firm, and multi-market competition variables; he proposes multi-objective mixed-integer fuzzy-goal programming as a methodology for this decision model.

While—at least in Continental Europe—the concept of Industry 4.0 has gained enormous interest within the business community, the organizational change required for its successful deployment is still in its infancy. In *Industry 4.0: How to Manage Transformation as the New Normal*, Thomas Ochs and Ute Riemann aim to overcome the traditional perception that change is not an episodic element, but a continuum. They showcase project experience from Villeroy & Boch, a large manufacturer of ceramics, which has been able to expand its position on the European home market while at the same time continuing a course of internationalization, especially in the new growth markets. To encourage innovative thinking, they propose a blended change management approach adding elements of Design Thinking in order to make Industry 4.0 successful.

Klaus Holzhauser and Philipp Schalla predict in their chapter *Digital Transformation in Manufacturing* that Industry 4.0 will have a far more profound influence on corporate business models and processes than the aspect of customer experience, which was primarily associated with digital transformation up to now. The increasing intelligence in manufacturing plants, the consistent incorporation of local intelligence into the production process and logistics chain, and the resulting opportunities for information management will bring massive changes to the entire process of work in manufacturing companies, as well as to the direct environment of individual workers. While this promises enormous added value potential for the manufacturing industry, management must accept to bear the responsibility of actively managing the change all the way down to the shop-floor level.

At the end of the book's second part, Dirk Holtbrügge and Annalena Zeier point out that, while industries are continuously becoming more and more global, the national background of firms still matters. In their chapter *Country-of-Origin Effects in a Global Market: The Case of China*, they explore the perceptions of Chinese cars by European customers. They analyze and compare the impact of country-of-origin effects on product evaluations and purchase intentions of German and French consumers.

Part 4: Dealing with New Technology

Part 4 is about *Dealing with New Technology*. The chapters collectively suggest sustainable ways for firms to stay competitive by sensing potential technology impact, devising a technology-based strategy, and flexibly integrating it into the existing landscape.

In a first step toward securing continuous development processes, Klaus Brockhoff advises in his chapter *Customer Integration into Continuous Development of IT-Based Services* that developers of IT-based services should be aware of potential conflicts arising from involving customers in co-development projects. He bases his analysis on extensive use of academic literature, including empirical research. His findings should help both decision makers and those involved in running the projects to avoid conflicts.

The chapter *Towards a Safer Tomorrow: Cybersecurity and Critical Infrastructure* addresses a type of threat that is relatively new compared to other substantial well-known and well-researched risks for organizations. The two authors, Solomon Karchefsky and H. Raghav Rao, provide insights into the effects of recent destructive cyber-attacks, the divide between governments and private industry, as well as lapses in security programs that prevent the effective defense of critical infrastructure. In order to address these faults, they demand scalable and risk-based processes to improve supporting processes of cybersecurity in critical infrastructure, namely information sharing, accountability, and risk assessment.

Anna Kruse and Hans Pongratz cover the topic of free online courses, so-called MOOCs. Their chapter *Digital Change: How MOOCs Transform the Educational Landscape* specifically addresses how MOOCs transform the landscape of higher education, and how institutions of higher education can respond with agility to a rapidly changing landscape of tools and approaches. Based on experiences of the Technische Universität München (TUM) with MOOC initiatives, they provide commentary and analysis on current public perception of MOOCs, as well as a hypothesis about the future trajectory of MOOCs.

The chapter *E-leadership for SMEs in the Digital Age* notes that the business climate is currently being transformed by digital technologies. Based on their empirical research in Europe, Maksim Belitski, Weizi Li, Kecheng Liu, and Yinshan Tang address one of the main challenges that the leaders of small and medium-sized enterprises (SMEs) face today: How to align business and information technology in an optimal manner to fully leverage the potential of digital technologies?

Next, Nils T. Kohle contributes an interesting case study about the *Digital Transformation of a Swiss Ski Destination*. He argues that digitalization does not only affect companies but also affects holiday destinations. How can a travel destination cope with the changes that come along with digitalization? And how would the ideal strategy look like? Using Saas-Fee in Switzerland as an example, he advocates establishing Destination Management Organizations,

which will need to follow radically different marketing processes in order to adapt to customers' continuously changing requirements.

The book's fourth part concludes with a chapter on the *Internet of Things: Legal Implications for Every Business*, in which Ulrich Bäumer, Miriam Keil, and Sabine von Oelffen highlight that businesses deploying the Internet of Things are subject to a variety of legal obligations. These are, due to their rigidity, contrary to the open and flexible nature of the Internet of Things. And while the Internet of Things blurs national boundaries, there is no uniform legal framework with respect to liability questions. Businesses thus face liability under numerous diverse national laws. Nonetheless, these legal challenges will most likely not decelerate the rapid growth of the Internet of Things.

Part 5: Leading the Change

Part 5 is about *Leading the Change*. It goes to the core of how companies can use the ideas provided in the previous parts of this book, create a new future, and stay out in front. The work included in this part also highlights gaps in current research, and provides directions for future research.

In their chapter *Establishing Continuous Change*, Erik Strauss, Jürgen Weber, and Susanne Zubler note that almost every organization has to undergo radical transitions to be able to continuously change and adapt to dynamic economic conditions. While the ability to transform has been primarily linked to the private sector, even government and other public organizations are moving toward a market-oriented logic. The authors provide evidence from a German federal agency, and show that radical change is one way of getting ready for continuous change, because, by shifting power structures in the organization, it helps to overcome inert interdependencies between contextual intra-organizational dynamics.

Moving back to the private sector, Enrico Rühle and Valerie-Laura Wagner present the case of TÜV Rheinland India Pvt. Ltd., a provider of technical, safety, and certification services. In their chapter *Organizational Culture: An Additional Perspective to the Balanced Scorecard*, they suggest to add organizational culture as a fifth and separate perspective to the balanced scorecard. They see it as a necessary step, because to stay competitive in today's market, it is very much important to understand an organization's employees as an integral part of success. This is especially true when considering that talent is becoming scarcer across the world. They develop a consistent and multi-dimensional framework, which is flexible enough to help focus on changes originating from the marketplace or within the organization.

The conceptual chapter *Integrating Holistic Marketing into the Stakeholder Management Approach* postulates that the sustainable business should not only represent a major strategic challenge, but that it must become an effective strategic solution. Mihaela Herciu and Claudia Ogreaan suggest that organizations should integrate holistic marketing into their stakeholder management. They introduce a strategic model that can lead to radical change of a firm's business model, while it can at the same time (re)position the firm within the global architecture as a good corporate citizen. This creates a win–win situation for business and society.

Next, Wiboon Kittilaksanawong argues that corporate divestitures have increasingly gained legitimacy as a strategic option for maximizing a firm's equity value, but that it is still not clear to academics and practitioners how value creation really happens. His chapter *Corporate Value Creation from Restructuring Through Divestitures* demonstrates that the drivers, paths, and performance of corporate divestitures are interdependent. Managers have to consider firm- and industry-level factors across geographic markets and timing of implementation to maximize value creation from divestitures.

Melissa Promes discusses flexible working environments in her chapter entitled *Adapting to Working Environment Change: Effects of Mobility and Flexibility*. While they allow organizations to accommodate continuous job growth, make best use of existing building space, and help to contain costs, they will inevitably result in the emergence of new challenges regarding an individual's satisfaction with the working environment; such change can be perceived as threatening by some employees. In her chapter, she takes the case of the BMW Group in Munich, and examines the effects that mobility and flexibility in the workplace have on perceived employee satisfaction and well-being. Her empirical study provides concrete evidence for the need to solve capacity issues in terms of job growth, as well as maintain a high level of employee satisfaction and well-being in today's continuously changing environment.

In the last chapter of this book, Peter Boggis, Frank Dannenhauer, and David Trafford explore how the role of leaders needs to change, given the profound impact that digital technology continues to have on organizations. Their chapter *The Changing Role of Leaders for the Digital Age* is based on a longitudinal review of 'digital project' experiences across industries. They suggest five leadership principles for the digital age, and conclude that many organizations have yet to recognize the fundamental shift in the primary role of leaders—together with the process of leadership—if they are to become truly digitally enabled enterprises.

Perhaps one of the salient qualities of this book is the variety of perspectives from which authors try to tackle the challenge of managing continuous business transformation in today's business world characterized by frequent and far-reaching shifts. We sincerely hope you will find this handbook useful for your own research or business practice. Following good old academic practice, throughout the book, all authors are consistently listed in alphabetic order.

April 2016

Horst Ellermann
Peter Kreutter
Wolfgang Messner

Acknowledgments

This book would not have been possible without the great support of many well-wishers and supporters, who have, in small and large ways, helped to turn the initial idea of writing a book on *change* into reality. The number of individuals involved is large. The result is now right in front of you, *The Palgrave Handbook of Managing Continuous Business Transformation*.

First and foremost, we want to express our heartfelt appreciation to Wipro Ltd., a leading Information Technology, Consulting and Business Process Services Company. Wipro combines digital strategy, customer-centric design, advanced analytics, and product engineering. It has endowed the Wipro Center for Business Resilience as a research think tank at WHU – Otto Beisheim School of Management in Düsseldorf (Germany). We also thank *CIO* magazine and IDG Business Media for being partners in supporting this collaboration. The Wipro Center for Business Resilience has created the necessary momentum and support to move this project from idea to reality. We especially thank WHU – Otto Beisheim School of Management, *CIO* magazine, Darla Moore School of Business at the University of South Carolina, and MYRA School of Business for allowing us to tap into their global research and business networks. Suffice to say that our debt in creating the momentum for this book is enormous.

Putting this book together was in many ways a collaborative effort, involving contributions from 48 academics, market researchers, and business practitioners from all over the globe. We want to thank all of our highly dedicated authors, who have spent considerable amount of effort and time researching and writing the content for the chapters of this book. Many chapters are stocked with case studies and examples from organizations. We are indebted to these companies for sharing their business transformation experiences with candor and detail.

Every chapter accepted for publication in this book has gone through both editorial and peer review. Many authors have gone the extra mile, and further contributed to the peer-review process:

Taruna Gautam – IILM Graduate School of Management, Greater Noida, India

Mihaela Herciu – Lucian Blaga University of Sibiu, Romania

Dirk Holtbrügge – Friedrich-Alexander-University Erlangen-Nürnberg, Germany

Wiboon Kittilaksanawong – Saitama University, Japan

Weizi Li – Henley Business School, University of Reading, UK

Claudia Ogrean – Lucian Blaga University of Sibiu, Romania

Hans Pongratz – TUM Technical University Munich, Germany

Melissa Promes – Ludwig-Maximilians-University and BMW Group, Munich, Germany

H. Raghav Rao – University of Texas, San Antonio, USA

Subrat Sarangi – KIIT School of Management, Bhubaneswar, India

Michael G. Schmitt – ISM International School of Management, Frankfurt, Germany

G. Shainesh – Indian Institute of Management Bangalore, India

Valerie-Laura Wagner – TÜV Rheinland Middle East, United Arab Emirates

As reviewers, they worked hard to ensure the accuracy of facts and the logic of reasoning, improve readability, suggest leads and research references, and, in general, serve as an invaluable second opinion. Sometimes this process was painful, for the reviewers, for the authors, as well as for us editors. There is no right or wrong answer in comparing opinion and subsequent arguments. In fact, such consultations are always to be welcomed in advancing science. And so, we have always enjoyed the fascinating discussions about business transformation, change, and technology, which have leapt forth and back between academics and practitioners, industries, and continents. We are sure that we have all learnt a lot from each other during this process.

The idea for this book developed around a series of editions of the WHU General Management Plus Program. Promoted and led by Rebecca Winkelmann, Managing Director Executive Education at WHU – Otto Beisheim School of Management, these programs are aimed at enhancing general management knowledge in strategy, leadership, finance, change management, and entrepreneurship. To stay ahead of competition, industry leaders need to be able to quickly transform breakthrough ideas into viable business models; the dynamics of today's markets and their increasing pace puts traditional management methods into question. We are extremely proud

to say that both faculty and alumni of these executive education programs have contributed to this handbook as authors.

When we proposed the book's idea to Palgrave Macmillan, we were very fortunate to have Liz Barlow as a Senior Commissioning Editor on our side. We personally met with Liz during the 2015 AIB Academy of International Business Conference in Bangalore (India). She not only helped us to decide on the right publishing format, but her comments and thoughtful additions were invaluable in bringing clarity and balance to the book's structure. Maybe most importantly, she represented the book's idea in Palgrave Macmillan's editorial meetings, and made sure we got the necessary approvals. Thank you, Liz. Without you, this book would not have been possible. Later in the process, Maddie Holder, Assistant Editor at Palgrave Macmillan, effectively (and sometimes mercilessly) pushed us through the publication process so that we keep to all our agreed timelines. As a result, we are proud to say that it took the book no more than 18 months from idea to availability in the bookstores.

Finally, we would like to thank our colleagues at our respective institutions for their help and support. We especially owe an incalculable debt to our life partners and families. Without their unyielding support and endurance, this and many of our other joint projects would not have been possible.

Contents

Part 1	Introduction	1
1	Continuous Business Transformation: What Is It All About? Wolfgang Messner	3
2	Industry Life Cycles as an Underlying Source of Continuous Change Peter Kreutter	19
Part 2	Transformational Shifts	65
3	Lost in Transformation: Strategy Formulation in a Digitized World Nicole Gottschalck and Christina Günther	67
4	An Exponential World: Nature, Patterns, and How to Leverage Them Hans-Martin Hellebrand	95
5	The Effect of Digitalization on the Labor Market Christian Bühner and Christian Hagist	115

6	Outcome-Driven Transformation Adam Bujak and Marcus Esser	139
7	Transformation of Banking Institutions: Comparing Germany and India Michael G. Schmitt and Taruna Gautam	151
Part 3	Achieving Customer Centricity	173
8	The Changing Face of Customer Centricity Rajesh Gaurav and G Shainesh	175
9	Rethinking Client Centricity to Reinvent Business Models Shailesh Chopra and Premkumar Rajendran	189
10	Transforming Product Line Selection Strategy Subrat Sarangi	213
11	Industry 4.0: How to Manage Transformation as the New Normal Thomas Ochs and Ute Riemann	245
12	Digital Transformation in Manufacturing Klaus Holzhauser and Philipp Schalla	273
13	Country-of-origin Effects in a Global Market: The Case of China Dirk Holtbrügge and Annalena Zeier	289
Part 4	Dealing with New Technology	313
14	Customer Integration into Continuous Development of IT-based Services Klaus Brockhoff	315

15	Toward a Safer Tomorrow: Cybersecurity and Critical Infrastructure	335
	Solomon Karchefsky and H. Raghav Rao	
16	Digital Change: How MOOCs Transform the Educational Landscape	353
	Anna Kruse and Hans Pongratz	
17	E-Leadership for SMEs in the Digital Age	375
	Weizi Li, Kecheng Liu, Yinshan Tang, and Maksim Belitski	
18	Digital Transformation of a Swiss Ski Destination	417
	Nils T. Kohle	
19	Internet of Things: Legal Implications for Every Business	435
	Ulrich Bäumer, Sabine von Oelffen, and Miriam Keil	
Part 5	Leading the Change	459
20	Establishing Continuous Change	461
	Erik Strauss, Jürgen Weber, and Susanne Zubler	
21	Organizational Culture: An Additional Perspective to the Balanced Scorecard	495
	Enrico Rühle and Valerie-Laura Wagner	
22	Integrating Holistic Marketing into the Stakeholder Management Approach	513
	Mihaela Herciu and Claudia Ogrean	
23	Corporate Value Creation from Restructuring Through Divestitures	533
	Wiboon Kittilaksanawong	

24	Adapting to Working Environment Change: Effects of Mobility and Flexibility	553
	Melissa Promes	
25	The Changing Role of Leaders for the Digital Age	585
	Peter Boggis, Frank Dannenhauer, and David Trafford	
	Index	599

Notes on the Authors

Ulrich Bäumer is a partner with the international law firm Osborne Clarke. He is a member of the company's Digital Business Group, and also co-heads the India Group. Ulrich drafts and negotiates complex international outsourcing (especially offshoring) contracts, and assists the firm's technology clients in all commercial aspects, including mergers and acquisitions (M&A). He also assists German companies in their legal requirements regarding their international operations. He is a guest lecturer of IT-law at the National Law School India in Bangalore (India), at the University of Cologne (Germany), and also a guest lecturer at WHU – Otto Beisheim School of Management in Vallendar (Germany).

Ulrich has published in academic and practice-oriented law and business journals. He is a sought-after speaker in conferences and workshops organized by agencies like BITKOM and NASSCOM, EUROFORUM, as well as at the ITechLaw conferences held in Europe and India. He was appointed ambassador of India by the city of Cologne.

Ulrich received a Master of Law (LLM) from the George Washington University (USA), and is Attorney at Law (NY).

Maksim Belitski joined the Henley Centre for Entrepreneurship (HCfE) at Henley Business School at the University of Reading (UK) in January 2014 as a Lecturer. Prior to joining Henley, Maksim was a Research Fellow at the Institute for Development Strategies, Indiana University Bloomington (USA) and a Contract Professor of Econometrics at the University of Bolzano (Italy). Previously, he held appointments at Loughborough University (UK), University College London (UK), University of Leicester (UK), University of Economics Bratislava (Slovakia), and Belarusian State University in Minsk (Belarus). During over eight years on the faculty, he has taught courses on entrepreneurship, managerial economics, research methods, quantitative methods for business and finance, econometrics at both undergrad and graduate levels. He holds a Ph.D. in Social Sciences from the University of

Leicester (UK), and another Ph.D. in Economics from the University of Milan (Italy). He is a 'trusted' researcher of the Secure Data Service Data Archive (UK) and Virtual Micro-data Lab, Office of National Statistics (UK). Since 2013, he is a fellow of the Higher Education Academy.

His research interests lie in the area of entrepreneurship, innovation, and regional economics, with a particular focus on entrepreneurship as a spillover of knowledge and creativity.

Peter Boggis is a Founding Partner of Formicio Limited. Prior to co-founding Formicio in 2010, Peter was a Senior Associate of nGenera (formally The Concours Group), a US-based research, management consulting, and executive education company. Before that, Peter was a Vice President at CSC Index where he led the eBusiness practice. Previously, he held senior consulting positions with Ernst & Young and Deloitte. During his consulting career, he advised companies in Europe, North America, South Africa, South-East Asia, and Australasia on all aspects of technology-led transformation across many different industry sectors, including steel, mining, chemicals, pharmaceuticals, financial services, and the automotive finance industry. He has also designed, developed, and delivered experiential learning journeys for executives to gain insights into the organizational capabilities needed to succeed with technology-enabled innovation for business value.

Peter holds an MA in Modern Languages from Cambridge University (UK) and is a qualified Chartered Accountant.

Klaus Brockhoff is Emeritus Professor of Technology and Innovation Management of the University of Kiel (Germany), and an honorary professor of business policy at WHU – Otto Beisheim School of Management in Vallendar (Germany). He is also a member of the board of WHU Foundation and ESC Foundation.

For 35 years, he was a full professor at the University of Kiel and WHU – Otto Beisheim School of Management. He held a number of visiting professorships in Europe and the USA. Among his activities in business firms was the membership of the supervisory board of an IT-provider for state and local governments in Northern Germany. He has been a consultant to various companies and governmental institutions, and he served on supervisory boards and advisory councils of private and public institutions.

He is a member of the German National Academy of Engineering Sciences and the Berlin-Brandenburg Academy of Sciences. Klaus received his doctorate and habilitation degree from the University of Bonn (Germany). He was honored with an honorary doctoral degree by the University of Berne (Switzerland).

Christian Bühner is a research assistant and Ph.D. student at the Chair of Intergenerational Economic Policy at the WHU – Otto Beisheim School of Management (Germany). He studied Economics at the University of Freiburg (Germany), and finished his M.Sc. as best of class in 2014. His studies led him to the University of Gothenburg (Sweden) and the University of Basel

(Switzerland). In his master thesis, which was awarded by the Friedrich August von Hayek Award, he examined the impact of leadership on the health of employees and analyzed the importance of this component with regard to an efficiently designed occupational health management.

Adam Bujak heads Technology Transformation at Capgemini Business Services. In his previous roles as Global Head of Delivery Excellence and SBU Competitiveness and Industrialization Director, Adam has been instrumental to Capgemini's transformation drive. Adam is an innovative and creative strategist with substantial finance and technology acumen. His ability to lead teams on five continents and a successful delivery of change projects yielded him the Delivery Diamond Award from the Capgemini Group CEO and Chairman in the category 'most complex and important projects'. He lived and worked in Germany, Poland, Finland, India, and Australia. He holds a Ph.D. in Strategic Management and a Master's degree in Banking and Finance from Europa Universität Viadrina in Frankfurt/Oder (Germany).

Shailesh Chopra is working for Deutsche Bank as Director in an infrastructure function with regional responsibility. Shailesh has held international managerial positions for several years in electronics, automobile, and banking industries, with work experience in quality management, process engineering, production, works engineering, and sales and marketing. A Master Black Belt in Six Sigma, Shailesh is an experienced trainer, mentor, and coach in areas of efficiency and organizational excellence.

Shailesh has co-authored the best-selling book *Delusion in Organisational Excellence*, published in 2013 by McGraw-Hill. He is an active member in the fields of quality, process, and customer experience.

Shailesh attended leadership trainings from ISB in Hyderabad (India) and ESMT in Berlin (Germany). He completed his MBA from SP Jain Institute of Management and Research in Mumbai (India), and graduated in Electronics and Power Engineering.

Frank Dannenhauer is the founding partner of troisval SA, a Swiss-based consulting firm that advises senior leaders worldwide on organizational development and the management of major transformations, especially in the digital domain. He is also a Senior Associate at Formicio Limited.

Prior to this, Frank was in various senior roles in the pharmaceutical and chemical industry, for example, as Divisional CIO for the pharma business of Merck. Overall, he has over 20 years of experience in managing change and leading people on a global basis.

Frank publishes quarterly viewpoint articles, and has been the co-author of a number of Formicio publications. Frank combines his background in economics with his studies of organizational psychology, for example, his executive Master's degree in Consulting and Coaching for Change from INSEAD in Fontainebleau (France).

Horst Ellermann is Publisher of the *CIO* magazine in Germany, Ambassador for CIOmove in Germany, and moderator of the Hamburger IT Strategietage, one of Germany's most important annual IT-related conferences.

Earlier, Horst was the Editor in Chief of the *CIO* magazine in Germany, in charge of the news department of the magazine *Tomorrow* and for IT-related news at the *Süddeutsche Zeitung*, one of Germany's leading daily newspapers. He publishes the *CIO Yearbook* series (2011–2014, IDG Business Media) about the future of IT; the series also contains IT-related background information from the largest companies in Germany.

Horst obtained his Master of Arts in mass media, political science, and psychology from the Free University of Berlin (Germany), and also studied statistics at the University of Essex (UK).

Marcus Esser is in charge of Global Technology Innovation at Capgemini Business Services. Applying the CD&E (Concept Development & Experimentation) process in their Innovation Labs located at key Business Services delivery locations across Asia, Europe, and the Americas, Marcus and his team help drive customers' service delivery improvement with groundbreaking technology concepts and solutions. This includes the global introduction of Artificial Intelligence (AI)/Robotic Process Automation (RPA), analytics/big data, cloud-based Software as a Service (SaaS), OpenSource (OS), and thin clients. Since joining Capgemini in 2006, Marcus has held a variety of technology roles with both Business Services and Consulting.

Prior to that, he worked for the Defense Industry setting up and operating Innovation Labs with pioneering results. Marcus holds a Ph.D. in Physics from the University of Twente (Netherlands).

Rajesh Gaurav is a research assistant at the Indian Institute of Management Bangalore (IIM-B, India). He works on Data Analytics-related research, and consulting projects at IIM-B.

Prior to joining IIM-B, Rajesh had 13 years of industry experience in various data management projects. He has worked in various roles such as practice lead, architect, consultant, and project manager in companies such as NxtGen and Infosys (India and USA). He is passionate about deriving intelligence from data, and has experience in analytics, business intelligence, data warehouses, and databases.

Rajesh has completed his B.Tech. from the Indian Institute of Technology Kharagpur (India) and PGPX from MYRA School of Business in Mysore (India).

Taruna Gautam has an experience of almost 17 years in academics and research. She is a Professor in the area of Economics and International Business at IILM in Greater Noida, New Delhi NCR (India). She is currently working as a Program Director for IILM's Post Graduate Management Program. She is a postgraduate in Economics, MBA in International Business, and Qualified National Eligibility Test for Lectureship. She was awarded with her Ph.D. in International Business in 2007 from the Department of Economics, Rajasthan University in Jaipur (India). During her

career, she has handled various responsibilities ranging from teaching, accreditations, research, and program administration. She has conducted and designed various courses for postgraduate management programs which include managerial economics, macro-economics, business environment, international business, foreign trade procedures, and corporate governance. She has a good exposure of incorporating case teaching pedagogy in her courses. Her research interest includes development economics and international trade-related issues. She has worked with National Institute of Agricultural Marketing, a central government organization at Jaipur, as a research associate handling government-sponsored projects in agricultural marketing. Since then, she has been associated with management institutions, as faculty in the area of economics and international business. She has published four cases and several research papers in national and international journals. Having organized several national and international conferences, she has also edited conference proceedings. Currently, she is actively looking forward toward associating with industry for preparing case studies which can be incorporated into the curriculum.

Nicole Gottschalck is a research assistant and doctoral student at the IHK-Chair of Small and Medium-Sized Enterprises at WHU – Otto Beisheim School of Management (Germany). She started her Ph.D. in the field of Industrial and Corporate Change in the beginning of 2015. Following studies at the University of Gießen (Germany) and University of Bristol (UK), Nicole obtained two Master's degrees. For her Master's degree in International Relations and European Studies at the Centre International de Formation Européenne across the cities of Istanbul (Turkey), Nice (France), and Berlin (Germany), she was rewarded with *summa cum laude* and the title of *Chargé de mission en organisations européennes et internationales*. She finalized her postgraduate studies in European Studies with distinction at the University of Leipzig (Germany).

Christina Günther studied international economics at the Universiteit Maastricht (Netherlands) before she joined the Max Planck Institute of Economics in Jena (Germany) as a research fellow. In her Ph.D. thesis, she explored innovative capacities and competitiveness within the showcase industry of the German *Mittelstand*. She completed her doctorate at the University of Jena in 2009.

In her current research projects, she investigates the challenges in growth processes of small and medium-sized enterprises as well as the relationship between ownership structure, location, innovation activity, and competitiveness. From 2010 to 2014, Christina worked as assistant professor for Industrial Organization and Economics of Innovation at the WHU – Otto Beisheim School of Management (Germany). Since April 2014, she holds the IHK-Chair of Small and Medium-Sized Enterprises. As part of her academic career, she spent several months at the Universitat Pompeu Fabra in Barcelona (Spain) and the ITESM Instituto Tecnológico y de Estudios Superiores de Monterrey (Mexico). For her research, she has been honored with numerous awards internationally. Christina is a member of the Executive Board of the Academy of

Management, Entrepreneurship Division. She has worked for numerous scientific conferences and journals as a reviewer and as an academic consultant.

Christian Hagist is the chairholder for Intergenerational Economic Policy at WHU – Otto Beisheim School of Management (Germany). The chair is endowed by the German Association of Family Business Owners *Die Familienunternehmer*. In addition, he is also Academic Director of the Wipro Center for Business Resilience at WHU.

Christian has provided testimony to the German Bundestag and the Landtag (state congress) of North Rhine-Westphalia on several occasions. Furthermore, he has written several reports concerning topics like fiscal sustainability, health care, and pension reform for companies, business associations, and political institutions. Christian's research focuses on public finance and social and economic policy. He has published in national and international academic journals while also addressing practitioners and politicians in transfer journals.

Christian received his Diploma in Economics after studying at the University of Freiburg (Germany) and UW-Madison in Wisconsin (USA) in 2003. Afterward he became a Ph.D. student/researcher at the Research Center for Generational Contracts, University of Freiburg (Germany), and a Visiting Scholar at Boston University (USA), where he worked together with Laurence J. Kotlikoff. In 2007, he received his doctorate which was supervised by Bernd Raffelhüschen, and awarded with the Friedrich August von Hayek Award. Furthermore, Christian received the Walter Eucken Award for his postdoctoral studies by the University of Jena (Germany). In 2012, he obtained the *venia legendi* in Economics from the University of Freiburg. During his postdoc studies, he visited the University of Bergen (Norway) as a visiting scholar several times and taught at the Université XII at Paris (France).

Hans-Martin Hellebrand fosters innovation and collaborative activities at RWE's innovation center in Silicon Valley. In early 2015, he and four other senior executives founded this innovation hub in California, focusing on business model innovation and generating business for RWE in the USA. In the course of this mission, Hans-Martin's specialty has been data-driven business models, advanced analytics, eMobility, and solar.

Hans-Martin's career has always been at the intersection of IT and financial steering. Before settling in Silicon Valley, he headed RWE's group-wide IT-controlling and led several projects, ranging from business intelligence system implementations for complex outsourcing and offshoring projects to cost-saving projects with an annual bottom-line impact worth hundreds of millions of Euros. Furthermore, he acted as chief financial officer of RWE's Hungarian IT subsidiary in 2011 and 2012.

Due to his broad and deep expertise in the IT-controlling segment, Hans-Martin's publications and speeches at various conferences have been mainly around IT steering models and intercompany IT-charging optimization. With his personal development toward innovation and the associated move to Silicon Valley, he has started publishing about innovation, start-up culture, and the Silicon Valley ecosystem.

Hans-Martin holds a first-class Master's degree in business administration and graduated as valedictorian in his graduating class (2006) at the University of Bielefeld (Germany). Furthermore, he successfully accomplished various high-class international leadership and innovation programs.

Mihaela Herciu is Professor of Financial Management, Comparative Management, and Financial Analysis at Lucian Blaga University of Sibiu (Romania), Faculty of Economic Sciences.

After graduating in 1999, she has been working at the Faculty of Economic Sciences, Lucian Blaga University of Sibiu, achieving great experience in teaching, and practical skills in financial management field.

Mihaela has an active research agenda which focuses on the development of financial management and analysis, competitiveness, and business simulations. She has published articles in international and national journals such as *Management Decision*, *Journal of Business Economics and Management*, *Global Business and Economics Review*, and *Romanian Journal of Economic Forecasting*; co-written chapters in important books like *A dynamic model for the Global corporation: the triad network-coevolution-competitiveness in Global Enterprise Management* (Palgrave Macmillan, 2015, edited by Angelo Camillo) and *Strategic management between the constraints and incentives of globalization – the role and contribution of business ethics and corporate social responsibility* in *The Economic Geography of Globalization* (InTech, 2011, edited by Piotr Pachura); participated with scientific paper at more than 30 international and national conferences. She is member of European Academy of Management, Academy of Management (USA), and Financial Management Association; reviewer for journals and conferences; and co-editor in chief of *Studies in Business and Economics Journal*.

Mihaela received her Ph.D. in Management from Lucian Blaga University of Sibiu (Romania) in 2013. She also graduated a Postdoctoral School at the Romanian Academy in 2013.

Dirk Holtbrügge is Professor of International Management (Head of Department) at the School of Business and Economics, Friedrich-Alexander-University Erlangen-Nürnberg (Germany). His main research interests are in the areas of international management, human resource management, and management in emerging markets. He has published 7 books, 8 edited volumes, and more than 70 articles in refereed journals such as *Academy of Management Learning & Education*, *Asian Business & Management*, *Business Strategy and the Environment*, *European Journal of International Management*, *European Management Journal*, *Human Resource Management*, *International Business Review*, *International Journal of Cross Cultural Management*, *International Journal of Emerging Markets*, *International Journal of Human Resource Management*, *Journal of Business Ethics*, *Journal of East European Management Studies*, *Journal of International Business Studies*, *Journal of International Management*, *Journal of Global Marketing*, *Journal of Product Innovation Management*, *Management International Review*, and *Thunderbird International Business Review*. He is also a member of the editorial boards of *International Journal of Cross Cultural Management*,

Journal for East-European Management Studies, *Management International Review*, and *Managementforschung*. The research-related ranking of the newspaper *Handelsblatt* lists him regularly as one of the top-100 professors of business administration in Germany, Austria, and the German-speaking Switzerland. He has large experience in executive education, and works as a consultant for firms in Germany and abroad.

Klaus Holzhauser is Managing Director of PAC Germany. Prior to joining PAC in September 2006, Klaus had worked in the Software and IT Services industry since 1994. He was account manager at Unilog-Integrata in Munich (Germany); he was manager of the Outsourcing Division at Deloitte in Munich, and earlier he was in charge of sales at IZB in Munich.

Klaus covers application management as well as consulting and systems integration and is head of PAC's manufacturing research, with a personal focus on automotive as well as nearshore and offshore research. His expertise also includes Industry 4.0 and the Internet of Things. Moreover, he is involved in strategic consulting projects for IT providers, sourcing advisory services, and M&A projects.

Klaus obtained a Master's degree in Business Administration, with a specialization in Organization and Informatics, from Regensburg University of Applied Sciences in Regensburg (Germany).

Solomon Karchefsky is an alumnus of the University at Buffalo, the State University of New York (USA). Prior to graduate school, Solomon has worked in the areas of IT customer support, system administration, and cybersecurity risk management. He has participated in numerous projects in the areas of compliance, vendor risk, and project research. Solomon regularly attends cybersecurity conferences and participates in cyber-defense competitions, most notably of which was the Northeast Collegiate Cyber Defense Competition of 2015, where he captained the team from the University at Buffalo.

Miriam Keil is currently trainee at the Higher Regional Court in Cologne (Germany) and will be completing her legal traineeship by the beginning of 2016. She was a legal trainee in the IT-Team at Osborne Clarke in 2014/2015.

Miriam studied German and French law in Cologne and Paris (2004–2008). Having passed her First State Exam, she spent six months at National Law School of India, Bangalore (2010/2011). During her doctorate (2011–2014), she worked as a research assistant at the University of Cologne.

Miriam holds a doctoral degree from the University of Cologne. She also holds a Master of Law (LLM) and a French degree (maîtrise) from the Universities of Cologne and Paris I (Panthéon Sorbonne).

Wiboon Kittilaksanawong is Professor of Strategy and International Business in the Graduate School of Humanities and Social Sciences, Faculty of Economics, Saitama University (Japan).

Prior to joining the faculty at Saitama University, Wiboon worked for five years as a professor at Nagoya University of Commerce and Business (Japan), Zhejiang

University (China), and Zhejiang Gongshang University (China). He worked for 12 years in management, engineering, and consulting positions with Chevron, Weatherford, Mitsubishi Heavy Industries, Palmer and Turner, and Thailand National Science and Technology Development Agency.

His research interests include global business and strategy, business strategies in emerging markets, and international entrepreneurship. Wiboon is a principal investigator of research projects funded by the Japan Society for the Promotion of Science and the Zhejiang Provincial Natural Science Foundation of China. He has published research articles in *Management and Organization Review*, *Asian Journal of Technology Innovation*, *International Journal of Emerging Markets*, *International Finance Review*, and *Academy of Management Proceedings*, and business cases with Richard Ivey School of Business, and Harvard Business School.

Wiboon received Ph.D. in Management from National Taiwan University (Taiwan). He was a visiting researcher in the European Union's Erasmus Mundus Program at Lund University (Sweden) and the Lee Hysan Visiting Scholar Scheme at The Chinese University of Hong Kong. He obtained a B.Eng. (Electrical Engineering) from Chulalongkorn University (Thailand), an M.Sc. (Economics) from Kasetsart University (Thailand), and an MBA from Thammasat University (Thailand).

Nils T. Kohle is founder and chief digital strategist at Prantos digital GmbH, based in Hamburg (Germany). His focus is on medium-sized companies throughout Europe, strategically advising them to transform their existing business into a new digitally based business model to open up new revenue streams for their future.

He is invested in several digital start-up companies and a member of the development board of the Oxford University's Mindfulness Centre. Prior to that, he founded several companies in the speech recognition and digital technology area, some of them highly funded with venture capital. The most recent one of them, a 96-employee strong digital marketing agency, was sold to a 750-people strong technology company in 2012.

He started his career in investment banking after studying European Finance and Accounting in Leeds (UK) and Bremen (Germany). He is currently pursuing a two-year Executive MBA education at Kellogg-WHU. His master thesis with the title *Keys to Success for Disruptive Digital Business Models Entering an Existing Market—Framework, Analysis, Strategy—and the Implications on a New Venture in the German Real Estate Market* was recently graded with excellent (1.0) by the well-known Chicago-based marketing professor Timothy Calkins.

The project described in his article at Saas-Fee/Saastal has been one of his most recent assignments in digital business transformation.

Peter Kreutter is Director of the WHU Foundation in Vallendar and Managing Director of the Wipro Center for Business Resilience at WHU – Otto Beisheim School of Management in Düsseldorf (Germany). He is also a member of the board of trustees of the CIO Foundation.

Before joining WHU in 2007, Peter spent more than a decade in the banking and consulting industry. He started his career as a relationship banker at Deutsche Bank's Corporate and Real Estate Division; later, he joined Sal. Oppenheim jr. & Cie.'s Investment Banking Division, where he advised technology, IT, and professional services firms on capital market, takeover, and market entry strategies. He also worked several years in the field of management and strategy consulting for a BCG spin-off.

Peter's academic work is based on a stream of research around the pioneering theories of Carnegie Mellon's Steven Klepper and the system theoretical approaches of Nuremberg's Werner Pfeiffer. He is co-editor of the handbook *Globalization of Professional Services* (Springer, 2012; with Ulrich Bäumer and Wolfgang Messner).

Peter studied Business Administration at the Friedrich Alexander University of Erlangen-Nuremberg (Germany) and Political Science at Trinity College Dublin (Ireland). He received his Doctorate in Business Administration from WHU – Otto Beisheim School of Management (Germany). He earned his CFA charter from the CFA Institute. He attended various certificate and executive education programs, including the DSA Deutsche Stiftungsakademie (Germany) and Harvard Business School (USA).

Anna Kruse is an eLearning Specialist at the TUM in Munich (Germany), where she is responsible for the coordination and development of TUM's MOOC presence.

From 2009 to 2015, she worked at the Center for New Designs in Learning and Scholarship at Georgetown University (USA), where she worked closely with faculty to enhance learning in their courses through engagement strategies that make the most of technology. During that time, from 2013 to 2015, Anna managed both the Initiative on Technology-Enhanced Learning and GeorgetownX, Georgetown's MOOC presence. Her projects have ranged widely from content development for digital learning environments and writing to managing programs and developing strategic communication plans.

She is co-author of the articles *From Planning to Launching MOOCs* (Springer, 2014) and *Linguistic Analysis and Cognitive Presence* (LACE, forthcoming), and previously presented on technology-enabled teaching at conferences around the USA, including Georgetown University's annual teaching symposium (TLISI), the EDUCAUSE Mid-Atlantic Regional Conference in 2014, and the EDUCAUSE Learning Initiative (ELI) Annual Conference in 2012.

Anna received her MA in English from Georgetown University (USA) in 2009.

Weizi Li is Lecturer in Business Informatics at the Informatics Research Centre (IRC), University of Reading (UK). Before she joined IRC, she was a system and policy analyst in Betsi Cadwaladr University Health Board (BCUHB). Weizi obtained her Ph.D. in Beijing Institute of Technology (China). She has been engaged in research in organizational semiotics since her Ph.D. when she applied semiotics in enterprise architecture research of systems for digital hospitals. Her research focuses on the integration between business processes and information systems. She currently

works on the European project of *LEAD – e-Leadership Skills: for Small and Medium Sized Enterprises* develops targeted actions for start-ups and fast-growing SMEs to provide them with relevant e-leadership skills.

Kecheng Liu Fellow of British Computer Society, is a full professor and holds a chair of Informatics and E-Business in Henley Business School, University of Reading (UK). During his academic career in British universities for more than 20 years, he has taught courses on business informatics, strategic information management, and information systems at undergraduate and postgraduate levels, including MBA and EMBA.

As an internationally renowned scholar in organizational semiotics and business informatics, 50 Ph.D. students have graduated under his supervision. His research interests and publications span from organizational semiotics, requirements studies, enterprise information systems management and engineering, business processing modelling, business-IT alignment, co-design of business and IT systems, pervasive informatics, and intelligent spaces for working and living. Kecheng is Head of Business Informatics, Systems and Accounting, and Director of the IRC in the Henley Business School.

Wolfgang Messner is Clinical Associate Professor at the Darla Moore School of Business, University of South Carolina (USA), and Director of GloBus Research. He was Professor of International Management at MYRA School of Business in Mysore (India) till 2016. He has also taught as Adjunct and Visiting Faculty at the Indian Institutes of Management Bangalore, Indore, and Kozhikode (India), Royal Docks Business School at the University of East London (UK), University of Würzburg (Germany), and WHU – Otto Beisheim School of Management (Germany).

Prior to joining academia, Wolfgang worked for 18 years in senior positions with Deutsche Bank, The Information Management Group (IMG), BMW Group, and Capgemini in Europe and India. He has consulted, led programs, and provided executive leadership trainings in big multinationals like BMW, Capgemini, Commerzbank, Credit Suisse, Deutsche Bank, Ericsson, Hitachi, Infosys, McKinsey, Microsoft, Siemens, and many highly successful mid-caps across industry verticals in Europe and India.

Wolfgang has an active research agenda which focuses on the challenges and needs of practitioners in international management; he has published in *Banking and Information Technology*, *Business Information Review*, *IIMB Management Review*, *International Journal of Managing Projects in Business*, *International Journal of Sociology and Social Policy*, *Journal of Indian Business Research*, *South Asian Journal of Global Business Research*, and *The Marketing Review*. He has written seven books, most recently *Winning the Right Job* (Pan Macmillan, 2015; co-authored with Pratibha Messner), *Making the Compelling Business Case* (Palgrave Macmillan, 2013), and *Globalization of Professional Services* (Springer, 2012; co-edited with Ulrich Bäumer and Peter Kreutter).

Wolfgang received his Doctorate in Marketing from the University of Kassel (Germany), and his MBA with distinction from the University of Wales (UK). Prior to this, he obtained a first-class Master's degree in Informatics after studies at the TUM in Munich (Germany) and the University of Newcastle upon Tyne (UK); he also spent time at the Università per Stranieri di Perugia (Italy), and attended executive education at Harvard Business School (USA).

Thomas Ochs gained a Master's degree in business administration and is certified as a global business transformation manager. After starting his business career as an SAP in-house application consultant at international companies such as Robert Bosch and Mannesmann, he is the CIO of the Villeroy & Boch Group since 1999.

Coming from a highly fragmented IT system landscape at Villeroy & Boch, Thomas formed a globally harmonized and integrated process and IT application landscape. In this role of the corporate CIO, Thomas focuses both on the harmonization of business processes and organizational change in the context of reorganizing country-specific IT departments into a global end-to-end IT setup.

In parallel, he established a cooperation with Rödl & Partner, an international consultancy, in the area of data center operation and provisioning of IT consulting service. It is in this cooperation he took over the role of a managing director.

In the past few years, the entire topic of digitalization becomes a key responsibility for Thomas where he drives the business transformation within Villeroy & Boch covering all aspect from a flexible IT landscape, agile processes toward new organizational structures such as the concept of trend scouts.

Thomas is also Assistant Professor of Computer Science teaching e-business and Enterprise Resource Planning at the Saarland University of Applied Science (Germany).

Claudia Ogrean is Professor of Strategic Management, Business Ethics, and Corporate Social Responsibility, and Organizational Behavior at Lucian Blaga University of Sibiu (Romania), Faculty of Economic Sciences.

Claudia has an active research agenda which focuses on strategy and strategic management, international competitiveness, business ethics, and corporate social responsibility. She has published in international and national academic journals, such as *Management Decision*, *Journal of Business Economics and Management*, *Global Business and Economics Review*, and *Romanian Journal of Economic Forecasting*. She has co-written chapters in international book projects, such as *A dynamic model for the Global corporation: the triad network-coevolution-competitiveness in Global Enterprise Management* (Palgrave Macmillan 2015, edited by Angelo Camillo) and *Strategic management between the constraints and incentives of globalization – the role and contribution of business ethics and corporate social responsibility* in *The Economic Geography of Globalization* (InTech 2011, edited by Piotr Pachura). She has presented papers at more than 40 international and national scientific conferences and workshops. She is a member of the Academy of International Business, European Academy of Management, Academy of Management (USA); she is a reviewer for

international journals (*Management Decision*, *Journal of Strategy and Management*, *Economic Research*) and conferences (The 2015 AIB Annual Conference, EIBA 2015 Conference) and co-editor in chief of *Studies in Business and Economics Journal*.

Claudia received her Doctorate in Management from the Lucian Blaga University of Sibiu (Romania) in 2002. She also graduated a Postdoctoral School at the Romanian Academy in 2012.

Hans Pongratz is Senior Vice President for IT-Systems and Services and the Chief Information Officer (CIO) of the TUM in Munich (Germany).

He worked as journalist at FOCUS Online and as technical consultant at Hewlett-Packard; he gained international experiences after his studies during a stay abroad at Siemens Corporate Research (SCR) before he returned to TUM as scientific assistant in 2005. Since 2005 he has worked in different positions and projects at TUM, and since 2010 he has the overall responsibility of Campus Management TUM and is Head of the unit Campus-Management Team. In 2011, Hans Pongratz was elected Senior Vice President IT-Systems and Services and CIO at TUM, and is responsible for the consequent implementation of the IT-Strategy Digital University at TUM. He is member of several program committees (e.g., Virtual University of Bavaria vhb), boards, reviewer groups, and member of the Advisory Board of CIONET Germany.

He is author of several academic and practitioner-oriented articles and book editor. Hans is a featured speaker at national and international conferences and workshops organized by agencies like EDUCAUSE, EUNIS, GI, DFN, ZKI, Allianz für Cyber-Sicherheit, and Hochschulforum Digitalisierung.

Hans studied computer sciences and economics (Master's degree) at TUM.

Melissa Promes earned her Ph.D. at the Department of Educational Sciences at Ludwig-Maximilians-University (LMU) in Munich (Germany), in combination with the BMW Group in Munich, where she conducted her research on change management and organizational learning in new working environments.

Melissa is currently working at the BMW Group in facility management, where she specializes in change management in various new working environment projects. She has also previously worked at Allianz SE in Munich in the talent management and talent development department, as well as at Deutsche Post Adress in the international business unit sector located in Munich.

Melissa wrote her dissertation on the topic of change management and organizational learning in new working environments.

Before her acceptance into the doctoral program at the BMW Group, Melissa obtained her Bachelor of Arts in Psychology at California State University Chico (USA) before moving to Germany to pursue a Master of Arts degree in the Psychology of Excellence in Business and Education program at LMU.

Premkumar Rajendran is Vice President and Regional Operations Manager in Global Cash Operations with the Asia Pacific Head Office of Deutsche Bank AG in Singapore.

Premkumar has been with Deutsche Bank for 19 years in a variety of roles in Operations, Quality, Sourcing, and Technology functions in India, Germany, and Singapore. His roles have included leading globally distributed teams in large change management initiatives, and managing relationships with global technology vendors. Prior to joining Deutsche Bank, Premkumar has worked in the Technology departments of Bharat Heavy Electricals Limited (a heavy engineering firm) and Steel Authority of India Limited (a steel manufacturing firm) in India.

Premkumar has received his MBA from Ashridge (UK) and Bachelor of Engineering (Honors) degree in Computer Engineering from Thiagarajar College of Engineering (Madurai, India). He has also obtained a Specialist Diploma in Compliance from the University of Manchester (UK).

H. Raghav Rao is the AT&T Chair Professor of Information Systems and Cybersecurity at the University of Texas, San Antonio (USA). Earlier, he was a SUNY Distinguished Service Professor of MIS at UB (USA). Raghav has published over 150 archival articles. His area of specialization is Information Assurance.

Ute Riemann gained a Master's degree in Computer Science, and an MBA from the University of Cologne (Germany). Additionally, she participated at a management training at the University of St. Gallen (Switzerland). Before becoming a business principal consultant at SAP, she started her career as a consultant for IT systems and worked for several international companies such as T-Systems, Kurt Salmon Associates, and Giesecke & Devrient, where she lead teams acting on process optimization and implementation.

Within SAP, she is in the Department of Business Transformation focusing on large transition projects supporting the company's strategy and the achievement of defined targets. In this role, she is responsible to successfully manage transformation and cloud-related projects, especially in the light of digitalization.

Ute is certified as global business transformation manager, and published articles with a strong focus on process and change management. Her main interest is in the definition of appropriate change management mechanisms that are comprehensive enough to address the change requirements within the transformation environment, for example, while combining change management and design thinking concepts. Ute is also a lecturer on Organizational Change Management.

Enrico Rühle is Member of the Board for Festo Didactic SE, and operates from Germany.

Prior to Festo, he worked as Executive Vice President for the Business Unit Academy and Life Care of TÜV Rheinland Group. Before he returned to Germany in December 2014, Enrico Rühle was, for more than seven years, CEO South Asia of TÜV Rheinland Group located in Bangalore (India). He also worked for more than ten years in Japan, Taiwan, Philippines, and the USA.

Enrico Rühle holds a degree in Electrical Engineering from the University of Applied Sciences Mittweida (Germany), and an MBA from six European busi-

ness schools (EURO*MBA) after studies at HHL Leipzig Graduate School of Management (Germany).

Subrat Sarangi is Associate Professor of Marketing at KIIT School of Management in Bhubaneswar (India), and a visiting faculty at XLRI, Jamshedpur (India) and XIM, Bhubaneswar.

Prior to joining academics in 2012, Subrat worked for more than 15 years with the likes of IBM Business Consulting Services, Wipro Consulting, iGATE-Patni, Avalon Consulting, Beroe Inc., and Jindal Steel and Power Ltd., in various capacities. Prior to joining KIIT University, he was Vice President at Beroe Inc. and was the Director, Consulting at iGATE-Patni. As a consultant, Subrat has been engaged in advisory capacity in corporate strategy, growth strategy, market entry strategy, process optimization and performance improvement, business due diligence, and outsourcing assessment. Some of his clients include Toyota Motors, Johnson Diversey, Hindustan Unilever, Tata Chemicals, Tata Steel, Ciena Corporation, Ashok Leyland, Ministry of Commerce (Sultanate of Oman), Merck, Kraft Foods, and Pitney Bowes, to name a few.

Subrat's research interests include business transformation and optimization with a multi-domain perspective and quantitative orientation. He has published papers in Taylor & Francis, *Transnational Marketing Journal* (Transnational Press, London), business case with Richard Ivey Publishing, and book chapters with Erich, Schmidt &Verlag, and Macmillan Publications, to name a few. He has been an invited speaker at workshops and conferences organized by FICCI, Operations Research Society of India, and various leading business schools. Subrat is also a 'mentor' at the Technology Business Incubator, KIIT University under the National Science & Technology Entrepreneurship Development Board (NSTEDB), Department of Science and Technology (DST), Government of India.

Subrat is a Mechanical Engineer from Government College of Engineering, Trivandrum (Kerala University), and received his PGDM degree from XIM, Bhubaneswar. He is currently pursuing fellow program from XLRI, Jamshedpur, in the area of Marketing Strategy; he is at an advance stage of his dissertation work.

Philipp Schalla is Senior Consultant—IoT and Engineering Services at PAC Germany.

Prior to joining PAC in 2008, Philipp worked as Process Consultant for International IT Spare Parts Logistics at Siemens IT Solutions and Services in Munich (Germany).

Philipp's main responsibilities include the Austrian software and IT services industry as well as the market for scientific, industrial, and embedded IT (STIE) systems in Germany. Furthermore, he focuses on application management, business application software, Industry 4.0, and the Internet of Things. He is also involved in marketing and strategic consulting projects.

Philipp obtained a Master of Science degree in Information Systems and Management from the University of Applied Sciences in Munich (Germany), and a

Bachelor of Science degree in Business Information Systems from the University of Applied Sciences in Ingolstadt (Germany).

Michael G. Schmitt received his Ph.D. in 2012 from WHU – Otto Beisheim School of Management (Germany). Following a professorship at Hochschule für Internationales Management Heidelberg, he is now a Professor of Financial Management at ISM – International School of Management in Frankfurt (Germany). The ISM ranks among Germany's leading private business schools, and continually places in the forefront of all applicable university rankings. At the state-recognized, non-profit private university, tomorrow's leaders are trained in compact and practice-relevant degree programs that prepare them to work in international business enterprises. The ISM has campuses in Dortmund, Frankfurt/Main, Munich, Hamburg, and Cologne and offers an integrated semesters of study abroad and international modules at one of over 170 partner universities of the ISM.

Michael's research interest focuses on M&A as well as sustainability issues in finance. He has published in leading international journals and is a reviewer for the journal *Business Research*. Further, he is the coordinator for the United Nation's Principles of Responsible Management Education (PRME) initiative at ISM.

Prior to his academic career, Michael has worked for PwC, KPMG, as well as private bank Sal. Oppenheim jr. & Cie.

G Shainesh is Professor of Marketing at the Indian Institute of Management Bangalore (IIM-B, India). His research focus on customer relationship management, services marketing, and service innovations. At IIM-B, he leads the cross-functional research initiative on consumer insights.

He has over two decades of research and teaching experience in India and abroad. He has conducted research and teaching assignments at the Goteborg University (Sweden), University of St. Gallen (Switzerland), Audencia Nantes and IESEG (France), Vienna University and MCI Innsbruck (Austria), Bocconi University (Milan), Curtin University of Technology (Perth), and the American University of Armenia (Yerevan).

His book titled *Customer Relationship Management – A Strategic Perspective* (Macmillan India) is a prescribed textbook for CRM courses at several business schools. He is also the co-author of a book on CRM titled *Customer Relationship Management – Emerging Concepts, Tools and Applications* (15th Reprint 2011, Tata McGraw Hill). His papers on services and relationship marketing have been published in the *MIS Quarterly*, *Journal of Service Research*, *Journal of International Marketing*, *International Journal of Bank Marketing*, *International Journal of Retail and Distribution Management*, *International Journal of Technology Management*, *Journal of Relationship Marketing*, *International Marketing Review*, *Revue Francais du Marketing*, *Journal on Marketing & Communication*, *Vikalpa*, and *IIMB Management Review*.

Shainesh received his Doctorate (Fellowship) from the Indian Institute of Management Bangalore (India). Prior to that, he obtained his Bachelor in Technology from Indian School of Mines, Dhanbad (India).

Erik Strauss studied Business Administration at the Catholic University of Eichstätt-Ingolstadt (Germany) before earning his doctorate and habilitation at the WHU – Otto Beisheim School of Management (Germany). In 2014, he was appointed as a professor at Witten/Herdecke University (Germany).

During his time at WHU, Erik was the managing director of the Center for Controlling and Management (CCM), a collaboration with partners from leading companies, most of which are listed in the DAX 30 index. Currently, he serves as program director of the bachelor program and is a member of the faculty board at Witten/Herdecke University.

Erik's research focuses on management accounting and control change, organizational routines, and the influence of new technologies on management accounting and control. His research is primarily based on qualitative single case studies.

He is a member of the Editorial Board of *Qualitative Research in Accounting and Management* (QRAM) and serves as reviewer for *European Accounting Research* (EAR), *Journal of Management Control*, *Management Accounting Research* (MAR), and *Organization Science*.

Yinshan Tang is Professor of Management Informatics and Vice Dean of Henley Business School, University of Reading (UK). He received his Ph.D. from Imperial College London (UK) in 1994 in Biology. After obtaining his M.Sc. degree in Computer Science in 2000, he started to work for a business consulting company as one of the senior management team members. He joined the University of Reading in 2004 as the deputy director of IRC. His current research interests include management theories, strategic management, knowledge management, and management ecosystems. He uses multi-disciplinary approach to examine management theories and practices based on his knowledge in biology and ecology. He teaches IT project management, research methods, applied informatics, organization design, and performance management at postgraduate level.

David Trafford is founding partner and Managing Director of Formicio Limited, a UK-based consultancy that provides thought leadership and thought partnership on all aspects of assessing, developing, and operationalizing strategy.

Prior to forming Formicio in 2010, David was Executive Vice President and European Managing Director of nGenera (formally The Concours Group), a US-based research, management consultancy, and executive education business. Before that David was a Principal Consultant at CSC Index where he was responsible for developing client capability in business reengineering. In 1987, David was a founding director of the Cranfield IT Institute, a privately funded organization aimed at helping organizations gain competitive advantage from information and communications technology (ITC). From 1981 to 1987, David was a Senior

Research Fellow at Cranfield University funded by the Royal Commission for the Great Exhibition of 1851.

During his academic and consulting career, he has advised companies in China, Australia, South Africa, Singapore, USA, and Europe on all aspects of technology-led transformation.

David has a B.Sc. in Electrical Engineering from Staffordshire University (UK), and a Ph.D. in IT Systems Design from Kingston University (UK). He is a Fellow of the Institution of Engineering and Technology.

Sabine von Oelffen is an associate at the international law firm Osborne Clarke. She is a member of the Digital Business Group at Osborne Clarke. Sabine drafts and negotiates complex international outsourcing (especially offshoring) contracts and assists the technology clients of the firm throughout the whole life cycle of IT-projects. Sabine is a co-lecturer (IT-Law) at the WHU – Otto Beisheim School of Management in Vallendar (Germany). Before joining Osborne Clarke, Sabine trained with an IP Team of an international law firm and with the legal department of a large German DAX company. Sabine also taught legal classes in Civil Law, Tax Law, and Labour Law at institutions offering adult vocational training for more than five years.

Sabine holds a doctoral degree in Law of LMU Munich (Germany) and a Master of Law LLM of King's College London (UK).

Valerie-Laura Wagner is Head of Strategic Projects at TÜV Rheinland Middle East, a subsidiary of TÜV Rheinland Group, operating in the UAE, where she takes the lead on new service and strategy development projects.

As a fresh graduate, she joined TÜV Rheinland at its Indian operations in 2013 as Executive Assistant to the Managing Director, where she developed a framework for the corporate strategy and was responsible of the successful strategy implementation.

Valerie Wagner has studied International Management (B.Sc.) at the University of Applied Sciences in Karlsruhe (Germany), and also holds a First Class Bachelor of Honors degree in Business Administration from the University of Staffordshire (UK).

Jürgen Weber studied Business Administration at the University of Göttingen (Germany) before earning his doctorate at the University of Dortmund (Germany). In 1986, he was appointed professor at the University of Erlangen-Nürnberg (Germany). In the same year, he accepted a call to the Chair of Business Administration, especially Financial and Management Accounting, of WHU – Otto Beisheim School of Management in Vallendar (Germany).

During his time at WHU, Jürgen headed the Kühne Center for Logistics Management, the Arthur Andersen Center for Accounting and Tax Law, and the CCM—a collaboration with partners from leading companies, most of which are listed in the DAX 30 index.

Previous academic appointments include service as Dean, several appointments as Associate Dean, Chair of the Doctoral committee, Chair of the Board of Examiners, and Academic Director of the Bachelor Program.

In 2008, Jürgen founded the Institute of Management Accounting and Control of WHU together with his alumnus Utz Schäffer. The Institute combines the numerous teaching and research activities of the professors and their doctoral students and also maintains close links with partners in science and industry. Practice-based activities include the WHU Contoller Panel, founded in 2007, which has around 1000 active members and provides empirical insights into the development of controlling.

His work also focuses on management and control in public institutions. Together with alumnus Bernhard Hirsch, he currently heads the Working Group on Management and Control in Public Institutions, which brings together around 20 large organizations and aims to develop and implement ideas for new public management and controlling.

Jürgen declined calls to the University of Mainz (Germany), Vienna University of Economics and Business (Austria), and Technische Universität Darmstadt (Germany). He was awarded an honorary doctorate from the EBS Business School in Oestrich-Winkel (Germany) in 2006. To date, he has successfully supervised well over 100 doctoral dissertations and 11 habilitations. His alumni include many professors at universities and universities of applied science, company founders, and CEOs of medium and large enterprises.

He is Chair of the Board of Trustees of the International Contoller Association (ICV), co-editor of *Controlling and Management Review* (CMR), and Chair of the Scientific Advisory Committee of CTcon. He previously held a position on the scientific advisory board of BVL International (The Global Supply Chain Network).

Annalena Zeier finished her M.Sc. degree in International Business Studies with a regional focus on Asian countries at the School of Business and Economics at Friedrich-Alexander-University Erlangen-Nürnberg (Germany). Her international experience comprises educational and working experience abroad in China, France, and the USA. After having finished her studies, she started working in the Human Resources department of a global pharmaceutical company in Frankfurt.

Susanne Zubler is Deputy Manager Corporate Development and Strategy in the Swiss Ministry of Finance, and worked as a strategy and management consultant in the area of performance management and CFO strategy. She received her MA in Business Administration after studying at the University of Zurich (Switzerland) in 2006. Afterward, she became research assistant and Ph.D. student at the WHU – Otto Beisheim School of Management (Germany) at the Institute of Management Accounting and Control. In her thesis, she examined the role of management accounting in public sector transformations. In 2012, she received her doctorate, which was supervised by Jürgen Weber.

About the Wipro Center for Business Resilience

The Wipro Center for Business Resilience (WCBR) was founded in June 2014 at WHU – Otto Beisheim School of Management, Germany’s leading business school, and endowed by Wipro Technologies.

As an interdisciplinary think tank and research network, the Wipro Center organizes its research projects along three core research questions:

1. How will the increasing impact and pace of information technology developments affect the world of business management and leadership over the next decade? What role does public policy making play?
2. Is disruptive industry change underpinned by technology the new normal, and how will digital transformation affect the nature of competition in different industry sectors?
3. How will the impact of economic, social, and political-regulatory megatrends shape future business strategies?

The center seeks to deploy and integrate different research perspectives on technology, strategy, and evolutionary economics to answer these questions. In addition, the center explores the perspective of public policy in the field of information and communications technology, which is an emerging field of importance for private companies. A particular focus is on the respective developments in family-owned firms.

The academic and the management-oriented results of the research projects are published as WCBR working papers, special supplements in the *CIO* magazine, and also via various online and social media channels to enable a close interaction with business practitioners.

For more information, please visit: <http://www.wipro.com/dach/en/center-for-business-resilience/>

List of Figures

Fig. 1.1	Types of business transformation	9
Fig. 1.2	The Four Rooms of Change model	13
Fig. 2.1	Different perspectives and research interests: diffusion of innovations	23
Fig. 2.2	The industry life cycle described as a pattern of five stages	29
Fig. 2.3	The industry life cycle as a three-stage pattern	30
Fig. 2.4	Commonly used technological shakeout theories and their perspectives	37
Fig. 2.5	Predicted pattern of an industry life cycle	38
Fig. 2.6	Different trajectories and the dominant design	40
Fig. 2.7	Overview of predictions according to the comparative advantage theory	43
Fig. 3.1	Alternation of industry boundaries	75
Fig. 3.2	Reinventing business models through conceptual distancing	89
Fig. 4.1	Exponential growth driven by paradigms	98
Fig. 4.2	Exponential growth versus linear expectations	100
Fig. 4.3	Clustering exponential technologies	102
Fig. 5.1	The distribution of employment by occupational sector over the probability of computerization, along with a division in employment quartiles	124
Fig. 5.2	The distribution of employment by occupational sector over the probability of computerization, along with a division in employment quartiles	127
Fig. 5.3	The distribution of employment by requirement level over the probability of computerization, along with a division in employment quartiles	130

xlvi List of Figures

Fig. 6.1	Kondratieff cycle—basics	141
Fig. 6.2	Kondratieff cycles in the past and today	142
Fig. 6.3	Gamification	148
Fig. 8.1	Evolution of customer centricity	177
Fig. 8.2	Evolution of a bank's marketing mix	178
Fig. 8.3	Possible avenues for engagement in the purchase cycle	180
Fig. 8.4	Some examples of companies embracing customer centricity	182
Fig. 8.5	Steps toward customer centricity	184
Fig. 9.1	Truth distinguished from belief	194
Fig. 9.2	Delusion of achieving client centricity by cost reduction	199
Fig. 9.3	Silo mentality promoted by organizational structure and hierarchy	202
Fig. 10.1	Multi-market competition leading to mutual forbearance	219
Fig. 10.2	Factors impacting product line selection decisions	222
Fig. 10.3	Product architecture of focal firm	229
Fig. 11.1	Key changes in manufacturing and the supply chain	247
Fig. 11.2	Major changes in the manufacturing business	250
Fig. 11.3	Key enablers for a manufacturing-oriented Industry 4.0 (Villeroy & Boch project)	251
Fig. 11.4	End-to-end process serves as a basis to make the effect and impact of Industry 4.0 on manufacturing transparent	257
Fig. 11.5	Smart and connected product and service portfolio	259
Fig. 11.6	Design Thinking methodology and its key phases	264
Fig. 12.1	Manufacturing value chain	276
Fig. 12.2	Innovation process	277
Fig. 12.3	Influencing factor conflict	278
Fig. 12.4	"Industry 4.0" role-process map	279
Fig. 12.5	"Industry 4.0" decision-making chain	281
Fig. 12.6	"Smart product" role-process map	282
Fig. 12.7	PAC's seven levers of growth model	285
Fig. 13.1	Country-of-origin effects: research model and hypotheses	296
Fig. 14.1	Types of IT-based service development alternatives (based on Meyer/van Husen 2008)	318
Fig. 14.2	Types of customer involvement	321
Fig. 14.3	Examples for motivation of customers	323
Fig. 14.4	Potential types of conflicts	326
Fig. 15.1	Outline of control system components in critical infrastructure	348
Fig. 16.1	Google trends on search-term "MOOC"	359
Fig. 16.2	MOOC SWOT analysis: key aspects for HEIs	360
Fig. 16.3	MOOC studio at media center of TUM	364
Fig. 16.4	Cumulative enrollment for "Einführung in Computer Vision"	366
Fig. 16.5	Screenshot of MOOC "Autonomous Navigation for Flying Robots"	368

Fig. 17.1	The organizational onion model	381
Fig. 17.2	Strategic alignment model	383
Fig. 17.3	E-leadership of strategy execution and technology transformation	387
Fig. 17.4	E-leadership of competitive potential and service innovation	387
Fig. 17.5	The diagnostic model of e-leadership for SMEs	399
Fig. 18.1	Trend in overnight stays in winter season in Alpine regions	419
Fig. 18.2	Important touchpoints to reach travelers to the Alps	420
Fig. 18.3	Results about disruptions in different industries	421
Fig. 18.4	Distribution channels in Swiss ski destinations (year 2014)	423
Fig. 18.5	User-driven way to book a hotel room from two example users	428
Fig. 18.6	Destinations digital platform structure	431
Fig. 20.1	Original framework for understanding organizational change	464
Fig. 20.2	Modified framework of radical organizational change	485
Fig. 21.1	Adapted strategy map	497
Fig. 21.2	Setting up a hierarchy of Balanced Scorecards in the organization	498
Fig. 21.3	Suggested attributes which shape organizational culture	503
Fig. 24.1	Study 1 – structural equation model	567
Fig. 24.2	Study 2 – structural equation model	571
Fig. 24.3	Employee well-being analysis	575

List of Tables

Table 2.1	Industries analyzed by the Gort and Klepper (1982) study	28
Table 2.2	Selected studies on industry life cycle patterns	31
Table 5.1	Impact of computerization on four categories of workplace tasks	119
Table 9.1	Singapore's customer satisfaction index for tourism and food and beverage	192
Table 11.1	Characteristics of project management, change management, and Design Thinking	267
Table 13.1	Factor loadings of car evaluation items	298
Table 13.2	Psychographic factors measurement scale	299
Table 13.3	Means, standard deviations, and correlations	301
Table 13.4	ANOVA analysis of car evaluations	302
Table 13.5	Regression analyses on car evaluation	303
Table 13.6	Regression analysis on purchase intention	305
Table 15.1	Sample of the framework core	344
Table 15.2	Sample of the framework core for improving critical infrastructure cybersecurity	345
Table 17.1	Business strategy and informal subsystem	384
Table 17.2	Organizational infrastructure and formal subsystem	385
Table 17.3	IT strategy and formal subsystem	385
Table 17.4	IT infrastructure and technical subsystem	385
Table 20.1	Overview of conducted interviews	471
Table 21.1	Weaknesses of the Balanced Scorecard model	499
Table 24.1	Conceptualization of mobile work variables	564
Table 24.2	Study 1 – validity statistics for mobile work SEM	565
Table 24.3	Study 2 – validity statistics for mobile work SEM	566
Table 24.4	Results of study 1 – mobile work open-ended responses	569
Table 24.5	Study 1: desk-sharing open-ended responses	570
Table 24.6	Results of Study 2 – mobile work open-ended responses	573
Table 24.7	Results of Study 2 – desk-sharing open-ended responses	574

Part 1

Introduction

1

Continuous Business Transformation: What Is It All About?

Wolfgang Messner

Ideas in Brief Business transformation is a long and complex process. It is an attempt to answer the greatest challenge that any business leader faces today: How to stay competitive amid a wide variety of internal and external triggers? And while the term is frequently used by management consultants and strategy writers, there is considerable confusion on what business transformation is all about. This chapter sorts through the chaos of opinion and hype; it examines the myriad usage of the term in practitioner and academic writings. In order to allow for a meaningful discussion toward the common goal of making organizations more competitive in the current dynamic marketplace, the various types of business transformation approaches are defined in a two-dimensional framework, which evolves around the key issues of the nature and scope of strategic change. Within this framework, continuous business transformation is understood as an approach to reach a new state through incremental steps in an evolutionary way rather than through a revolution. It occurs within the organization's existing paradigm, and because it never stops, it helps the organization to accelerate, build momentum, and deliver impact. However, for a successful execution, it has to be underpinned by a winning strategy and an organizational structure. The employees go through a trajectory of their own; the Four Rooms of Change model is used to help provide existential insights into what is happening in an organization as it experiences strategic change.

W. Messner (✉)

Darla Moore School of Business, University of South Carolina,
Columbia, SC, USA

e-mail: wolfgang.messner@moore.sc.edu

Keywords Business transformation • Change management • Competitiveness
• Continuous business transformation • Four Rooms of Change

Introduction

Most of today's mature organizations are optimized for operational efficiency rather than strategic agility. After their start-up phase, they lose their ability to make the most of opportunities and to avoid threats. When they see a new exciting market opportunity or face a real dangerous threat, they try to pull together a major business transformation initiative using an established change process that worked in the past. But the traditional ways of defining, implementing, and leveraging strategy are failing us today (Kotter 2012a, p. 43).

In the past, companies used to evaluate, redesign, and change their strategies only very rarely. Products and services offered, customer segments, hierarchical structures, and organizational processes were all set in stone. But today's business context is changing both rapidly and continuously. "The speed of change continues to increase" (Kotter 2012b, p. vii). There is a diversity of triggers coming from the marketplace (KPMG 2014, p. 5); they are unprecedented in their sheer number and intensity bringing business transformation to the forefront of the corporate agenda (AT&Kearney 2013). Changing customer demand is often perceived as the primary trigger of transformation. Customers always want something new, and companies need to answer with an improved product or service, or actively push a new breakthrough solution by anticipating customer needs (Moreno 2014). However, changes in technology, to the competitor landscape, or in the regulatory framework are often equally significant drivers. To make matters even more complicated, these drivers interact with each other. For example, customer demand is often redefined by changes in technology. While reacting to these drivers, business leaders need to first bridge the dichotomy of seeking competitive advantage without disrupting daily operations, which ultimately deliver the much-needed results to the company's stakeholders. The ability to manage business transformation is, or should be, a core organizational capability (Ashurst and Hodges 2010, p. 218).

In a lot of organizations change is quickly becoming the new normal. Business transformation now has a prominent place on the corporate agenda; more than 90 percent of US-based multinational corporations are currently in some phase of changing their business models (KPMG 2014, p. 1). But while most managers remain comfortable with consistency, they need to face a pressing requirement to change, and this change will be followed by another change. Corporate leaders may feel "like being on a treadmill with the speed control set to max" (Hemerling et al. 2015, p. 3). Once started, the circle of

continuous change will never end. “The concept and the execution of transformation are never complete because the marketplace changes, and so do the needs of [...] clients and customers—and the digital era just accelerates all of that” (Catherine Bessant, Bank of America, as quoted in: KPMG 2014, p. 3). In short, “continuous change isn’t about the end state” (Stebbins 2010). Creating an environment of continuous improvement can keep an organization’s performance from stagnating or regressing (Jacquemont et al. 2015, p. 2). After all, organizational success—and indeed, organizational survival—depends on an organization’s ability to adapt and transform. Yet, the successful management of strategic change continues to be a major issue for many organizations (Ashurst and Hodges 2010, p. 217); the returns that organizations derive from their change initiatives continue to disappoint (Messner 2013, p. 363).

After this short introduction, the remainder of this chapter is organized as follows. It first looks at some of the many and often confusing attempts of defining continuous business transformation. Next, it classifies the types of business transformation. It then goes on to highlight the challenges of executing continuous business transformation, and guiding employees through the trajectory of change. It concludes by suggesting that companies must constantly seek competitive advantage through continuous business transformation without disrupting daily operations.

Myriad Attempts of Defining Continuous Business Transformation

Although the term business transformation is very familiar to management consultants and strategy writers (Philip and McKeown 2004, p. 625), there is considerable confusion among industry practitioners about what business transformation is all about. As of December 2015, Google delivers more than 4.8 million hits for the term “business transformation,” but just a little more than 6100 for “continuous business transformation.” Google Scholar returns 18,800 and 38 results, respectively. The literature defies easy summarization because of the range of definitions (McKeown and Philip 2003, p. 5); business transformation appears to be a catchall phrase for a variety of economic and organizational outcomes (Muzyka et al. 1995, p. 346).

The following reviews some of these exemplary definitions. First, definitions of business transformation as used by the American business advisory, benchmarking, and transformation consultancy The Hackett Group, the American management consulting firm M&S Consulting, and the Indonesian consultancy Jakarta Consulting Group are looked at. Second, the views of the

multinational management consulting firms McKinsey and Boston Consulting Group are presented. Third, definitions by Infosys (the Indian multinational IT consulting and outsourcing services company), Oracle (the American global computer technology corporation), Accenture (the multinational management consulting, technology services, and outsourcing company), Gartner Group (the market research and advisory firm), Wipro (the Indian multinational IT consulting and system integration services company), and Huawei (the Chinese multinational networking and telecommunications equipment services company) are studied. While these sections cover the arena of the service providers, the fourth section examines definitions used in the academic literature.

1. *The Hackett Group* defines business transformation as “a wide-reaching, strategically driven campaign to improve the way in which a company conducts business” (Hackett 2015). This view clearly limits business transformation to a disruptive initiative focusing on the existing business. In the eyes of *M&S Consulting*, “continuous business transformation is an approach to treating business transformation as a service where business process models, business intelligence information, and executable process layers are iteratively improved for an informed and proactive strategy to traverse the business landscape” (M&S 2012). For *The Jakarta Consulting Group*, “business transformation is a process of change that requires cooperation in order to gain a better position to answer and face business challenges and changing business environment accurately, as well as fulfilling new internal demands. Change is conducted holistically and continually across paradigms, perspectives, company’s policy, business strategy, corporate cultures, as well as organizations attitude and capability” (JCG 2014). Both these definitions are rather all-embracing, but they leave the reader clueless on what business transformation really is all about.
2. In a *McKinsey* insight publication, Keller et al. (2010) report that most executives focus transformations in their companies “wholly or in part on changing organizations’ long-term health by building capabilities, changing mind-sets or culture, or developing a capacity for continuous improvement.” In other words, this view holds that business transformation is different from continuous improvement. Business transformation comes first, and kick-starts continuous improvement. McKinsey clearly concentrate their definition of transformational change as a key source of competitive advantage (Keller n.d.) on “any large-scale change, such as going from good to great performance, cutting costs, or turning around a crisis” (Keller et al. 2010). Change initiatives, which are smaller in scope and maybe even incremental, are not included in this classification. *The Boston Consulting*

Group takes a similar stance: “We define a transformation as a profound change in a company’s strategy, business model, organization, culture, people, or processes—either enterprise-wide or within a specific business unit, function, or market. A transformation is not an incremental shift in some aspect of the business but a fundamental change aimed at achieving a sustainable, quantum improvement in performance and, ultimately, shareholder value. [...] Unlike continuous improvement—which focuses on small-scale changes that start with employees and percolate up through the organization—[...] transformation requires a series of much larger, interdependent initiatives that are driven by top management” (Hemerling et al. 2015, p. 4). This explanation appears to maintain that business transformation cannot be driven bottom-up, that employees are unable to identify change opportunities, and that only top management—probably aided by strategy consultants—can identify and initiate transformation.

3. In an *Infosys* whitepaper, Leyva (2012, p. 2) rather unhelpfully state that “definitions of business transformation can differ from company to company.” For *Oracle*, “continuous business transformation is the ongoing improvement of processes, the exploration of new ways to use information, and the constant evaluation of how to apply technologies. The goal is to improve immediate business performance while securing future business performance” (Oestreich et al. 2010, p. 3). While this interpretation clearly brings in the continuous aspect of business transformation, it mixes an episodic realignment of the current business with a more fundamental shift of getting ready for future challenges. Business transformation programs led by *Accenture* are either “focused on customer acquisition, retention and increased share of wallet to drive additional revenue” or attack “costs through a range of efficiency initiatives”; they are aimed at “setting new standards of excellence, which create a capability that can be leveraged by the enterprise again and again” (Wallis et al. 2012, p. 4/8). This approach appears to be nothing but the traditional hierarchy-based business (Kotter 2012a): We identify a problem, find and analyze internal or external data, build the business case for change, and gain approval. *Gartner Group* and *Wipro* differentiate business activities between running the business, growing the business, and transforming the business. The last one looks at entering new markets with new value propositions for new customer segments (Hunter 2012; Sankaran 2013). This definition, while certainly providing some ideas for companies to redefine their operational systems, puts business transformation at the level of diversification investments, of strategic entry points into new markets which set the path for other investments (Messner 2013, p. 46). *Huawei* focuses on the evolutionary aspect

of business transformation, and maintains that “transformation is a constant and continuous process that can never end” (Huawei n.d.).

4. In the A*-ranked *European Journal of Information Systems*, Irani et al. (2001, p. 63) suggest in the context of implementing a manufacturing information system that continuous business transformation as a lifecycle methodology involves many aspects of an organization. This definition clearly highlights the ongoing and always-on aspect of business transformation. In the A-ranked *International Journal of Information Management*, McKeown and Philip (2003, p. 3) describe “business transformation as an overarching concept encompassing a range of competitive strategies which organizations adopt in order to bring about significant improvements in business performance.” In the B-ranked *European Management Journal*, Muzyka et al. (1995, p. 348) apply a two-dimensional view on the topic and conceptualize business transformation as “a fundamental change in organizational logic which resulted in or was caused by a fundamental shift in behavior.” It is about “bringing radical changes in organizational culture in terms of structure, processes, and, above all, people’s attitudes, beliefs, and behaviors” (*European Management Journal*; Philip and McKeown 2004, p. 625).

As the above shows, business transformation appears to be a difficult concept to describe; the term is used in many different ways (Muzyka et al. 1995, p. 351). This chaos of opinion and hype created by an overuse of buzzwords is truly unfortunate. Moreover, “if left unresolved, it can easily turn a desire for bold, systemic change into a rag-tag collection of discrete, ad hoc initiatives. Less obviously, but perhaps more troublingly, it can also prevent the kind of meaningful discussion that keeps a management group pulling together toward a common end” (Dichter et al. 1993).

Types of Transformation

Strategic change can be understood by two dimensions: its nature and scope (e.g., Balogun et al. 2015, pp. 30–37; Haberberg and Rieple 2008, pp. 691–693; de Wit and Meyer 1998, pp. 242–248; Johnson and Scholes 2002, p. 536). The first dimension, the *nature of change*, spans from incremental to disruptive. Incremental change is a series of consecutive additions to the current state. By building on the existing skills, routines, and beliefs of an organization, change is likely to win over the commitment of employees and succeed. On the other side of the spectrum, a disruptive approach to change is occasionally needed to counter a situation of crisis, or to abruptly

and very quickly change the direction the organization is heading to. The second dimension, the *scope of change* describes whether the transformation occurs within the organization's current paradigm or whether the paradigm itself requires a fundamental change. Change within an organization's current paradigm can be described as a realignment of strategy. A fundamental change means that all the interconnected components of an organization—that is its structure, strategy, systems, style, staff, skills, and superordinate goals (7S framework; Waterman et al. 1980)—need to be shifted in unison.

Combining these two dimensions shows a matrix with four types of business transformation (see Fig. 1.1): adaptation, reconstruction, revolution, and evolution. The last of the four types, evolution, is also referred to as continuous business transformation. All of them highlight the tension between norms and behaviors, between an organization's old competencies, and present and future challenges (Muzyka et al. 1995, p. 348).

Adaptation is the most common form of business transformation in today's organizations. It is a change which can be accommodated within the current organizational paradigm; it may occur either as a one-time change effort (episodic adaptation) or incrementally (continuous adaptation).

Reconstruction is often rapid, and it may cause a great amount of upheaval in an organization. However, it does not fundamentally change the organizational paradigm. Instead, it merely tackles the failure of past corporate resource allocation processes. Examples are major cost-cutting initiatives, out-

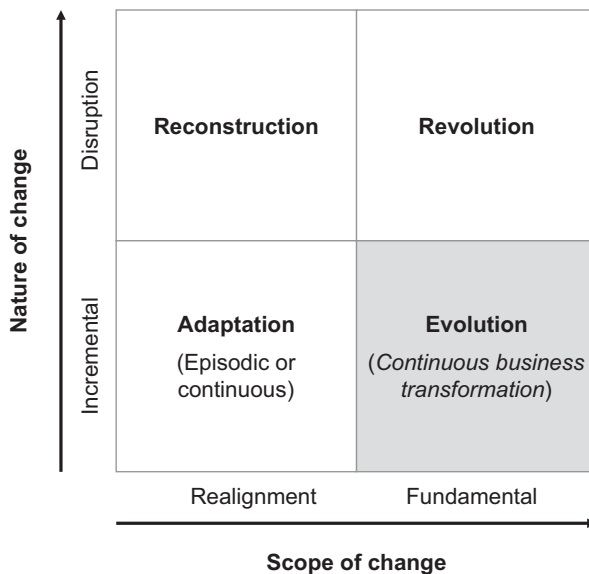


Fig. 1.1 Types of business transformation

sourcing or offshoring decisions, and market consolidation programs. Just like adaptation, reconstruction leads to an immediate, tangible impact on systems and structure within an organization (Muzyka et al. 1995, p. 348).

Revolution comes along with a full and broad paradigm change when external pressures for change are extreme. For example, profits may have declined, a competitor activity threatens the existence of the firm, or the organization's identity has to be reshaped after a takeover. Revolutionary transformation efforts are usually reactive in nature when an organization has become a victim of its own success, and when past ways of doing business and competing in the marketplace have become deeply embedded in the organizational culture, and taken for granted (Balogun et al. 2015, p. 6). This kind of business transformation is implemented in a rapid and full-scope fashion. While it leads to an uplifting and tapping of entrepreneurial behavior (Muzyka et al. 1995, p. 348), it is usually of a discontinuous change nature (de Wit and Meyer 1998, p. 244).

Evolution (or *continuous business transformation*) requires an organizational paradigm change, but over time. The management of the organization may anticipate the need for disruptive change, but there is enough time to reach the new state through incremental and moderate steps in an evolutionary way out of the present situation. Evolution with its low amplitude of change is in stark contrast to a revolution (de Wit and Meyer 1998, p. 245).

It is helpful to have a view of the scope of change required, and especially if the transformation can be achieved within the organizational paradigm or if a significant shift is required (Johnson and Scholes 2002, p. 537). Strategic leaders should actively manage the selection process of the type of business transformation to increase opportunity capture and avoid traumatic experiences of failed transformations (Muzyka et al. 1995, p. 348). In fact, executive leadership pervades every step of the business transformation process; no organization reporting success with strategic change had an unengaged or passive leader (Kaplan and Norton 2008, p. 20).

Some scholars tend to question the feasibility of delivering business transformation in a revolutionary, rapid, and all-at-once manner (Balogun et al. 2015, p. 6). They believe that if organizations shift by "earthquake," it is usually their own "fault" (de Wit and Meyer 1998, p. 240). A full paradigm change can often only be sustained for a short period of time, after which the transformation momentum disintegrates again. In fact, any positive inclination toward change and improvement by the organization's employees will have completely vanished by the time revolutionary change has been rolled out. The organization lapses back into a stable state, in which further change hardly occurs until the next external shock happens, and another round of

revolutionary transformation becomes necessary to once again wake up the organization.

Continuous business transformation, on the other hand, would, at the end, lead to the same outcome, but in a less dramatic fashion. It follows the paradigm of *slow and steady wins the race* as proposed by the Greek philosopher Aesop (620–560 B.C.) in the fable of the hare and the tortoise. Continuous business transformation is conceptualized as a continuous process of accommodations and adaptations, moving gradually but unrelentingly toward a long-term goal. It is long-term in orientation. Strategic change can originate both top-down and bottom-up; employees are encouraged to put forward ideas and initiatives to their managers. In this case, the organization's leadership does not necessarily a priori have an intention to implement change.

Preparing for the Execution of Transformation

Execution is the hard part of transformation. More than half of the companies undertaking transformation fail to achieve the desired results (Moreno 2014). Dichter et al. (1993) warn that “organizations can easily grow enamored with the promise of continuous improvement, and forget that the transformation process cannot overcome fundamental strategic and structural disadvantages by itself. [...] A winning strategy and a viable economic and organizational structure must underpin any transformation effort.”

A coherent corporate strategy does not just set goals; it draws on existing strength and creates new strength through the coherence of its design. Such strategy involves focus and choice. Focus denotes the identification of promising areas in which to search for business opportunities, or the identification of potential business threats which are to be circumvented. Choice means setting aside some goals in favor of others. Pursuing all possible goals and reacting to all kinds of triggers on the marketplace at the same time is hardly possible (Messner 2013, p. 6). The kernel of a good corporate strategy is therefore a mixture of thought and action with a basic underlying structure; it contains three steps: diagnosis, guiding policy, and coherent actions (Rumelt 2011, pp. 77–94).

The *diagnosis* defines and explains the trigger and challenge that the organization faces. A good diagnosis simplifies the complexity of the business world, reduces it to certain critical aspects, and replaces it with a simpler story, which allows business leaders to make sense of the situation so that they can embark on a transformation journey to solve the problem. Most strategic change is

initiated by a change in diagnosis, which is basically a change of the view of the company's situation.

The *guiding policy* identifies an overall approach for dealing with the challenge identified in the diagnosis. It does not yet fully define the exact form and content of the transformation process; neither is it a goal nor a vision, nor a description of the desired future state. Rather, it describes a method of how to take care of the challenge by channeling action into a certain direction, and by drawing upon existing sources of competitive advantage. The guiding policy generally spans multiple and complementary perspectives from various parts of the company, such as human resources, information technology, marketing, distribution, and operations.

The guiding policy alone is not a strategy, because it does not contain any concrete action. "Strategy is about action, about doing something. The kernel of a strategy must contain action. [...] To have punch, actions should coordinate and build upon one another, focusing organization energy" (Rumelt 2011, p. 87). A set of *coherent actions* is required to carry out the transformation, step by step, coordinated with each other, continuously working toward accomplishing the guiding policy. Each of these actions is a finite duration and discretionary activity, which works outside the organization's day-to-day operational activities. Together, they represent the force that accelerates the transformation of an organization, overcoming inertia and resistance to change (Kotter 2012a; Kaplan and Norton 2008, p. 103).

Unfortunately, in today's organizations, it is quite rare to find such a system of coherent actions, which extends seamlessly from strategy to execution thereby supporting the continuous business transformation process. Montgomery (2012) recommends: "You and every leader of a company must ask yourself whether you have one [a system of coherent actions]—and if you don't, take the responsibility to build it. The only way a company will deliver on its promises, in short, is if its strategists can think like operators." Leadership builds systems, or transforms existing ones. Leadership takes the organization into new territory; management makes the system work. This point has huge implications for the process of continuous business transformation in today's ever-faster-moving world (Kotter 2012b, p. vii).

Adjusting Humans to Continuously Changing Conditions

To a certain degree, the downside of change is inevitable. Whenever human communities are forced to adjust to shifting conditions, pain is ever present (Kotter 2012b, p. 4). While the organization goes through a transformation, the people impacted by change are going through a trajectory of their own

(Messner and Messner 2013, p. 14), which Janssen (1996) summarizes in *The Four Rooms of Change* model. This model discusses organizational change derived from the school of existential thought within psychology; it attempts to deal directly with the nature of existence, viewed through the lenses of conscious experiences (Hind 2005, pp. 268–269). It takes an organization's employees through the stages of strategic change shown in Fig. 1.2: contentment, denial, confusion, and renewal. Recognizing these stages will give the company's leadership some support to guide their employees through these rooms, ultimately making the transformation successful in an efficient manner.

1. *Contentment*. When everything is working fine, the employees know their processes, the communication channels are established, and exceptions can be handled skillfully. While things may not be perfect, the organization's structure and processes is a familiar environment, and employees are comfortable with it. The contentment room encourages a stable internal perspective that totally ignores the outside triggers on the marketplace.
2. *Denial*. Things were running smoothly, when triggers made the transformation effort necessary. All humans are, by nature, resistant to change, and this is when employees will question every step of the transformation, but there is no falling back into the contentment stage (Hind 2005, p. 271). They might bring up a list of things that went wrong during the last transformation, and why it will also be similarly futile this time. Clear communication will be needed here; the organization's leadership needs to come

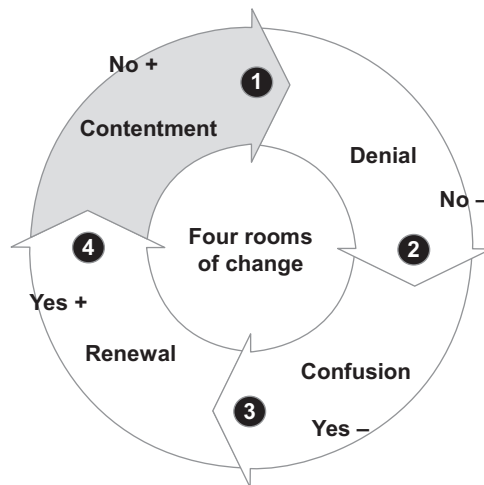


Fig. 1.2 The Four Rooms of Change model

- in publicly with their support, and draw a picture of the future using strategy communication tools as proposed by Kaplan and Norton (2004).
3. *Confusion*. The transformation is underway, maybe the changes are being introduced in a continuous and phased manner. For a while, both the old and the new way of working will need to coexist, and this can easily lead to confusion. Listening to the employees, bringing key people together on a regular basis to understand issues, and making procedures as clear as possible will be effective remedies during this phase.
 4. *Renewal* (or *inspiration*). This phase should hopefully kick in when the fruits of transformation are becoming evident. The change is in place, the doomsayers have retreated, and employees can feel the real difference.

In the first phase of contentment, employees say no to change, but they are happy (No+). In the second denial phase, employees still resist change, but their mood has changed to unhappiness (No+). Subsequently, in the third phase of confusion, employees begin to accept the necessity of change while still being maladjusted to the new way (Yes-). In the final and fourth phase of renewal, employees fully embrace change, and they also get rewarded with a strong feeling of self-confidence (Yes+).

The model holds that employees realize the doors between the rooms are open all the time, just like the road between the rooms is not a one-way street. But this also means that one cannot stay in the exciting last room of renewal forever. The door to the first room of contentment is tempting with an irresistible magnetic pull. Similarly, the organization can slip back to the previous room of confusion (Hind 2005, p. 273). It is impossible to predict how long the cycle lasts, or if everyone in the organization will go through it completely (Haberberg and Rieple 2008, p. 704). Some employees never get beyond the denial stage, because pushing through to the next door and entering the room of confusion is a scary thing. They must acknowledge the need for change, they must change their attitude from “It’s not going to happen before I retire” to “When will it happen?” Otherwise, they risk falling right through into the dungeon of denial—this is one reason why business transformation programs are often characterized by high rates of employee attrition.

Obviously, everybody has the right to rest a bit after a transformation process, but not for too long. It is the job of continuous business transformation to keep the organization and its employees energized, and to turn the four-rooms-of-change cycle into a flywheel of success, where people spiral themselves upward in an energized way to greater heights and competitive

advantage. The strength of this model and its contribution to transformation success is to make leadership aware of what is going on at the individual employee level. It provides existential insights into what is happening in an organization as it experiences strategic change.

Conclusion

The days of one-off major business transformations are coming to an end (Hemerling et al. 2015, p. 16). The old-era process of deciding on a top-down strategy, giving orders to employees, maybe asking an external partner for help with the implementation and roll out, hopefully hitting the targets, and finishing it off by declaring victory is no longer a viable option to counter the various transformation triggers in today's dynamic business environment. Today, companies must constantly seek competitive advantage without disrupting daily operations (Kotter 2012a). Interestingly, leading management consultancies still continue to define business transformation as a profound change in response to a well-defined trigger—in clear contrast to incremental and continuous shifts. This may be one of the reasons why “people have been grumbling for years about the strategy consulting industry, whose reports fail to solve the problem of finding and implementing strategies to better fit a changing environment. A consultant's report—[...] produced by smart outsiders, and acted on in a linear way by a limited number of appointed people—has little or no chance of success in a faster-moving, more uncertain world” (Kotter 2012a).

The whole notion of strategy and transformation has to evolve in the twenty-first century; business transformation initiatives should no longer only be born out of a crisis, but they should be triggered by an opportunity. Strategy identifies critical aspects and seeks opportunities; it designs a guiding policy as an overall framework for dealing with market triggers. Business transformation is the dynamic force that coordinates and executes initiatives swiftly and efficiently, in parallel to the existing operations of the company. Companies need a second, parallel operating system (Kotter 2012a), in which continuous business transformation helps the organization to accelerate, build momentum, and deliver impact. Continuous business transformation doesn't jolt the organization in the way that sudden dramatic changes suggested by a consultant's report do; it doesn't require the organization to flick a switch in order to build something new. Continuous business transformation is always on, it never stops.

Bibliography

- Ashurst, C., & Hodges, J. (2010). Exploring business transformation: The challenges of developing a benefits realization capability. *Journal of Change Management*, 10(2), 217–237.
- ATKearney. (2013). *Fit transformation: Making your company strong, agile, and lean*. Retrieved December 30, 2015, from A.T. Kearney: https://www.atkearney.com/latest-article/-/asset_publisher/ION5IOfbQl6C/content/fit-transformation-making-your-company-strong-agile-and-lean/10192
- Balogun, J., Hailey, V. H., & Gustafsson, S. (2015). *Exploring strategic change* (4th ed.). Harlow: Pearson.
- de Wit, B., & Meyer, R. (1998). *Strategy. Process, content, context* (2nd ed.). London: Thomson Learning.
- Dichter, S. F., Gagnon, C., & Alexander, A. (1993). *Leading organizational transformations*. Retrieved December 30, 2015, from McKinsey Quarterly: http://www.mckinsey.com/insights/organization/leading_organizational_transformations
- Haberberg, A., & Rieple, A. (2008). *Strategic management. Theory and application*. New York: Oxford University Press.
- Hackett. (2015). *Business transformation*. Retrieved December 30, 2015, from The Hackett Group: <http://www.thehackettgroup.com/business-transformation/>
- Hemerling, J., Dosik, D., & Rizvi, S. (2015). *A Leader's guide to "Always-On" transformation*. Retrieved December 30, 2015, from The Boston Consulting Group: https://www.bcgperspectives.com/Images/BCG_A_Leaders_Guide_Always-On_Transformation_Nov_2015_tcm80-199944.pdf
- Hind, P. (2005). Making room for career change. *Career Development International*, 10(4), 268–274.
- Huawei. (n.d.). *Never stop moving: 3-steps business transformation*. Retrieved December 30, 2015, from Huawei Solutions SingleCORE@IIMS: http://www.huawei.com/ilink/en/solutions/costs-down/HW_443379
- Hunter, R. (2012, July 18). *A few things about running, growing, and transforming in the cloud*. Retrieved December 30, 2015, from Gartner Blog Network: <http://blogs.gartner.com/richard-hunter/a-few-things-about-running-growing-and-transforming-in-the-cloud/>
- Irani, Z., Sharif, A. M., & Love, P. E. (2001). Transforming failure into success through organisational learning: An analysis of a manufacturing information system. *European Journal of Information Systems*, 10(1), 55–66.
- Jacquemont, D., Maor, D., & Reich, A. (2015, April). *How to beat the transformation odds*. Retrieved December 30, 2015, from McKinsey Insights: http://www.mckinsey.com/insights/organization/how_to_beat_the_transformation_odds
- Janssen, C. F. (1996). *About the Four Rooms of Change*. Retrieved October 30, 2013, from Quaternity. The Home of Claes F Janssen: <http://www.claesjanssen.com/four-rooms/about-the-four-rooms-of-change/index.shtml>

- JCG. (2014). *Managing business transformation*. Retrieved December 30, 2015, from The Jakarta Consulting Group. Expertise: <http://www.jakartaconsulting.com/mainpage/expertise/managing-business-transformation>
- Johnson, G., & Scholes, K. (2002). *Exploring corporate strategy* (6th ed.). Harlow: Financial Times Prentice Hall.
- Kaplan, R. S., & Norton, D. P. (2004). *Strategy maps. Converting intangible assets into tangible outcomes*. Boston: Harvard Business School Publishing.
- Kaplan, R. S., & Norton, D. P. (2008). *The execution premium*. Boston: Harvard Business Press.
- Keller, S. (n.d.). *Transformational change*. Retrieved December 30, 2015, from McKinsey. Expertise: http://www.mckinsey.com/client_service/organization/expertise/transformational_change
- Keller, S., Meaney, M., & Pung, C. (2010). *What successful transformations share: McKinsey global survey results*. Retrieved December 30, 2015, from McKinsey Insights: http://www.mckinsey.com/insights/organization/what_successful_transformations_share_mckinsey_global_survey_results
- Kotter, J. P. (2012a). Accelerate! *Harvard Business Review*, 90(11), 43–58.
- Kotter, J. P. (2012b). *Leading change*. Boston: Harvard Business Review Press.
- KPMG. (2014). *Business transformation and the corporate agenda*. Retrieved December 29, 2015, from KPMG: <https://www.kpmg.com/US/en/IssuesAndInsights/ArticlesPublications/Documents/BusinessTransformationandtheCorporateAgendaDec13.pdf>
- Leyva, M. A. (2012). *Transformation: The bridge to an enterprises future*. Retrieved December 30, 2015, from Infosys: <https://www.edgeverve.com/finacle/resources/thought-papers/Documents/transformation-the-bridge-enterprises-future.pdf>
- M&S. (2012). *Continuous business transformation*. Retrieved December 30, 2015, from M&S Consulting: <http://www.mandsconsulting.com/services/solutions/continuous-business-transformation>
- McKeown, I., & Philip, G. (2003). Business transformation, information technology and competitive strategies: Learning to fly. *International Journal of Information Management*, 23(1), 3–24.
- Messner, W. (2013). *Making the compelling business case. Decision-making techniques for successful business growth*. Houndmills: Palgrave Macmillan.
- Messner, P., & Messner, W. (2013). *Change management. A practitioner's pocketbook for the journey to better days*. Bangalore: Createspace.
- Montgomery, C. A. (2012, July). How strategists lead. *McKinsey Quarterly*, 48(3), 1–7.
- Moreno, K. (2014, March 18). *4 steps to a successful business transformation*. Retrieved December 30, 2015, from Forbes: <http://www.forbes.com/sites/forbesinsights/2014/03/18/4-steps-to-a-successful-business-transformation/>
- Muzyka, D., De Koning, A., & Churchill, N. (1995). On transformation and adaptation: Building the entrepreneurial corporation. *European Management Journal*, 13(4), 346–362.

- Oestreich, T., Buytendijk, F., & Hatch, T. (2010). *Continuous business transformation: The CIO's perspective*. Retrieved December 30, 2015, from Oracle: <http://www.oracle.com/us/ciocentral/continuous-business-transform-wp-396361.pdf>
- Philip, G., & McKeown, I. (2004). Business transformation and organizational culture: The role of competency, IS and TQM. *European Management Journal*, 22(6), 624–636.
- Rumelt, R. (2011). *Good strategy. Bad strategy. The difference and why it matters*. London: Profile Books.
- Sankaran, A. (2013, January 7). *The CIO: A new role in business transformation*. Retrieved December 30, 2015, from Wipro: <http://www.wipro.com/blogs/the-cio-a-new-role-in-business-transformation/>
- Stebbing, H. (2010, Sep). *Continuous organisational transformation*. Retrieved December 29, 2015, from Cranfield School of Management, Think: Cranfield: <http://www.som.cranfield.ac.uk/som/p15287/Think-Cranfield/2010/September-2010/Continuous-Organisational-Transformation>
- Wallis, J., Weisblum, Y., & Wiltshire, R. (2012). *Business process 2.0. Six best-in-class strategies to fast forward banking transformation*. Retrieved December 30, 2015, from Accenture: https://www.accenture.com/us-en/-/media/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Industries_5/Accenture-NA-FS-PoV-Online.pdf
- Waterman, R. H., Peters, T. J., & Phillips, J. R. (1980). Structure is not organization. *Business Horizons*, 23(3), 14–26.

2

Industry Life Cycles as an Underlying Source of Continuous Change

Peter Kreutter

Ideas in Brief Continuous change is driven by a complex interaction of various forces, among them the endogenous evolution of industries. The entry and exit patterns of firms, the emergence of new technologies, and the application of competitive strategies create a complex picture with multilayered dynamics of change. In order to develop successful strategies coping with this type of change, it is necessary to fully analyze and understand the evolution of industries. This chapter seeks to provide a broad and solid academic perspective on industrial dynamics in the sense of industry life cycles—both in empirical and in theoretical terms. It puts a particular focus on research following the footsteps of Steven Klepper; two of his most seminal papers are examined in detail, and five related theories explaining a shakeout during the course of an industry’s evolution are discussed. The chapter then presents a new line of reasoning taking into account that certain industries emerge through a combination of distinct know-how components from other industries and as a mixture of products and services. Such industries are particularly attractive for specific groups of market entrants, especially diversifying firms.

Keywords Dominant design • Industrial dynamics • Industry life cycle • Technological innovation

The core of this chapter is based on the author’s doctoral thesis; for the full research project see Kreutter (2014).

P. Kreutter (✉)

WHU – Otto Beisheim School of Management, WHU Foundation,
Vallendar, Germany

e-mail: peter.kreutter@whu.edu

Introduction

The famous Joseph A. Schumpeter stated shortly before his death, that “[...] nobody seems to understand or even to care precisely how industries and individual firms rise and fall and how their rise and fall affects the aggregates” (Schumpeter 1951, p. 155). In the decades since then, there has been an impressive expansion in research on industrial dynamics. Academic scholars from various schools of thought have increasingly focused on the question of how industries evolve over time.

Industrial organization scholars, in particular, have contributed a substantial set of empirical and theoretical work discussing evolutionary processes in such settings (e.g., Agarwal and Audretsch 2001; Nelson and Winter 2002; Mazzucato 2002; Klepper and Simons 2005). This led to an improved understanding of entry, exit, firm growth, and survival during the course of an industry’s evolution. Moreover, they reemphasized and further expanded research on the inherent dynamics of those developments, and the strategic implications at the firm level (e.g., Carroll and Hannan 2000; McGahan 2000; Geroski 2003; Murmann 2003; Baum and McGahan 2004).

It is noteworthy in this context that research on industrial dynamics has been emerging since the late 1970s as an important area of inquiry in industrial economics. Often inspired by Schumpeter’s (1939, 1942) ground-breaking ideas of how innovation and dynamic competitive processes shape industries, scholars have produced an impressive body of publications (e.g., Jovanovic and MacDonald 1994; Audretsch 1995a; Klepper 1997) by the mid-1990s. Over time, from the larger spectrum of industrial organization research trajectories in this field, a few central strands of evolutionary thinking on industrial dynamics developed (Malerba 2007).

Among these major clusters, a stream of research became established around the work of Carnegie Mellon’s Steven Klepper (Gort and Klepper 1982; Klepper and Graddy 1990; Klepper 1997; Klepper 2002). It focuses, in general, on what later became known as the *industry life cycle*, that is, the patterns of firm entry and exit during an industry’s emergence (Nelson and Winter 2002). Scholars in this tradition focus in particular on shakeouts, that is, the empirical regularity that the number of producers initially rises, but, after having reached a peak, subsequently falls sharply (Agarwal and Gort 1996).

The remainder of this chapter is organized as follows. After the introduction with an outline of the general research background, two seminal papers about the industry life cycle are discussed. Subsequently, the major theories for explaining industry life cycles and shakeouts are examined. The chapter then presents a new line of reasoning taking into account that certain

industries emerge through a combination of distinct know-how components from other industries, and as a mixture of products and services. The chapter ends with a short conclusion.

Stylized Facts in the Emergence of New Industries

General Background

In the first decades of the twentieth century, Joseph Schumpeter was among the most prominent figures discussing the topic of the dynamic processes shaping industries and the role of innovation and competitive patterns within it (Schumpeter 1939, 1942). The further dissemination of Schumpeter's ideas was, however, postponed by the emergence of the *structure–conduct–performance (SCP) model*. From the 1950s onward, SCP became the dominant paradigm in the field of industrial organization research, inseparably linked with Mason (Mason 1939) and colleagues at Harvard (Bain 1956; Scherer 1970), known as the *Harvard School*. Only in the early 1980s did Schumpeter's ideas experience a renaissance among economics scholars. A new spur of research emerged, increasingly replacing the short-term oriented, static SCP paradigm with more dynamic, long-term evolutionary approaches. Nelson and Winter (1978, 1982) were at the center of those who broke ground for a paradigm shift.

Gort and Klepper (1982) published a paper exploring the evolutionary path of diverse US product industries in this period of change. Retrospectively, the paper was a major milestone in research on the evolution of industries (Jovanovic 1998). It provided an initial set of stylized facts that defined the state of the art for many years, and inspired subsequent publications on the industry life cycle (Klepper and Graddy 1990; Jovanovic and MacDonald 1994; Geroski 1995). Many of these studies built upon and further expanded Gort and Klepper's initial dataset (Münter 1999; Agarwal and Audretsch 2001). Although time series studies of outputs and prices in an industry were hardly new, having previously been performed by, for example, Kuznets (1930), Gort and Klepper's innovation was the favored different perspective. Rather than focusing data collection on commonly used criteria (e.g., patents or sales output), they targeted the number of firms active in the industry in general and particularly its change over time. Jovanovic (1998, p. 331) appraises this focus as nothing less than the major shift “*to an industrial organization's approach dealing with the endogenous evolution of industries.*”

Two Seminal Papers on the Evolution of Industries Revisited

While Klepper's publications belong to the most often cited work in his field (Malerba 2006), two of his papers stand out; they mark the milestones in his research on the industry life cycle (Agarwal 1998). The first one, as previously noted, was published in 1982 and co-authored by Michael Gort (Gort and Klepper 1982). The second, published roughly a decade later, was co-authored by Elizabeth Graddy (Klepper and Graddy 1990). The following sections briefly analyze four aspects of these two papers:

The basic terminology used to circumscribe the field of research.

The type of industry definition used to delineate the industry's population.

The temporal scope of industry evolution examined.

The datasets used and empirical regularities, that is, stylized facts, found when analyzing them.

The first three aspects are important to clarify the unique perspective chosen by research in Klepper's tradition. The last aspect introduces and discusses the set of empirical patterns found that—as stylized facts—depicts what became known in industrial organization research as *the industry life cycle*.

Klepper's Terminology: Toward the "Industry Life Cycle"

When first encountering Gort and Klepper (1982), many readers unfamiliar with research on industrial dynamics risk being misled by the paper's title *Time Paths in the Diffusion of Product Innovations*. In particular, those having a strong marketing, technology management, or strategic management background almost automatically misinterpret the paper's focus on the basis of the title's terminology.

This misinterpretation occurs because the majority of academic literature commonly discusses *diffusion of innovations* from the perspective established by Rogers' (1962) seminal book with the same title. Such research focuses on the process whereby various types of individual customers and entire customer groups adopt a new innovative product (Kotler 2003, pp. 182–214). The different adopter categories (innovators, early adopters, early majority, late majority, and laggards) introduced by Rogers have become common knowledge (Höft 1992, p. 48). The categories describe which type of customer starts to use the new product in which stage of market development (Moore 2002,

p. 9) and its impact on market volume growth. In a nutshell, the *Roger's view* on diffusion of innovation focuses primarily on the demand side and the related development of market volume by customer type.

However, when Gort and Klepper (1982) discussed the diffusion of innovations, they used the term to describe a different, even somewhat opposite, context. As they stated in the introduction to their paper, they subsume under diffusion “*the spread in the number of producers engaged in manufacturing a new product. Thus, the term refers to the net entry rate*” (Gort and Klepper 1982, p. 630). That is, their research focuses on the industry side and the dynamic change in firm numbers over time, rather than focusing on the customer side and the patterns in market volume as in Roger's approach. Figure 2.1 contrasts the differences between the two approaches.

In Klepper and Graddy (1990), the second seminal paper, the terminology has changed from that in the Gort and Klepper (1982) paper. Retrospectively, the later paper is much clearer and more straightforward in pointing out the research focus on the industry side and the particular interest in the evolution of firm numbers over time. This fact can be seen by both the paper's title (*The evolution of new industries and the determinants of market structure*) and the introductory paragraph, which states that “[*t*]he primary purpose of this article is [*to*] bring together and extend the empirical regularities concerning the evolution of new industries” (Klepper and Graddy 1990, p. 27). In the paper's aftermath, the term *industry life cycle* spread among scholars and was used to

	Gort and Klepper (1982)	Rogers (1962)
Title	Time path in the diffusion of product innovations	Diffusion of innovations
Primary perspective	Number of producers Supply side	Typologies of customer groups Demand side
Interest	Change in number of firms over time	Change in market volume

Fig. 2.1 Different perspectives and research interests: diffusion of innovations

express both Klepper's perspective on firm numbers on the industry side and the distinct empirical patterns depicting an industry's evolution regarding this variable (Klepper 1997).

However, before discussing these empirical patterns, two other important questions must be addressed: Which type of industry definition is used? And which evolutionary periods are analyzed in the industry life cycle perspective?

Klepper's Industry Definition: A Narrow, Product-Oriented Approach

Michael Porter (1980, p. 5) once noted: “[I]n practice there is often a great deal of controversy about the appropriate definition [of the term ‘industry’].” Even a cursory analysis of existing industry definitions reveals the large number of partially overlapping and often conflicting approaches. They comprise statistical classifications, both governmental and private, economic definitions (e.g., for antitrust purposes), and definitions from a strategic management, market research, or business practitioner viewpoint (Geroski 1998). Each of these different types of industry definitions results in a different population of companies comprising *the industry* (Dhalla and Yuspeh 1976). For example, delineating industries along the North American Industry Classification System (NAICS) will group essentially those companies with a similar production process (U.S. Census 2006). Although this approach may be suitable for collecting aggregate statistical data, it obviously lacks usability for cases requiring that a close competitive relationship between firms is the guiding factor defining an industry (Lind 2005). Such close competitive ties are essential in definitions from strategic management and industrial economics viewpoints.

In basic economic terms, one can define an industry as a “*group of firms producing products that are close substitutes for each other*” (Porter 1980, p. 5). However, this definition raises the questions of what constitutes a *close substitute* and how changes will include or exclude certain groups of companies, that is, widening or narrowing the scope. A prominent example can be used to illustrate related problems and consequences. In his seminal paper *Marketing Myopia*, Levitt (1960) argued that Hollywood's studios only fell into decay as result of considering themselves part of the movie industry. In his opinion, defining itself as part of the entertainment industry would have allowed a studio to realize—and perhaps even successfully fight—the danger of substitution by television as another means of entertainment.

The two different industry definitions used in this argumentation, movie versus entertainment, resemble what Pfeiffer et al. (1997) label a *functional abstract* versus a *phenomenological-product-oriented* approach. They use the terms to mark the endpoints in the continuum of types of industry definitions found in the literature. The former is a broad, open approach, defining industries along basic, abstract customer needs. The latter represents a narrow perspective, delineating industries by concrete product classes and product types.

Gort and Klepper (1982) and other authors' later work in their tradition use a fairly precise industry definition with narrow product classes (Simons 1995). The advantage of such an approach is that it enables capturing a rather homogeneous, compact industry population with strong competitive ties among the firms included in the population. Moreover, in contrast to a functional industry definition, a product-oriented approach makes it easier to establish unambiguous decision criteria for inclusion or exclusion of firms when developing a new dataset (Lambkin and Day 1989). Complementing this advantage is the possibility of using existing industry directories to identify the companies in a given industry (Carroll and Hannan 2000, pp. 168–172).

Critics might argue that the use of a narrow industry definition might cause problems when two different industries (by product definition) directly compete against each other in addressing the same abstract customer need. This case often occurs in discontinuous, transitory periods, as discussed by Foster (1986), among others, when new products with a new technology replace products based on an old technology.

When analyzing *old industries* and the causes for their decline, a narrow product-based industry definition would indeed ignore the new competitors responsible for this situation (Pfeiffer et al. 1997, p. 32). Consequently, most research focusing on the transitory paths from old to new industries (i.e., inter-industry dynamics) takes a broader, more abstract approach to overcome the inherent problems of narrow definitions (Weiß 1989). As research in Klepper's tradition, however, focuses entirely on *new industries* and on intra-industry dynamics during their emergence, Simons (1995) argues that narrowly defined industries are in fact a practical necessity for conducting this type of research.

Klepper's Temporal Focus: The Emergence of New Industries Rather than Their Decline

Klepper's industry life cycle research focuses on the emergence of new industries rather than their decline (Agarwal et al. 2002). Gort and Klepper (1982, p. 630) even explicitly factored out "*the period of eventual decay or contraction*

in absolute market size.” To correctly interpret the motivation and to better understand the implications of where one draws this demarcation line, one can briefly digress and discuss product life cycle concepts in strategic management, as they follow a different approach for different reasons.

In the 1950s, discussions arose in marketing and management science about the question of whether a company’s products follow predictable patterns in demand (Dean 1950). Similar to evolutionary trajectories in biology, the evolution of a product’s market volume, that is, the demand for the product, is assumed to follow a natural life cycle. A four-stage model became the dominant design in the literature, describing a product’s life cycle as the sequence of (a) introduction, (b) growth, (c) maturity, and (d) decline (e.g., Patton 1959; Levitt 1965).

From the very beginning, there was a controversy around the validity of the product life cycle concept (Polli and Cook 1969). Certain authors argued against simply transferring biological thinking to management research because of its determinism (Penrose 1952). Other authors emphasized the lack of the concept’s empirical underpinning. As Dhalla and Yuseph (1976, p. 103) state: “*Most writers present the PLC [product life cycle] concept in qualitative terms, in the form of idealization without any empirical backing.*” Often management consultants such as Arthur D. Little or the Boston Consulting Group, rather than academic scholars, promoted the concept (Servatius 1985, pp. 112–113). Thus, the combination of intuitively appealing predictions, catchy rule-of-thumb strategies, and a shortage of empirical justification found in many publications on this topic is not surprising. Academic studies trying to establish sound empirical validation of the product life cycle concept reported mixed results at best (Höft 1992, pp. 23–25). For example, Cox (1967) surveyed a sample of 754 ethical drug products introduced in the USA in 1955–1960, and Polli and Cook (1969) presented results from a sample of 140 nondurable consumer goods. Both studies’ results clearly demonstrated the limited empirical validity of the product life cycle concept. It took Cox (1967) six entirely different ‘basic’ types of product life cycles curves to describe the empirical patterns for different products he examined. In addition, large differences in the rate at which cycles progressed were observed, as were significant differences in skewness and kurtosis. Such problems were often found in the mature and declining phases in particular (Harrigan 1980; Hopenhayn 1993). Therefore, Lambkin and Day (1989, p. 4) concluded that “*as criticisms of the conceptual deficiencies and strategic shortcomings mount, the basic notion of [product] life cycles may be so eroded that little of value will remain.*”

From such a perspective, Gort and Klepper's (1982) approach focusing on the industry's emergence and excluding the phase of decline might be easily misinterpreted as an evasive move. However, such an argument ignores the inherent differences between the product life cycle studies in strategic and management research as opposed to industrial organization research studies on the industry life cycle in Klepper's tradition (Klepper 1997). The former regularly takes the company-level perspective on individual products and focuses on predicting demand patterns to turn "*the knowledge of its existence into a managerial instrument of competitive power*" (Levitt 1965, p. 81). To exclude the period of decay would, by definition, significantly limit the concept's ability to guide and support strategic decision making. For research on the industry life cycle and the question of why it excludes the period of decay, one must always acknowledge that this domain has an entirely different research objective. Research on the industry life cycle seeks to examine and explain the path by which industries arrive at relatively stable market structures, for example, the oligopolies in the automobile or television industries (Klepper and Simons 1996). That observation explains that industry life cycle research necessarily focuses on the period of an industry's emergence and can, therefore, exclude "the period of eventual decay" with no harm to research results.

To summarize the previous sections, three aspects characterize the Klepperian perspective:

The focus is on the industry side, that is, the number of firms active in an industry and its changes over time.

A fairly precise industry definition along narrow product classes defines the industry population, which is examined empirically.

The focus is on the emergence of new industries and intra-industry dynamics, thus excluding the period of the industry's eventual decay.

Building on these findings, this chapter will now discuss the set of empirical regularities found in the industries studied by Gort and Klepper (1982), Klepper and Graddy (1990), and other authors in this field.

Klepper's Industry Life Cycle: A Set of Stylized Facts on the Emergence of New Industries

Hypothesizing that the number of firms within an industry is non-monotonic over time, Gort and Klepper (1982) assembled an extensive dataset for 46

US product industries. The purpose was to explore the empirical patterns of industrial dynamics in these industries before they reached relatively stable market structures. Their dataset comprised the profiles of net entry into each industry using competitive-level data derived from the Thomas' Register of American Manufacturers (Agarwal et al. 2002). Measured on the basis of the first commercial introduction of the product, that is, the inception of the industry, their dataset spans a period of 73 years from 1887 (introduction of the phonograph record) to 1960 (introduction of the laser). Table 2.1 lists the industries comprising their dataset.

The study's results were striking. Gort and Klepper (1982, p. 639) found robust empirical evidence for their hypothesis that the number of participants in an industry is non-monotonic over time. Critics might argue that this result is intuitive, but as Buenstorf (2007) remarked, the paper was a milestone in delivering detailed empirical evidence for a broad range of industries. Most importantly, the study identified how dramatically the number of firms in an industry changes during the emergence of the industry (Jovanovic and MacDonald 1994).

Figure 2.2 (based on Gort and Klepper 1982) illustrates the general pattern; after a buildup in the number of firms, most industries experience a rapid decline (Agarwal 1998). Based on the numbers of net entry and net exit, respectively, the study decomposes the evolutionary path into five stages (McGahan et al. 2004). Despite the differences found in the length of the stages and in absolute firm number levels, the *stylized* patterns tended

Table 2.1 Industries analyzed by the Gort and Klepper (1982) study

Baseboard radiant heating	Missiles, guided	Streptomycin
Compressor freon	Motors, outboard	Styrene
Computers	Nylon	Tanks, cryogenic
Crystals, piezo	Paints, rubber and rubber based	Tapes, recording
DDT	Penicillin	Telemeters
Electrocardiographs	Pens, ballpoint	Television, apparatus, parts
Electric blankets	Photocopy machines	Tents, oxygen
Electric shavers	Polariscope	Tires, automobile
Engines, jet-propelled	Pumps, heat	Transistors
Engines, rocket	Radar, marine, airborne, other	Trees, artificial Xmas
Fluorescent lamps	Radio transmitters	Tubes, cathode ray
Freezers, home and farm	Reactors, nuclear	Turbines, gas
Gauges, beta-ray	Readers, microfilm	Whippers, windscreen
Gyroscopes	Records, phonograph	Zippers
Lasers	Saccharin	
Machinery, adding and calculating	Shampoo	

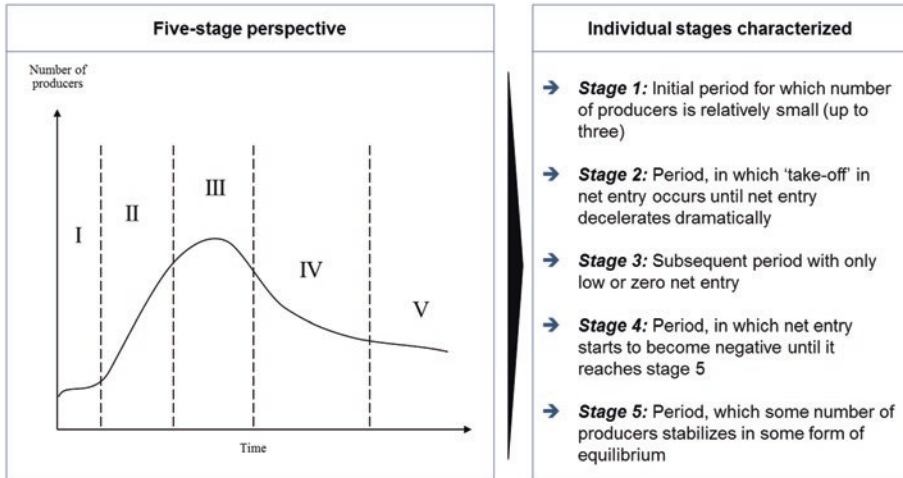


Fig. 2.2 The industry life cycle described as a pattern of five stages

to be remarkably consistent across the various industries in the dataset (Horvath et al. 2001).

When Klepper and Graddy (1990) later examined an extended set of the data used by Gort and Klepper (1982), they confirmed the earlier results. However, Klepper and Graddy decided to decompose the general pattern into three, rather than five, stages. By overcoming the practical problem of clearly identifying stage I in the five-stage model (Gort and Klepper 1982, p. 642), their three-stage decomposition identified a distinctive empirical regularity. This pattern consequently became the central focus in academic reasoning on the industry life cycle. The fact is that a severe decrease occurs in the number of firms in the industry: the shakeout (Simons 1995, p. 2).

The demarcation in the three-stage model is clear-cut. Stage I starts at the industry's inception and continues as long as there are rising firm numbers, that is, there is positive net entry. Stage II spans the period thereafter, when the firm numbers tend to decrease, that is, there is negative net entry. Stage III comprises the period after the decrease, when the number of firms tends to stabilize around a certain level. Figure 2.3 illustrates the three stages according to Klepper and Graddy (1990) and exemplified with data from the US tire industry (Klepper and Simons 1997).

Over the following decade, scholars such as Agarwal (1997), Simons (2003), and Buenstorf (2007) contributed additional empirical and theoretical work. As analyzed by Peltoniemi (2011) in a review of 216 industry life cycle studies with 169 datasets, three aspects characterize the state of industry life cycle research, and they, in turn, suggest important avenues for future research.

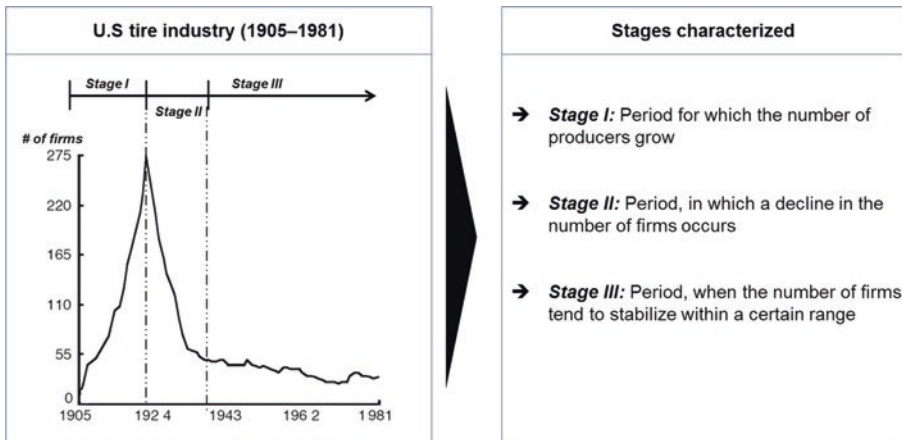


Fig. 2.3 The industry life cycle as a three-stage pattern

First, the existing range of industries researched is highly dominated by traditional product and manufacturing industries, as the overview in Table 2.2 indicates. There are several reasons for the dominance of product industries in industry life cycle research. Most important, product industries have a great advantage in the availability of industry data. Various studies, for example, use data from Thomas' Register for American Manufacturers, a broad and reliable source known for its focused, longitudinal information on products and corresponding suppliers in the USA (Agarwal et al. 2002).

Such product handbooks and supplier directories do exist for various industries, and Carroll and Hannan (2000, p. 168) consider them a primary, ideal source for population data. For services industries, however, such directories are rare and those that do exist are often fuzzy in the service definitions. The dominance of product industries also stems from the research focus itself. Many industry life cycle researchers have a strong interest in the question of how innovation, R&D, and innovation processes shape industry evolution (Audretsch 1995c; Nelson 1994; Agarwal and Bayus 2002). Whereas in product industries the innovation mechanisms, the scalability of R&D, and the resulting improvement in a firm's market position often occur in a rather prototypical manner, controversy surrounds the discussion of services' potential to innovate to achieve productivity growth (Baumol 1996).

As a consequence of both issues, the difficulty in finding sources and the unclear innovation processes, there are currently only very few studies on services industries. Fein's (1998) study on the wholesale industry and Baum, Korn, and Kotha's (1995) study on facsimile transmission services are among the few notable exceptions. Therefore, little is known about whether life cycle

Table 2.2 Selected studies on industry life cycle patterns

Industry	Author(s)	Data source	Setting	Support/ challenge
Automobile	Abernathy (1978)	Firm archives; trade press; interviews	USA	Support
	Argyres and Bigelow (2007)	Previous research	USA	Support
	Cantner et al. (2009)	Yearbooks; historical and statistical journals; books; patents	Germany	Support
	Mazzucato (2002)	Wards Automotive Yearbook	USA	Support
	Mazzucato (2003)	Wards Automotive Yearbook; Moody's Industrial Manual; Standard and Poor's Analyst's Handbook	USA	Support
B2B exchanges	Day et al. (2003)	–	USA	Support
Beer brewing	Horvath et al. (2001)	American Breweries	USA	Support
	Swaminathan (1998)	American Breweries; USA Modern Brewery Age Bluebooks; Brewers Almanac; Microbrewery Resource Handbooks	USA	Challenge
Info-communications	Krafft (2004)	National Institute for Statistics and Economic Studies; Chambers of Commerce and Industry	France	Challenge
Gas turbine	Bergek et al. (2008)	Annual reports; trade press; interviews	Worldwide	Challenge
Internet start-ups	Goldfarb et al. (2007)	Business Plan Archive	USA	Support
Laser	Klepper and Thompson (2006)	Buyer's Guide by Laser Focus	USA	Challenge
	Buenstorf (2007)	Laser Focus World	Germany	Challenge

(continued)

Table 2.2 (continued)

Industry	Author(s)	Data source	Setting	Support/ challenge
Personal computer	Mazzucato (2002)	International Data Corporation (IDC)	USA	Support
	Mazzucato (2003)	Compustat; Standard and Poor's Analyst's Handbook	USA	Support
Pharmaceutical wholesaling	Fein (1998)	Investment Dealer's Digest; Mergers & Acquisitions	USA	Challenge
Semiconductor	Tan and Mathews (2010)	Semiconductor Industry Association	Worldwide	Support
Synthetic dye	Murmann and Homburg (2001)	Industry and firm histories; trade directories; trade associations; biographies	UK, Germany, France, Switzerland, USA	Challenge
Telecommunications	Baum et al. (1995)	Manhattan Business Classified Directory	USA	Support
Tire	Jovanovic and MacDonald (1994)	Thomas; US Department of Labor; Bureau of Labor Statistics	USA	Support
	Carree and Thurik (2000)	US Price Index of Tires; US Department of Commerce	USA	Challenge
	Kato (2010)	Thomas; US Department of Labor; Bureau of Labor Statistics	USA	Support
Turboprop engine	Bonaccorsi and Giuri (2000)	Atlas Aviation; Jane's Worldwide All the World's Aircraft		Challenge
Wine	Swaminathan (1995)	Wines & Vines	USA	Support

(continued)

Table 2.2 (continued)

Industry	Author(s)	Data source	Setting	Support/ challenge
Panel studies	Agarwal et al. (2002)	Thomas	USA	Support
	Agarwal and Gort (2001)	Thomas	USA	Challenge
	Audretsch (1995b)	US Small Business Administration	USA	Support
	Bayus et al. (2007)	Dealerscope Merchandising; Predicasts Basebook	USA	Support
	Fotopoulos and Spence (1998)	Federation of Greek Industries	Greece	Support
	Gort and Klepper (1982)	Thomas	USA	Support
	Dinlersoz and MacDonald (2009)	US Census Bureau's Census of Manufactures	USA	Support
	Klepper and Graddy (1990)	Thomas; government and trade sources	USA	Support
	Klepper and Miller (1995)	Thomas	USA	Support
	Plehn-Dujowich (2009)	US Census Bureau's Census of Manufactures	USA	Support
	Shane (2001)	MIT Patents	USA	Support
	Utterback and Abernathy (1975)	National Science Foundation	USA	Support
	Bartelsman et al. (2005)	OECD	USA, Germany, France, Italy, UK, Canada, Denmark, Finland, Netherlands, Portugal	Support

Based on: Peltoniemi (2011)

processes take place similarly to those in product industries and whether the commonly used theoretical explanation models apply to services industries.

The observed lack of research on service industries is a surprising result, given that during recent decades, industrialized economies have increasingly tended to structurally change from predominantly manufacturing societies to service economies. The fact that professional services, for example, are a major global sector with estimated revenues of approximately \$ 2 trillion already in 2010 and average annual growth rates of 10 percent over the last three decades (Broderick 2011, p. 1) illustrates this phenomenon. Moreover, services are of ever-increasing economic importance not only for modern, developed economies but also for emerging regions (PWC 2011).

A second factor characterizes the status quo in industry life cycle research. The vast majority of datasets focus geographically on US industries. Among 169 datasets, Peltoniemi (2011) finds 103 using solely US data, 9 focus on Canada, and 19 use worldwide data. Only 38 datasets—roughly one-fifth of all existing datasets—represent the nations of the “rest of the world”. An improvement of this situation requires a significant increase in non-US datasets, focusing, for example, on European countries. In recent years, Cantner et al. (2009), Günther (2009), and Buenstorf (2007) have conducted industry life cycle studies in the German context, thereby successfully contributing to broadening geographical focus.

The third and final aspect of the status quo is that many of the existing studies support the regularities found in Klepper’s initial studies. Among these studies, Filson (2001) collected empirical data for the USA on automobiles (1895–1929), personal computers (1975–1999), rigid disk drives (1980–1999), computer monitors (1971–1999), and computer printers (1970–1999) to examine the nature and effects of technological change. Furthermore, Dowell and Swaminathan (2006) researched entry timing, exploration, and firm survival in the early US bicycle industry. A word of caution is important here. It is crucial to realize that not every study examining the evolution of industries and firm numbers over time identified an industry life cycle pattern. Certain industries exhibited only a weak shakeout or did not experience any shakeout. Bonaccorsi and Giuri (2001), for example, found no shakeout among firms producing turboprop engines. The same “no shakeout” situation was identified by Buenstorf (2007) and Klepper and Thompson (2006) when examining the German and the US laser industries. They attribute this to the evolution of submarkets. Krafft (2004) found that in the French communications industry, a shakeout took place, but only in certain geographic regions.

Despite sporadic no-shakeout results, the broad empirical support for industry life cycle patterns can serve as a point of departure for new research when interpreted as *stylized facts* (Kaldor 1961). According to Geroski (2003,

p. 18), stylized facts can be defined as “the summaries of the common experiences which seem to be present in a number of different realizations of the same event.” Even if “they skip over many of the idiosyncratic features that are present in each particular realization, and [...] that they are not necessarily present in each and every realization of that event,” stylized facts are well accepted in research due to their robustness.

In this sense, the industry life cycle can be defined as a set of stylized facts found in the evolution of a new industry. Three stylized facts in particular describe the path firm numbers follow over time.

Stylized fact I: The number of producers in an industry initially rises (stage I).

Stylized fact II: The number of producers in an industry subsequently falls (stage II).

Stylized fact III: The number of producers in an industry finally levels off (stage III).

Although these three stylized facts capture the industry life cycle pattern's overall direction, an additional stylized fact IV captures the extent to which the decrease in firm numbers occurs. The issue of what percentage reduction constitutes a shakeout and how it is measured is debated in the literature. Certain authors such as Filson (2001, p. 485) use the net exit rate. He defines the shakeout phase as beginning when the net exit rate exceeds 15 percent and continuing through a period of sustained net exit. Other authors see a shakeout when the rate of failures in an industry is high. Day et al. (2003) define a shakeout as when 80 percent of all entrants exit. A final group of authors use the difference in firm numbers between peak year and the year the firm numbers begin to level off (Audretsch and Feldman 1996).

Klepper and Miller (1995) define a shakeout as when the number of firms declines after the peak by at least 30 percent and does not rebound to more than 90 percent of the peak level. The latter measure has proven to be a pragmatic solution and is used in several publications. When Klepper and Graddy (1990, p. 32) analyzed their data in such a way, they found that for most industries, the percentage decrease was severe rather than being only a small dip. They found a relative average decrease of 52 percent, indicating that an industry's population was cut by approximately half from its previous peak level. Thus, one can state

Stylized fact IV: A shakeout occurs, that is, there is a significant decrease in firm numbers (shakeout).

Finally, stylized fact V specifies the context in which stages I–III and the shakeout occur. As noted earlier, industry life cycle research focuses on the emergence of new industries. As defined by Porter (1980, p. 215) “(e)merging

industries are newly formed [...] industries that have been created by technological innovations, shifts in relative cost relationships, emergence of new customer need, or other economic and sociological changes that elevate a new product or service to the level of a potentially viable business opportunity.” That is, the defining aspect of emerging industries is that a business opportunity manifests itself in the form of an increasing revenue pool for the firms in the industry. This is illustrated by

Stylized fact V: The shakeout occurs despite rising demand defined by market volume (emerging industry).

These stylized facts together define what constitutes a *Klepperian industry life cycle* and provide the framework against which empirical data of new industries can be examined or theoretical models can be tested. Five of the most prominent theories will be discussed in the following sections.

Five Major Shakeout Theories to Explain Shakeouts in an Industry

The five commonly used theories identifying the possible causes of a decrease in the number of producers can be divided into two major categories. The first three models attribute the dynamics of firm numbers to technological advances, based, for example, on single, ground-breaking technological events or resulting from incremental technological advantages. Two other models, in contrast, depict shakeouts as a consequence of non-technological causes, such as demand factors or uncertainty of market size. The following two subsections review the theoretical contributions for both types of theory, describing their theoretical line of argumentation and outlining their predictions for shakeout timing and course.

Three Theories Explaining Shakeouts Based on Technological Changes

Scholars have long recognized that the dynamics of industry structure and the size of its firms relate closely to changes in technology and productivity (Winter 1984; Acs and Audretsch 1987; Nelson 1994). Although the three theories discussed in this section share the concept of technological change as the shakeout's root cause, they differ in the speed of change (sudden vs. gradual) and

where the technological changes originate (inside the industry vs. outside the industry). Figure 2.4 conceptualizes the different perspectives.

The Innovative Gamble Theory

Jovanovic and MacDonald (1994) propose a theoretical model explaining shakeouts as result of an “innovative gamble,” a term coined by Klepper and Simons (1996, p. 81). Formalizing some of Schumpeter’s (1934, 1939, 1942) major ideas, the model assumes an industry context established and shaped by exogenous events, that is, inventions in science and technological developments outside the industry in question. The formal model assumes a free-entry equilibrium and two exogenous events determining the industry structure in the long term: a basic invention and a refinement invention. Although the basic invention spawns the industry, the refinement invention triggers the subsequent shakeout.

The model describes the development of the industry’s trajectory. By successfully innovating on the basic invention, firms enter and the industry emerges. Firms meet a continuous and strictly declining inverse market demand not varying over time. Successful entries into the industry cause expected returns to fall and reach a normal level. A static equilibrium becomes established with no further exit and entry occurring until the refinement innovation (high-tech) arrives, which supersedes the technology previously employed (low-tech).

In the wake of the refinement, invention incumbents must decide whether to stick to low-tech know-how, to attempt innovation, or to exit. For all other companies outside the industry, the refinement provides a new opportunity to enter by innovation. As innovative success is assumed to be stochastic, only

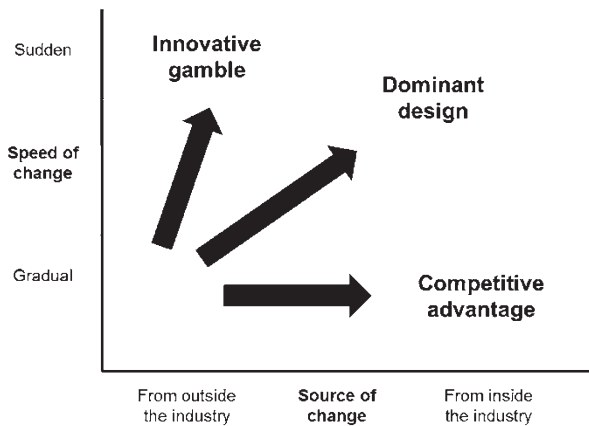


Fig. 2.4 Commonly used technological shakeout theories and their perspectives

a portion of the incumbents and the new entrants will realize the benefits offered by the refinement innovation. Because of their prevailing experience from the low-tech period, incumbents exhibit a higher chance of successfully innovating as new entrants must acquire the low-tech know-how as a necessary precondition for high-tech. Consequently, new entrants have a higher post-refinement hazard rate in comparison with incumbents.

The refinement innovation results in a reduction of production cost accompanied by increased optimal firm scale. Exit of low-tech firms occurs en masse, particularly when the refinement leads to a massively increased industry output due to high-tech producers' considerable growth. The corresponding price decline drives the technological laggards (i.e., low-tech producers), out of the market and reduces the overall number of firms relative to the pre-refinement state. Figure 2.5 depicts the model's prediction of firm number patterns with a shakeout shortly after a refinement invention occurs.

When evaluating the model's strengths and weaknesses, one can observe that one of its major strengths is an explicit transfer of Schumpeter's ideas to the industry life cycle context. Furthermore, it theoretically allows not only to explain the situation of rapid entry and subsequent net exit but also to model the accompanying rising output and falling prices (Jovanovic and MacDonald 1994, p. 324). Those factors are commonly found in industries experiencing an industry life cycle pattern. Jovanovic and MacDonald tested the model parameterized for data from the US automobile tire industry (1906–1973) with a refinement through the invention of the Banbury mixer, a technology for mixing rubber with other components. They found that the model

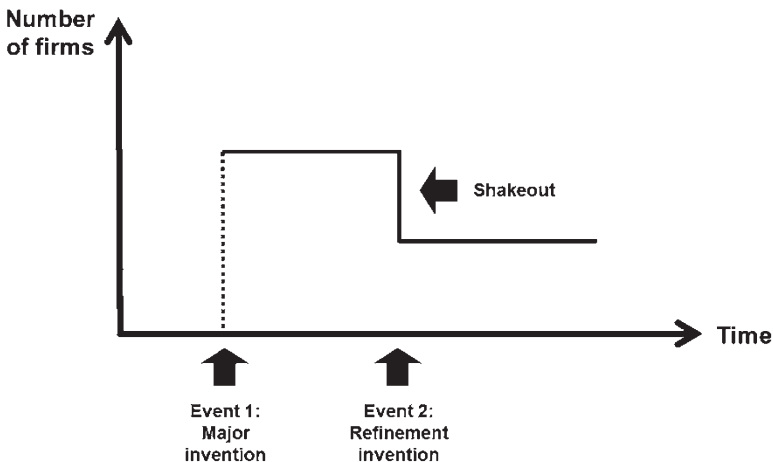


Fig. 2.5 Predicted pattern of an industry life cycle (Based on the theoretical model of Jovanovic and MacDonald (1994))

accurately explains the empirically observed non-monotonic time path of firm numbers in the US automobile tire industry.

Klepper and Simons (1996), however, come to a different conclusion when evaluating theoretical explanations for shakeouts in four different industries (automobiles, automobile tires, televisions, and penicillin). Despite agreeing on the importance of technological innovations for the development of industry structures, they challenge the explanatory power of the innovative gamble theory to explain the shakeout in the US tire industry. They make the point that according to their own analysis, the Banbury mixer's effect of accelerating "*the mixing process by more than an order of magnitude*" (Jovanovic and MacDonald 1994, p. 345) was at best confined to a small fraction of the entire production process. Moreover, other production stages seem to have contributed even more strongly to the observed overall productivity growth at that time. Under those circumstances, linking the Banbury mixer to a necessary condition of the model, the increase in the optimal scale, is rather questionable. Klepper and Simons identified another key assumption of the model that was not fulfilled. The model assumes that the refinement invention is difficult to implement, and, therefore, trying to innovate is a risky game with a high rate of failure. In contrast, the Banbury mixer could be procured from specialized suppliers, who even helped to adjust production lines to the new technology. Implementation obstacles, therefore, should not have been large enough to generate a substantially large portion of failure cases driving companies out of the market (Klepper and Simons 1996, p. 85).

Their criticism of the model's application to the US tire industry is rooted in the model's overall characteristics. The model rests critically on the strong assumption of a single refinement invention with a significant effect on the industry's competitive structure. The theory's application to a given industry is, therefore, limited in several ways. First, the technology that represents the initial basic invention and the technology for subsequent single refinement invention must both be identified. Second, there must be detailed evidence regarding the technological changes and how they affect the efficient scale of production.

The Dominant Design Theory

The point of departure in this theoretical model is the idea that the emergence of a dominant design alters the terms of competition in an industry. The term *dominant design* was coined by Utterback and Abernathy (1975) and refers to "*a specific path, along an industry's design hierarchy, which establishes dominance among competing design paths*" (Suarez and Utterback 1995, p. 416).

The theory states that in the early development of industries, a situation prevails in which many types of general product form exist. The different types of structural and technical models compete in the market place. In the case of typewriters, for instance, models with two entirely different keyboards for the upper- and lowercase function competed against models with only one keyboard including a shift key. Even among those with one keyboard, the keyboard arrangement for numbers and characters differed (Utterback 1996, pp. 3–5). Considerable uncertainty about user preferences and the technological means of satisfying them is the logical consequence in this situation. As both producers and customers increasingly experiment with competing versions, at one point, a de facto standard is likely to emerge which becomes locked in: the dominant design.

Figure 2.6 illustrates a simplified path pattern toward a dominant design (based on Utterback and Suarez 1993, p. 6), that is, a de facto industry standard. As opposed to the narrow, conventional view of a technical standard, a standard established by a dominant design can be interpreted more broadly. In the words of Hemenway (1975, p. 12) this is what “*is accepted for current use through authority, custom, or general consent.*” Despite being strongly influenced by technological factors, the dominant design often results from a unique mixture of social, economic, and organizational factors. The famous story about how Video Home System (VHS) became the dominant design for Video cassette Recorder (VCR) systems is a case in point (Rosenbloom and Abernathy 1982). Given that such dominant designs emerge, the question of how they can trigger a shakeout has to be discussed.

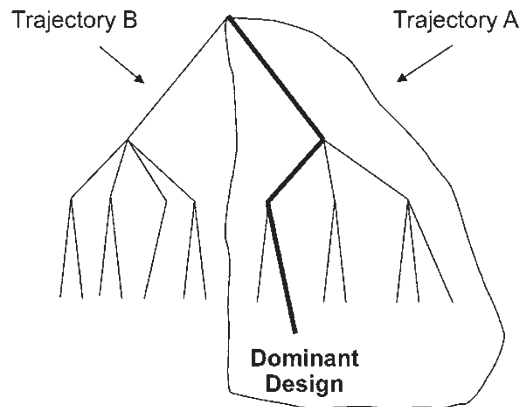


Fig. 2.6 Different trajectories and the dominant design

Suarez and Utterback (1995) outlined a theoretical argumentation focusing on the industry life cycle and tested the model successfully for the automobile, typewriter, transistors, electronic calculator, television, and picture tube industries. The main argument is that the emergence of a dominant design has an asymmetric effect on the industry's population, that is, for those already following the *right* trajectory and for those on the *wrong* trajectories. Companies already following the dominant design can further expand existing skills and production facilities. All others must change their skill set and redesign product and production infrastructure. The previous trajectory reaches a dead end. New investments are necessary to catch up, and old investments in the nondominant design become worthless, generating a competitive environment that forces certain companies to exit.

A different reasoning applies to potential new entrants. In the predominant design period, new entrants have the opportunity to leap-frog incumbents by introducing new technical alternatives. After a dominant design is established, though, this strategy becomes very difficult, and the mode of competition shifts to producing the dominant design at the lowest cost. This strategy reduces the possibility of successful entry as incumbents have advantages over newcomers in, for example, achieving economies of scale (Boston Consulting Group 1968). Both effects in combination, a slowdown in new entry and an increase in incumbent exits, can yield continuous negative net entry: a shakeout.

Comparative Advantage Theory

In contrast to the former two theories, which rest on the notion that a single distinct technological event triggers the shakeout, the theoretical approach discussed in this section takes a different line of argumentation. Rather than a sudden discontinuity, a gradually intensifying competitive pressure causes the shakeout. The key idea is that certain firms in an industry possess certain competitive advantages over other firms. The advantages can continuously expand over time, and put companies initially lacking such capabilities in a difficult position, in which closing the performance gap becomes increasingly challenging. Several such *success-breeds-success* theories can be found across economics and in strategic management research. Each author draws on different sources of competitive advantage (Simons 1995), such as advertising (Sutton 1981), progressive cost reduction due to economies of scale in production (Boston Consulting Group 1968), and technological leadership in general (Nelson and Winter 1978).

Klepper (1996, 2002) proposes, in two slightly different variants, a theoretical success-breeds-success model constructed to specifically explain industry shakeouts. He departs from theories of industry evolution (i.e., Nelson and Winter 1982) and the discussions of the relationship between market structure and R&D (Dasgupta and Stiglitz 1980). His model features “*heterogeneity in firm capabilities, cost of expansion that condition market selection, and increasing returns associated with technological change*” (Klepper 2002, p. 37). R&D proves to link the factors.

In Klepper’s model, firms differ in their R&D productivity and cluster into two types of firms. Type I firms have a higher R&D productivity than most type II firms. The higher R&D productivity of type I firms stems from their pre-entry experience in related industries. Type II firms are inexperienced in this respect, a weakness manifested in their low R&D productivity. R&D productivity remains fixed over time in the model. Firms are assumed to struggle to reduce their average cost by investing in R&D. Monopoly gains from successful R&D last only for one period because, in the following period, all R&D is costlessly imitated by other firms in the industry. Larger firms are assumed to benefit more from R&D as the total return from lowering average cost is scaled by individual output. Finally, increasing a firm’s output is seen to be subject to a marginally increasing cost of adjustment.

In the early years of an industry, a large price-cost margin allows both type 1 and type 2 firms to profitably enter the industry. Over time, competition increases and prices decrease as more new firms enter the industry while the early incumbents expand their sales volumes and their total return. At some point, the price-level is too low for type 2 firms to enter. Later, even type 1 firms find entry difficult.

The shakeout results from the combined effects of cessation of entry and an increasing hazard rate among the industry’s incumbents. Entry becomes prohibitive because of shrinking price-cost margins. Driven down by previous entries and the ongoing expansion of large incumbents, the remaining profit-margin becomes too small for new entrants to offset the one-time cost of entry and to cushion disadvantages in average cost. Shrinking price-cost margins even put smaller incumbents, especially those with low R&D productivity, under pressure and force them to exit the industry.

Klepper (2002, p. 41) summarizes the model’s two major predictions in a straightforward, simple recommendation: “*better to enter early than late, and better to be experienced.*” The predictions of the competitive advantage theory regarding the hazard rates for different cohorts in the different life cycle phases are summarized in Fig. 2.7.

Dimensions	Predictions
Change of the hazard of incumbent (experienced) firms at the outset of the shakeout	<ul style="list-style-type: none"> • No increase in the hazard at the time of shakeout
Change in the nature of evolution of the hazard of both incumbents and shakeout entrants as the shakeout proceeds	<ul style="list-style-type: none"> • Apart from effects of age on the hazard, there is also no reason for the hazard to decline as the shakeout proceeds
Differences during shakeout in the hazards of firms that entered at different times	<ul style="list-style-type: none"> • By the time of the shakeout, the hazard should be lower the earlier the time of entry • The entry cohort difference will no dissipate over time, but might even grow
Effect of age on the hazard	<ul style="list-style-type: none"> • Hazard will decline with age, particularly in industries with a lot of diversity among the entrants • Diversity is expected to be greater for industries in which a small percentage of entrants have experience producing related products prior to entry

Fig. 2.7 Overview of predictions according to the comparative advantage theory (Based on Klepper and Simons 1999)

Two Theories Explaining the Shakeout by Non-technological Reasons

The three major theories discussed above focus on technological change as the root cause for shakeouts and the industry life cycle pattern. In the following section, therefore, two additional theories shall be analyzed:

- Declining growth of demand (Hopenhayn 1993),
- Exit follows entry (Horvath et al. 2001).

Both theories are non-technological in nature and focus on the demand side to explain the massive exit of firms as the industry matures. Hopenhayn (1993) discusses a slowdown in demand expansion as an important factor, whereas Horvath et al. (2001) stress the uncertainty about the potential profitability in the market.

Declining Growth of Demand Theory

Conventional wisdom in strategic management links a high rate of exits in an industry to declining markets and deteriorating demand (Harrigan 1980; Harrigan and Porter 1983). In contrast, shakeouts discussed in industry life cycle research occur in a period during which demand continues to rise. But even growing demand can have a negative impact on an industry's population, as demonstrated in a theoretical model developed by Hopenhayn (1993). The combined effect of two factors generates the shakeout: a decrease in the rate of growth of aggregate demand and an increase in average firm size.

In Hopenhayn's model, the change in demand for a product is assumed to be an exogenous factor. The growth in demand is not constant, but rises significantly during the market's initiation and slows after a period of sustained growth. That is, it reflects the assumption that market growth can be well approximated by a logistic diffusion curve, often better known for its S-shape. This prediction is consistent with results found in various empirical studies about the development of new markets (e.g., Rogers 1962; Golder and Tellis 2004) and a broader range of related theoretical considerations (see the review in Mahajan et al. 1990). In addition, Moore (2002) presents a different, more complex, and modified theory of demand evolution, which also rests on an S-shaped demand pattern.

In the tradition of models explaining industry evolution based on the concept of stochastic growth and selection (Jovanovic 1982), Hopenhayn's view of the industry is characterized by heterogeneity in firm size and related efficiency levels. His model explains the shakeout as follows: As demand takes off rapidly, incumbents are limited by scale and cannot fully satisfy the increasing demand. New and, by definition, small entrants arrive in the industry and take advantage of the incumbents' limitations. The industry experiences increased entry although incumbents continue to grow. As demand growth slows, supply expansion finally exceeds the demand increase. A decrease in demand elasticity as the industry expands is an important underlying assumption. Later, new entry ceases as result of a lack of uncontested market volume, which previous new entrants could address despite being relatively inefficient in comparison to incumbents. Selection processes among the incumbents, which have different levels of productivity, result in ongoing exit among them as well.

The shakeout materializes as the result of a close interdependency between demand, price development, firm numbers, and, in particular, scale limitations. Following these dynamics, the industry experiences a shift in the age structure toward older firms and thereby an increase in average firm size. Only

the most efficient firms survive in the long run, and an equilibrium situation becomes established in which the demand is met. The industry structure's firm numbers finally stabilize.

Hopenhayn (1993, p. 24) derives three distinctive predictions from his model. The extent of the shakeout is larger,

the faster the diffusion of demand,
the greater the impact of selection, and
the larger the gap between the average size of incumbent firms and the average size of entrants, in an industry.

Undoubtedly, Hopenhayn's paper was seminal and unique in the sense that it opened a new, complementary research stream for demand-side arguments to explain shakeouts. The S-shaped demand pattern, as one of the model's core assumptions, has the advantage of not being limited to a certain group of industries (i.e., technologically progressive product industries) but can be considered a general phenomenon. Rogers (1962), for example, found S-shaped patterns in his empirical work on social innovations. Moreover, as Cabral (2011, p. 541) noted, Hopenhayn proposed the first mathematical, equilibrium model of industry shakeout and performed a complementary series of numerical simulations.

Despite the strengths of Hopenhayn's approach, one must carefully consider the full range of assumptions when using his formal model for a specific industry. The model requires that "*the optimal scale of the firm is small relative to aggregate industry demand so [that] at any point in time there will be a large number of firms in the industry*" (Hopenhayn 1993, p. 6). Although the argumentation is made at an abstract level, the mechanism that drives the cost reduction and price reduction reflects technology-driven thinking in a broader sense. The precise characteristics of demand growth and stochastic evolution of firms also figure strongly and partly curtail the range of potential applications. Nevertheless, the idea that firms overestimate demand in later stages is a compelling and very intuitive argument, despite the limitations regarding a general use of Hopenhayn's formal model.

Exit Follows Entry Theory

The fifth and final major theory was developed by Horvath et al. (2001). It approaches the shakeout phenomena using an argumentation driven

primarily from the entry side. Other theories, predominantly technologically oriented theories, consider the shakeout as a combined result of decreasing entry rates but especially of massively increased exit rates (Jovanovic and MacDonald 1994).

In contrast, Horvath et al. (2001) argue that exits are a common event among all entry cohorts in an industry, and massive exit requires an earlier massively increased entry. Their theory posits that too many firms enter an industry at the same time and the shakeout is, therefore, a purely logical reaction to the previous mass-entry into the industry. Without such a mass-entry, a much lower number of firms would exit. Rather than explaining the proximate causes for the firms' exit, this theory asks for an explanation for the massive entry into an industry.

Horvath et al. were motivated by the evolution of the beer brewing industry in the USA between 1800 and 1980. They used its empirical evidence to test and support the theory, as outlined in the remainder of this section. Their study also briefly considered empirical patterns from the US automobile and tire industries. The beer industry developed as predicted by the industry life cycle. The number of firms rose significantly in 1800–1880. Then a severe shakeout occurred between 1880 and 1890, which reduced the industry population by approximately 40 percent. The data revealed that the period of prohibition (1919–1933) was just a temporary break in the overall industrial dynamics triggered with the beginning of the shakeout some 40 years earlier. In their empirical analysis, Horvath et al. compared the shape and the levels of the hazard function in different time cohorts. They found that the shape of the hazard function remains stable across the cohorts over time. All cohorts exhibit a high probability of failure in the first two years of a cohort's life. Over time, this exit hazard rate falls sharply and continuously. The level of the hazard function, however, is lower in pre-shakeout years compared to post-shakeout years. By observing the stability of the hazard function's shape, they derive a key prediction: *“If an unusually large cohort of firms enters an industry, a large number of exits (both gross and net) will be observed in subsequent years”* (Horvath et al. 2001, p. 1024).

They explain the dynamics of mass-entry into an industry as the effect of information accumulation. They capture their theoretical argumentation in a formal model cast in discrete time. The model assumes that entrepreneurs are uncertain about the viability and profitability of the industry itself. Their uncertainty leads to reluctance to enter until more sufficient information is available. Only a few firms enter in any time period despite uncertainty. The major portion of entrepreneurs remains outside the industry, but is ready to join if they perceive enough strong positive signals. They use information about

existing firms in the industry to examine the opportunities. In Hopenhayn's (1993) theory, firms focus on information from the demand side, whereas the firms in Horvath et al.'s theory observe three types of signals on the supply side: entering entrepreneurs, exiting entrepreneurs, and the number of incumbents receiving orders. Based on the number and quality of information points regarding those three factors, the potential entrants make their judgments in each time period.

The basic mechanism of the model, which generates a cascade type of entry behavior, can be summarized as follows: "*Higher entry rates in the past makes information accumulation proceed at a faster rate since it provides more 'data points' for potential entrants to gauge market profitability in future periods*" (Horvath et al. 2001, p. 1003). It is a self-enforcing process that exponentially boosts the information level, brings more accurate information, and thereby encourages the entry plans of ever larger numbers of entrepreneurs. Once uncertainty is resolved, many firms rush into the market in a kind of *big bang*. This entry cohort is larger than the early cohorts, and so—given a rather stable hazard rate—many more firms are likely to exit the industry in the years following this burst of entry. In fact, Horvath et al. demonstrate that the sharp decline in the total number of firms in the US beer industry comprises almost entirely firms that entered as part of the 1874–1878 cohort. This was the last cohort before the shakeout began. Without those firms having entered the industry, the overall life cycle pattern would be flatter and shakeout would be much less.

Horvath et al. found similar effects for the US automobile and tire industries. In the US tire industry, the shakeout began in 1921. It lasted from 1921 until 1937 before the industry reached a rather stable level of firm numbers. The peak number of firms in the industry fell from 274 in 1921 to 47, or 17 percent of the peak, in 1937. Among the victims of this shakeout were many firms that had entered between 1919 and 1921, two years in which the industry saw massive entry compared to previous years. In the US automobile industry, roughly 40 percent of the exits during the shakeout were firms that had entered in 1906–1907. The numbers indicate how massive the wave of entries was: 82 entries in 1907 alone compared to an all-time high in of 271 firms in 1909 (Klepper 2002). As predicted by the theory, the period of mass entry was followed by the mass exit of firms that had entered in cohorts immediately preceding the shakeout.

Does the theory now help to explain a shakeout in other industries? Horvath et al. (2001, p. 1040) are rather reluctant to see a universal application of their theory. Despite the fact that other authors like Geroski and Mazzucato (2001) support the role of information accumulation as a driver

behind industry evolution, Horvath et al. see a few open issues requiring additional research to establish a generalizable theory. First, the simulation they conducted revealed how influential varying degrees of informative value were on firms' delay of entry. When observations have a high informative value, the delay is very limited or does not exist. In contrast, low informative values cause long delays and small entry numbers. Only if the information content of signals is "somewhat informative" (Horvath et al. 2001, p. 1047) does it generate a shakeout pattern as predicted by the theory. The designation "somewhat" is obviously difficult to define for measurement purposes.

Second, the model is not capable of dealing with strategic behavior in exits. It simply assumes that in every time period, the least efficient firms exit the industry, that is, the firms whose costs per product are higher than the equilibrium market price. Such a simplification can cause biased results for industries where many firms actively drop out through M&A activities or attempt to refrain from exit despite negative profitability. Although the authors see the relevance of tackling this issue to develop a tractable model, they leave it for further research.

Metcalfe (2005) joins in with a few general concerns regarding a broader application of the theory. He notes that there are clear and uniform empirical findings about the industry life cycle, but different industries might support different theoretical explanations. Direct criticism of specific features of the model comes from Jovanovic and Tse (2010), who argue that the theory lacks a deeper explanation of why the firms learn about the profitability all at once rather than gradually over time as one would usually assume.

Exit guaranteed? The Conditioning Effect of Pre-history on Entry and Survival

The previous sections explored five major theories to explain shakeouts. In this section, an alternative line of reasoning is outlined to provide a novel interpretation about the reasons why an industry experiences a shakeout. It takes into account that certain industries emerge through a combination of distinct know-how components from other industries and as a mixture of products and services. Therefore, such industries have a particular profile for the groups of entrants, among which are a larger proportion of diversifying firms.

Toward a More Differentiated View of the Origins of New Industries

It is a commonly known fact that new industries constantly emerge (Bala and Goyal 1994). Many different views explain the driving factors forming new industries and the entrepreneurial environment required for their creation. Consider Porter's (1980, p. 215) view as the first example. He defines emerging industries as "*newly formed or re-formed industries, that have been created by technological innovations, shifts in relative cost relationships, emergence of new customer need, or other economic and sociological changes that elevate a new product or service to the level of a potentially viable business opportunity.*" His definition provides an excellent summary of the various positions found in management and economics literature. They highlight changes either on the supply side, on the demand side, or in the broader political and regulatory field as the root cause for new industries (Geroski 2003).

Especially in the 1960s and 1970s, a debate emerged about the question of whether the supply of new technology or changes in market demand would have a greater impact on innovation—and consequently for the creation of new markets. Strong believers in the technological innovations' role found a wealth of anecdotal evidence to support their *technological-push* position, for example, in the era's massively expanding electronics field (Cringely 1996). On the other side, authors argued that untapped or latent demand steers entrepreneurs to develop innovations (e.g., Schmookler 1962, 1966; Myers and Marquis 1969; Scherer 1982). Although the technological-push argument received broad acceptance, *demand-pull* arguments have been under controversial discussion since then. Mowery and Rosenberg's (1979) review of studies that support demand-pull lists several problems. Specifically, they identified as weaknesses a loose definition of market demand, a lack of clear linkage between the influence of market demand on innovative activity, and frequent confusion between necessity and sufficiency. More recent studies, such as Nemet (2009), argue in a similar manner against the relevance of pure demand-pull.

In evolutionary economics and in particular in industry life cycle research, the "*basic supply push story of how new markets are created*" (Sarasvathy and Dew 2005, p. 558) has also achieved dominance. The ideas of many papers and theories can be traced back to *Schumpeterian economics*. In his major works, Schumpeter (1934, 1939, 1942) developed ground-breaking ideas and fundamental theories on the relationship of innovation and industrial dynamics. His writings captured the crucial role of innovation to shape industries along

two different lines, often referred to as *Schumpeter Mark I* and *Schumpeter Mark II* (Dreßler 2006, p. 33). In his early work (Schumpeter Mark I), he sees small firms started by visionary entrepreneurs as the main source of innovative activity. As a reflex to the change in national economies and the strong emergence of corporate structures (Metcalf 2012), he gave innovation in large firms a greater importance in his later work (Schumpeter Mark II).

The first generation of industry life cycle research was heavily influenced by Schumpeter's ideas. Authors explicitly identify technological-push innovation as the single driving force for the creation of new industries, as in Gort and Klepper's (1982) pioneering study. Similarly, studies of this period, such as those of Tushman and Anderson (1986), Klepper and Graddy (1990), and Jovanovic and MacDonald (1994), assume a radical technological innovation as the starting point from which a new industry develops. Tushman and Anderson (1986, p. 429) identify "*technology as the central force in shaping environmental conditions*" and in causing entire industry populations to rise. Moreover, the impact of technological change is far-reaching as it often also causes the shakeout as the industry matures. This effect is emphasized by the three technological shakeout theories already discussed. In second-generation studies, the role of technology remains dominant. However, rather than being explicitly identified, it becomes an implicit assumption as many studies build on the datasets of the first-generation studies. These second-generation studies include Suarez and Utterback (1995), Agarwal and Gort (1996), and Agarwal (1997). They overtook the perspective of the first generation while seeking to further refine the extant datasets and to expand the existing argumentations.

Currently, a more fundamental progress is heralded by the third generation of industry life cycle studies. Often single industry case studies, their authors give greater attention to describing an industry's deeper roots, the complex dynamics before the industry finally emerges and its broader environment (Braunerhjelm and Carlsson 2011). Geroski (2003, p. 2) laid the foundation for the importance of meeting this challenge by stating "*that much of what happens later on in the life of most markets can be only fully understood if one understands how the market itself came into being.*"

While still addressing the core questions regarding the industry life cycle and the existence of shakeouts, this third-generation research also shows first tentative interest for topics such as (Helfat and Lieberman 2002):

Does the new industry only re-form an existing one, does the new industry entirely displace existing ones, or is new industry one additional industry adding to the existing range of industries?

How do the industries develop internally, that is, do subindustries emerge?

Which types of entrants can be found (i.e., entrepreneurs vs. diversifying firms)?

From which industries do diversifying firms enter the new industry?

How stable and closed are the regional market boundaries?

Thereby, industry life cycle research is progressing stepwise toward the development of a broader view and a more interrelated interpretation of founding factors. Horvath et al. (2001, p. 1027) provide an excellent example and anecdotal evidence on how the brewing industry was created. Similar accounts with important insight into the respective industry's pre-history are provided by Fein (1998) for pharmaceutical wholesaling, by Dowell and Swaminathan (2006) for the US bicycle industry, by Thompson (2005) for the shipbuilding industry, and by Murmann (2003) for the synthetic dye industry.

These new industries sometimes emerge either (a) “*out of the blue*” based on a new technology or solution as described in many first generation studies. But (b) cases also exist where new industries are re-formed existing industries. Thompson (2005, pp. 27–29), for example, describes such a radical industry reform in the shipbuilding industry through the shift from wood to iron and steel. Finally, Malerba (2007) makes a strong point for an additional type of industry emergence. He uses the term (c) *convergence* to describe this distinct path for the creation of new industries. In a convergence situation, a new industry is constructed through the combination of skills from different existing industries and new know-how components interacting with emerging client demands.

Malerba's argumentation follows one of Schumpeter's (1934, pp. 65) most famous statements, in which he explained *development* (later using the term *innovation*) as the process of establishing new combinations (Fagerberg 2009). The creative destruction of established combinations can be a necessary precondition in some, but not all, cases. Heuskel (1999, pp. 10–33) presents a few interesting examples of shattered industry structure followed by combinatory strategies for the energy and the retail sectors. He coined the term *business migration* to describe how individual components of a business model migrate into others or provide the building blocks for new industries.

Services may serve as a premier catalyst for such new combinations (Berry et al. 2006). Although the paper was originally written for the field of marketing, Vargo and Lusch's (2004) argumentation for a new, service-dominant logic is transferable to the entire field of management and economics. At the core of their argument is a paradigm shift from industries doing pure exchange of goods and products to industries with a “*revised logic focused on intangible resources, the cocreation of value, and relationships*” (Vargo and Lusch

2004, p. 1). Against the background of the three aforementioned industry emergence schemes, new services industries or product-service combinations can establish themselves in the following forms.

New Service Industries Emerge by Establishing New Business Models

New industries usually do not simply fall into unfilled niches. They must carve out their own niche among neighboring industries and gain legitimacy among clients and other stakeholders (Aldrich 1999, pp. 226–228). McKenna's (2006, pp. 8–25) historical account of the development of the management consulting companies describes how regulatory changes in the USA in the 1930s shifted the market boundaries of existing industries. Firms then exploited this structural break through new services offerings, such as management consulting and advisory services. There are other examples, such as when a technological change creates opportunities for a new service field. In the Internet's aftermath, a new industry focusing on web services (e.g., web design and search engine optimization) arose (Geroski 2003). It is important to realize that not all new industries fully develop. Some fail to create sufficient legitimacy. Others cannot sharpen boundaries and differentiate themselves against other industries, most often larger and sometimes with a decades-long history.

Existing Industries Are Reformed Through a New or Different Service Dominant Logic

Far-reaching transformation processes can also occur within an existing industry. Berry et al. (2006) explain such shifts through two potential mechanisms for service industries. The first possibility involves the offering of a new core benefit for the customer. The second is defined on the basis of new delivery benefits. Two practical examples illustrate how such options work, stand alone or in combination. By creating the service of rapid, reliable delivery of time-sensitive materials, FedEx offered a new customer value proposition and re-formed many parameters its industry (Johnson et al. 2008, p. 65). Thereby, FedEx combined an improved added value with a new delivery model. Similarly, Southwest turned the airlines industry upside down by departing from the traditional hub-and-spoke model and establishing the low-cost-carrier model. In both cases, the basic business paradigm changed massively.

Existing Components Combine with Innovative Know-How to Create a New Solution Model

Even though it did not create an entire new industry, the example of Cirque du Soleil provides an interesting and often cited case of how different know-how and service components can be integrated into a new solution (Kim and Mauborgne 2004). It recombined specific parts of the circus industry with know-how components from theater and ballet to develop an entirely new entertainment experience. For its combinatory strategy, Cirque du Soleil can be interpreted as a form of convergence model.

Because of its multiple industry origins, outsourcing industries, for example, regularly belongs to this convergence-type cluster. Its ingredients often originate from both product and services industries and interact with newly arising demands (Georgius and Heinzl 2005). The facility management (FM) outsourcing industry can serve as a vivid example to illustrate the big picture of such developments. Its business model combines product related know-how components from the construction industry and industries manufacturing items such as heating, ventilating, and air conditioning products. Service-related know-how components include cleaning, security services, and real estate management. Additional leasing and asset-financing models provide the glue for an integrated offering (Barrett and Baldry 2003). The International Facility Management Association (IFMA) defines FM as “*a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process, and technology*” (IFMA 2011).

Theoretically, Murmann (2003, p. 22) defines such developments as coevolution: “*Populations coevolve if and only if they both have significant causal impact on each other’s ability to persist.*” Thus, instead of developing only in parallel, the industries directly or indirectly influence each other’s fitness as a bidirectional linkage. It is noteworthy in this context that a particular industry can coevolve only with a very limited number of other industries.

Let us consider two major dimensions of linkages. The first focuses on interactions between the emerging industry and its neighboring industries. The second is the link between the emerging industry and the demand side. Coevolution between the emerging industry and a surrounding industry (the first dimension) can result in three outcomes:

Mutualism: average fitness of both industries increases.

Competition: average fitness of both industries decreases.

Predation and parasitism: positive impact on the average fitness of one industry and negative impact on the other industry.

Although research in this area currently lacks a set of proper instruments to identify and systematically analyze each causal relationship, the coevolutionary perspective helps to outline a more robust big picture. For the individual firm the surrounding industries can provide, as will be observed later, not only a starting point from which to enter a new industry but also a backup option or place for retreat.

The coevolutionary perspective also adds important additional insight for the second dimension, the linkages between the new industry and the emerging demand for it. If a new product is available, it has the potential to change the existing consumption patterns on the consumer side and spark a coevolution process. Coevolution also happens in the opposite case, when latent demand exists and a product is developed to meet the demand.

The need for a coevolutionary perspective becomes even clearer if one broadens the view beyond a simple product and an individual customer. This is particularly true for outsourcing services. When a new outsourcing service emerges, it usually does not focus on individuals but on entire organizations or even complete populations of firms (Yates 2006). Using the service requires the client firms to start a process of deverticalization. The firms shift from internal, self-provision to external supply by transferring the existing assets, employees, and processes to a third party (Feeny and Willcocks 1998). The coevolution between the emerging industry and its clients follows Adam Smith's dictum that division of labor is limited by the extent of the market. The larger and more credible the outsourcing industry becomes, the more firms will start to use the offering (Arora et al. 2009).

A few client firms might even go further and enter the industry by turning their existing back office processes into a new field of business. Another example from the FM outsourcing industry illustrates this point. The German airline Lufthansa had extensive internal know-how in servicing its own facilities at various airports (Lufthansa 2001). As the facility outsourcing industry emerged in the mid-1990s, Lufthansa founded its own subsidiary, Lufthansa Gebäudemanagement. It entered the industry in 1995, soon winning large clients like Deutsche Bank and BMW. Unlike Lufthansa, other entrants originated in more related industries, such as construction or technical services (GIG 2010).

Conclusion

This chapter provided an overview on industry life cycle research and reviewed five major theories that can be used to explain the reasons for a shakeout. The discussion revealed that none of the theoretical approaches provided convincing arguments to fully explain the industry life cycle patterns.

Different theories appeal to different industries for different reasons. Therefore, an alternative line of reasoning was followed to attempt to capture the characteristics of more service-driven industries, for example, outsourcing industries. The explanation took into account the phenomenon that certain industries emerge out of a combination of diverse know-how components from other industries and as a mixture of products and services.

The argumentation was based on anecdotal evidence, and one can tentatively argue that several convergent industries might follow those dynamics. It must be stated, however, that this new “industry life cycle story” remains somewhat speculative. It would be premature to propose a general pattern or even a theory, but this preliminary finding suggests a number of promising areas for future investigation. On the theoretical side, however, there is a need to develop consistent theoretical approaches and conceptual tools to better understand and to model the interaction between an emerging industry and its neighboring industries. Identifying the factors that shape the direction of a nascent industry’s fate in its interaction with incumbent industries can help to specify successful strategies for managing this continuous change.

Bibliography

- Abernathy, W. J. (1978). *The productivity dilemma: Roadblock to innovation in the automobile industry*. Baltimore: Johns Hopkins University Press.
- Acs, Z. J., & Audretsch, D. B. (1987). Innovation, market structure, and firm size. *The Review of Economics and Statistics*, 69(4), 567–574.
- Agarwal, R. (1997). Survival of firms over the product life cycle. *Southern Economic Journal*, 63(3), 571–584.
- Agarwal, R. (1998). Evolutionary trends of industry variables. *International Journal of Industrial Organization*, 16(4), 511–525.
- Agarwal, R., & Audretsch, D. B. (2001). Does entry size matter? The impact of the life cycle and technology on firm survival. *Journal of Industrial Economics*, 49(1), 21–43.
- Agarwal, R., & Bayus, B. L. (2002). The market evolution and sales takeoff of product innovations. *Management Science*, 48(8), 1024–1041.
- Agarwal, R., & Bayus, B. L. (2004). Creating and surviving in new industries. In J. A. C. Baum & A. M. McGahan (Eds.), *Business strategy over the industry life cycle* (pp. 107–130). Oxford: Elsevier.
- Agarwal, R., & Gort, M. (1996). The evolution of markets and entry, exit and survival of firms. *Review of Economics and Statistics*, 78(3), 489–498.
- Agarwal, R., & Gort, M. (2001). First-mover advantage and the speed of competitive entry, 1887–1986. *Journal of Law & Economics*, 44(1), 161–177.

- Agarwal, R., Sarkar, M., & Echambadi, R. (2002). The conditioning effect of time on firm survival: An industry life cycle approach. *Academy of Management Journal*, 45(5), 971–994.
- Aldrich, H. (1999). *Organizations evolving*. London: SAGE.
- Argyres, N., & Bigelow, L. (2007). Does transaction misalignment matter for firm survival at all stages of the industry life cycle? *Management Science*, 53(8), 1332–1344.
- Arora, A., Vogt, W. B., & Yoon, J. W. (2009). Is the division of labor limited by the extent of the market? Evidence from the chemical industry. *Industrial and Corporate Change*, 18(5), 785–806.
- Audretsch, D. B. (1995a). Innovation, growth and survival. *International Journal of Industrial Organization*, 13(4), 441–457.
- Audretsch, D. B. (1995b). The propensity to exit and innovation. *Review of Industrial Organization*, 10(5), 589–605.
- Audretsch, D. B. (1995c). *Innovation and industry evolution*. Cambridge: The MIT Press.
- Audretsch, D. B., & Feldman, M. P. (1996). Innovative clusters and the industry life cycle. *Review of Industrial Organization*, 11(2), 253–273.
- Bain, J. S. (1956). *Barriers to new competition*. Cambridge: Harvard University Press.
- Bala, V., & Goyal, S. (1994). The birth of a new market. *Economic Journal*, 104(423), 282–290.
- Barrett, P., & Baldry, D. (2003). *Facilities management: Towards best practise*. London: Wiley.
- Bartelsman, E., Scarpetta, S., & Schivardi, F. (2005). Comparative analysis of firm demographics and survival: Evidence from micro-level sources in OECD countries. *Industrial and Corporate Change*, 14(3), 365–391.
- Baum, J. A. C., & McGahan, A. M. (Eds.). (2004). *Business strategy over the industry life cycle*. Amsterdam: Elsevier.
- Baum, J. A. C., Korn, H. J., & Kotha, S. (1995). Dominant designs and population dynamics in telecommunications services: Founding and failure of facsimile transmission service organizations, 1965–1992. *Social Science Research*, 24(2), 97–135.
- Baumol, W. J. (1996). Children of performing arts, the economic dilemma: The climbing costs of health care and education. *Journal of Cultural Economics*, 20(3), 183–206.
- Bayus, B. L., Kang, W., & Agarwal, R. (2007). Creating growth in new markets: A simultaneous model of firm entry and price. *Journal of Product Innovation Management*, 24(2), 139–155.
- Bergek, A., Tell, F., Berggren, C., & Watson, J. (2008). Technological capabilities and late shakeouts: Industrial dynamics in the advanced gas turbine industry 1987–2002. *Industrial and Corporate Change*, 17(2), 335–392.
- Berry, L. L., Shankar, V., Parish, J. T., Cadwallader, S., & Dotzel, T. (2006). Creating new markets through service innovation. *MIT Sloan Management Review*, 47(2), 56–63.

- Bonaccorsi, A., & Giuri, P. (2001). Network structure and industrial dynamics: The long-term evolution of the aircraft-engine industry. *Structural Change and Economic Dynamics*, 12(2), 201–233.
- Boston Consulting Group. (1968). *Perspectives on experience*. Boston: Boston Consulting Group.
- Braunerhjelm, P., & Carlsson, B. (2011). Steven Klepper: Recipient of the 2011 Global Award for Entrepreneurship Research. *Small Business Economics*, 37(2), 131–140.
- Broderick, M. (2011). *The art of managing professional services: Insights from leaders of the world's top firms*. Upper Saddle River: Wharton School Publishing.
- Buenstorf, G. (2007). Evolution on the shoulders of giants: Entrepreneurship and firm survival in the German laser industry. *Review of Industrial Organization*, 30, 179–202.
- Cabral, L. (2011). Technology uncertainty, sunk costs, and industry shakeouts. *Industrial and Corporate Change*, 20(4), 1–14.
- Cantner, U., Dreßler, K., & Krüger, J. J. (2009). Knowledge and creative destruction over the industry life cycle: The case of the German automobile industry. *Economica*, 76(301), 132–148.
- Carree, M. A., & Thurik, A. R. (2000). The life cycle of the U.S. tire industry. *Southern Economic Journal*, 67(2), 254–278.
- Carroll, G. R., & Hannan, M. T. (2000). *The demography of corporations and industries*. Princeton: Princeton University Press.
- Cox, W. E. (1967). Product life cycles as marketing models. *The Journal of Business*, 40(4), 375–384.
- Cringely, R. X. (1996). *Accidental empires*. London: Penguin.
- Dasgupta, P., & Stiglitz, J. (1980). Industrial structure and the nature of innovative activity. *Economic Journal*, 90(358), 266–293.
- Day, G. S., Fein, A. J., & Ruppertsberger, G. (2003). Shakeouts in digital markets: Lessons from B2B exchanges. *California Management Review*, 45(2), 131–150.
- Dean, J. (1950). Pricing policies for new products. *Harvard Business Review*, 28(6), 45–54.
- Dhalla, N. K., & Yuspeh, S. (1976). Forget the product life cycle concept! *Harvard Business Review*, 54(1), 102–112.
- Dinlersoz, E. M., & MacDonald, G. (2009). The industry life-cycle of the size distribution of firms. *Review of Economic Dynamics*, 12(4), 648–667.
- Dowell, G., & Swaminathan, A. (2006). Entry timing, exploration, and firm survival in the early U.S. bicycle industry. *Strategic Management Journal*, 27(12), 1159–1182.
- Dreßler, K. (2006). *Der Lebenszyklus der deutschen Automobilindustrie: Know-how und Überleben von Unternehmen 1886–1939*. Lohmar: EUL.
- Fagerberg, J. (2009). *A guide to Schumpeter*. Oslo: Centre for Advanced Study.
- Feeny, D. F., & Willcocks, L. P. (1998). Core IS capabilities for exploiting information technology. *MIT Sloan Management Review*, 39(3), 9–21.

- Fein, A. J. (1998). Understanding evolutionary processes in non-manufacturing industries: Empirical insights from the shakeout in pharmaceutical wholesaling. *Journal of Evolutionary Economics*, 8(3), 231–270.
- Filson, D. (2001). The nature and effects of technological change over the industry life cycle. *Review of Economic Dynamics*, 4(2), 460–494.
- Foster, R. N. (1986). *Innovation: The attacker's advantage*. New York: Summit Books.
- Fotopoulos, G., & Spence, N. (1998). Entry and exit from manufacturing industries: Symmetry, turbulence and simultaneity – some empirical evidence from Greek manufacturing industries, 1982–1988. *Applied Economics*, 30(2), 245–262.
- Georgius, A., & Heinzl, A. (2005). Strategien und Erfolgsfaktoren von Anbietern im IT und Business Process Outsourcing in Deutschland. *Wirtschaftsinformatik*, 47(1), 409–428.
- Geroski, P. A. (1995). What do we know about entry? *International Journal of Industrial Organization*, 13(4), 421–440.
- Geroski, P. A. (1998). Thinking creatively about markets. *International Journal of Industrial Organization*, 16(6), 677–695.
- Geroski, P. A. (2003). *The evolution of new markets*. Oxford: Oxford University Press.
- Geroski, P. A., & Mazzucato, M. (2001). Modelling the dynamics of industry populations. *International Journal of Industrial Organization*, 19(7), 1003–1022.
- GIG (2010). 15 Jahre Facility Management – Was hat sich geändert? Retrieved March 08, 2011 from http://www.gig24.com/typo3/fileadmin/user_upload/PDF/Geschichte_des_Facility_Management_Interview.pdf
- Golder, P. N., & Tellis, G. J. (2004). Growing, growing, gone: Cascades, diffusion, and turning points in the product life cycle. *Marketing Science*, 23(2), 207–218.
- Goldfarb, B., Kirsch, D., & Miller, D. A. (2007). Was there too little entry during the Dot Com era? *Journal of Financial Economics*, 86(1), 100–144.
- Gort, M., & Klepper, S. (1982). Time paths in the diffusion of product innovations. *Economic Journal*, 92(367), 630–653.
- Günther, C. (2009). *Pioneer burnout: Radical product innovation and firm capabilities, The papers on economics and evolution*. Jena: Max-Planck-Inst. für Ökonomik.
- Harrigan, K. R. (1980). Strategy formulation in declining industries. *The Academy of Management Review*, 5(4), 599–604.
- Harrigan, K. R., & Porter, M. E. (1983). End-game strategies for declining industries. *Harvard Business Review*, 61(4), 111–120.
- Helfat, C. E., & Lieberman, M. B. (2002). The birth of capabilities: market entry and the importance of pre-history. *Industrial and Corporate Change*, 11(4), 725–760.
- Hemenway, D. (1975). *Industrywide voluntary product standards*. Cambridge: Ballinger.
- Heuskel, D. (1999). *Wettbewerb jenseits von Industriegrenzen: Aufbruch zu neuen Wachstumsstrategien*. Frankfurt am Main: Campus.
- Höft, U. (1992). *Lebenszykluskonzepte*. Berlin: Erich Schmidt Verlag.
- Hopenhayn, H. A. (1993). *The shakeout*. Universität Pompeu Fabra.

- Horvath, M., Schivardi, F., & Woywode, M. (2001). On industry life-cycles: Delay, entry, and shakeout in beer brewing. *International Journal of Industrial Organization*, 19(7), 1023–1052.
- IFMA. (2011). What is facility management? Retrieved April 29, 2011 from <http://www.ifma.org/about/what-is-facility-management>
- Johnson, M. W., Christensen, C. M., & Kagermann, H. (2008). Reinventing your business model. *Harvard Business Review*, 86(12), 50–59.
- Jovanovic, B. (1982). Selection and the evolution of industry. *Econometrica*, 50(3), 649–670.
- Jovanovic, B. (1998). Michael Gort's contribution to economics. *Review of Economic Dynamics*, 1(2), 327–337.
- Jovanovic, B., & MacDonald, G. M. (1994). The life cycle of a competitive industry. *Journal of Political Economy*, 102(2), 322–347.
- Jovanovic, B., & Tse, C.-Y. (2010). Entry and exit echoes. *Review of Economic Dynamics*, 13(3), 514–536.
- Kaldor, N. (1961). Capital accumulation and economic growth. In F. A. Lutz & D. C. Hague (Eds.), *The theory of capital* (pp. 177–222). New York: St. Martin's Press.
- Kato, M. (2010). The role of investment efficiency in the industry life cycle. *Industrial and Corporate Change*, 19(1), 273–294.
- Kim, W., & Mauborgne, R. (2004). Blue ocean strategy. *Harvard Business Review*, 82(10), 76–84.
- Klepper, S. (1996). Entry, exit, growth, and innovation over the product life cycle. *American Economic Review*, 86(3), 562–583.
- Klepper, S. (1997). Industry life cycles. *Industrial and Corporate Change*, 6(1), 145–182.
- Klepper, S. (2001). Employee startups in high-tech industries. *Industrial and Corporate Change*, 10(3), 639–674.
- Klepper, S. (2002). Firm survival and the evolution of oligopoly. *The RAND Journal of Economics*, 33(1), 37–61.
- Klepper, S., & Graddy, E. (1990). The evolution of new industries and the determinants of market structure. *The RAND Journal of Economics*, 21(1), 27–44.
- Klepper, S., & Miller, J. H. (1995). Entry, exit, and shakeouts in the United States in new manufactured products. *International Journal of Industrial Organization*, 13(4), 567–591.
- Klepper, S., & Simons, K. L. (1996). Innovation and industry shakeouts. *Business and Economic History*, 25(1), 81–89.
- Klepper, S., & Simons, K. L. (1997). Technological extinctions of industrial firms: An inquiry into their nature and causes. *Industrial and Corporate Change*, 6(2), 379–460.
- Klepper, S., & Simons, K. L. (2000). Dominance by birthright: Entry of prior radio producers and competitive ramifications in the U.S. television receiver industry. *Strategic Management Journal*, 21(10–11), 997–1016.

- Klepper, S., & Simons, K. L. (2005). Industry shakeouts and technological change. *International Journal of Industrial Organization*, 23(1-2), 23–43.
- Klepper, S., & Thompson, P. (2006). Submarkets and the evolution of market structure. *RAND Journal of Economics*, 37(4), 861–886.
- Kotler, P. (2003). *Marketing management* (11th ed.). Upper Saddle River: Prentice-Hall.
- Krafft, J. (2004). Entry, exit and knowledge: Evidence from a cluster in the information communications industry. *Research Policy*, 33(10), 1687–1706.
- Kreutter, P. (2014). *Shakeouts: Firm survival and technological change in new manufacturing industries*. Doctoral thesis, WHU – Otto Beisheim School of Management.
- Kuznets, S. (1930). *Secular movements in production and prices*. Boston: Houghton Mifflin, Riverside Press.
- Lambkin, M., & Day, G. S. (1989). Evolutionary processes in competitive markets: Beyond the product life cycle. *Journal of Marketing*, 53(3), 4–20.
- Levitt, T. (1960). Marketing myopia. *Harvard Business Review*, 38(4), 45–56.
- Levitt, T. (1965). Exploit the product life cycle. *Harvard Business Review*, 43(November-December), 81–94.
- Lind, J. (2005). *Ubiquitous convergence: Market redefinitions generated by technological change and the Industry Life Cycle*. Paper presented at the DRUID Academy Winter 2005.
- Lufthansa. (2001). *Lufthansa Gebäudemanagement Gruppe steigert Umsatz um 20 Prozent*. Retrieved June, 12 2012 from http://www.pressrelations.de/new/standard/result_main.cfm?pfach=1&n_firmanr_=107148&sektor=pm&detail=1&r=81801&sid=&aktion=jour_pm&quelle=0&profisuche=1
- Mahajan, V., Muller, E., & Bass, F. M. (1990). New product diffusion models in marketing: A review and directions for research. *Journal of Marketing*, 54(1), 1–26.
- Malerba, F. (2006). Innovation and the evolution of industries. *Journal of Evolutionary Economics*, 16(1-2), 3–23.
- Malerba, F. (2007). Innovation and the dynamics and evolution of industries: Progress and challenges. *International Journal of Industrial Organization*, 25(4), 675–699.
- Mason, E. S. (1939). Price and production policies of large-scale enterprise. *American Economic Review*, 29(March), 61–74.
- Mazzucato, M. (2002). The PC industry: New economy or early life-cycle? *Review of Economic Dynamics*, 5(2), 318–345.
- Mazzucato, M. (2003). Risk, variety and volatility: Growth, innovation and stock prices in early industry evolution. *Journal of Evolutionary Economics*, 13(5), 491–512.
- McGahan, A. M. (2000). How industries evolve. *Business Strategy Review*, 11(3), 1–16.
- McGahan, A. M., Argyres, N., & Baum, J. A. C. (2004). Context, technology and strategy: Forging new perspectives on the industry life cycle. In J. A. C. Baum & A. M. McGahan (Eds.), *Business Strategy over the industry life cycle* (pp. 1–21). Amsterdam: Elsevier.

- McKenna, C. D. (2006). *The world's newest profession: Management consulting in the twentieth century*. Cambridge: Cambridge University Press.
- Metcalf, S. (2005). *The evolution of industrial dynamics, DRUID tenth anniversary summer conference*. Denmark: Copenhagen.
- Metcalf, S. (2012). *J.A. Schumpeter and the theory of economic evolution, The papers on economics and evolution*. Jena: Jena Max Planck Inst. of Economics, Evolutionary Economics Group.
- Moore, G. A. (2002). *Crossing the chasm: marketing and selling high-tech products to mainstream customers* (Rev. ed.). New York: HarperCollins.
- Mowery, D., & Rosenberg, N. (1979). The influence of market demand upon innovation: A critical review of some recent empirical studies. *Research Policy*, 8(2), 102–153.
- Münter, M. T. (1999). *Wettbewerb und die Evolution von Industrien*. Bayreuth: P.C.O.
- Murmann, J. P. (2003). *Knowledge and competitive advantage: The coevolution of firms, technology, and national institutions*. Cambridge: Cambridge University Press.
- Murmann, J. P., & Homburg, E. (2001). Comparing evolutionary dynamics across different national settings: The case of the synthetic dye industry, 1857–1914. *Journal of Evolutionary Economics*, 11(2), 177–205.
- Myers, S., & Marquis, D. G. (1969). *Successful industrial innovations. A study of factors underlying innovation in selected firms*. Washington, DC: National Science Foundation.
- Nelson, R. R. (1994). The co-evolution of technology, industrial structure, and supporting institutions. *Industrial and Corporate Change*, 3(1), 47–63.
- Nelson, R. R., & Winter, S. G. (1978). Forces generating and limiting concentration under Schumpeterian competition. *The Bell Journal of Economics*, 9(2), 524–548.
- Nelson, R. R., & Winter, S. G. (1982). *An evolutionary theory of economic change*. Cambridge, MA: The Belknap Press of Harvard University Press.
- Nelson, R. R., & Winter, S. G. (2002). Evolutionary theorizing in economics. *Journal of Economic Perspectives*, 16(2), 23–46.
- Nemet, G. F. (2009). Demand-pull, technology-push, and government-led incentives for non-incremental technical change. *Research Policy*, 38(5), 700–709.
- Patton, A. (1959). Stretch your product's earning years-top management's stake in the product life cycle. *Management Review*, 48(June), 67–79.
- Peltoniemi, M. (2011). Reviewing industry life-cycle theory: Avenues for future research. *International Journal of Management Reviews*, 13(4), 349–375.
- Penrose, E. T. (1952). Biological analogies in the theory of the firm. *American Economic Review*, 42(5), 804–819.
- Pfeiffer, W., Weiß, E., & Strubl, C. (1997). *Funktionalmarkt-Konzept zum strategischen Management prinzipieller technologischer Innovationen*. Göttingen: Vandenhoeck & Ruprecht.
- Plehn-Dujowich, J. M. (2009). Entry and exit by new versus existing firms. *International Journal of Industrial Organization*, 27(2), 214–222.
- Polli, R., & Cook, V. (1969). Validity of the product life cycle. *The Journal of Business*, 42(4), 385–400.

- Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors*. New York: Free Press.
- PWC. (2011). *Changing landscape and emerging trends: Indian IT/ITeS industry*. Bangalore: PricewaterhouseCoopers Private Limited.
- Rogers, E. M. (1962). *Diffusion of innovations*. New York: Free Press.
- Rosenbloom, R. S., & Abernathy, W. J. (1982). The climate for innovation in industry: The role of management attitudes and practices in consumer electronics. *Research Policy*, 11(4), 209–225.
- Sarasvathy, S. D., & Dew, N. (2005). New market creation through transformation. *Journal of Evolutionary Economics*, 15(5), 533–565.
- Scherer, F. M. (1970). *Industrial pricing: Theory and evidence*. Chicago: Rand McNally & Company.
- Scherer, F. M. (1982). Inter-industry technology flows and productivity growth. *The Review of Economics and Statistics*, 64(4), 627–634.
- Schmookler, J. (1962). Economic sources of inventive activity. *Journal of Economic History*, 22(1), 1–20.
- Schmookler, J. (1966). *Invention and economic growth*. Cambridge: Harvard University Press.
- Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Oxford: Galaxy Books.
- Schumpeter, J. A. (1939). *Business cycles: A theoretical, historical, and statistical analysis of the capitalist process*. New York: McGraw-Hill.
- Schumpeter, J. A. (1942). *Socialism and democracy*. New York: Harper.
- Schumpeter, J. A. (1951). Historical approach to the analysis of business cycles. Retrieved December 14, 2011 from <http://www.nber.org/chapters/c4762>
- Servatius, H.-G. (1985). *Methodik des strategischen Technologie-Managements*. Berlin: Erich Schmidt Verlag.
- Shane, S. (2001). Technology regimes and new firm formation. *Management Science*, 47(9), 1173–1190.
- Simons, K. L. (1995). *Shakeouts: Firm survival and technological change in new manufacturing industries*. PhD thesis, Carnegie Mellon University.
- Simons, K. L. (2001). *Product market characteristics and the industry life cycle*. Egham, Surrey: Manuscript.
- Simons, K. L. (2003). *Industry life cycles and their causes (synopsis)*. Academy of Management Proceedings, 11.
- Stigler, G. J. (1951). The division of labor is limited by the extent of the market. *The Journal of Political Economy*, 59(3), 185–193.
- Suarez, F. F., & Utterback, J. M. (1995). Dominant designs and the survival of firms. *Strategic Management Journal*, 16(6), 415–430.
- Sutton, J. (1981). *Sunk costs and market structure*. Cambridge, MA: MIT Press.
- Swaminathan, A. (1995). The proliferation of specialist organizations in the American wine industry, 1941–1990. *Administrative Science Quarterly*, 40(4), 653–680.

- Swaminathan, A. (1998). Entry into new market segments in mature industries: Endogenous and exogenous segmentation in the U.S. brewing industry. *Strategic Management Journal*, 19(4), 389–404.
- Tan, H., & Mathews, J. A. (2010). Cyclical industrial dynamics: The case of the global semiconductor industry. *Technological Forecasting and Social Change*, 77(2), 344–353.
- Thompson, P. (2005). Selection and firm survival: Evidence from the shipbuilding industry, 1825–1914. *Review of Economics & Statistics*, 87(1), 26–36.
- Tushman, M. L., & Anderson, P. (1986). Technological discontinuities and organizational environments. *Administrative Science Quarterly*, 31(3), 439–465.
- U.S. Census. (2006). *North American industry classification system*. Retrieved March 29, 2006 from <http://www.census.gov/eos/www/naics/index.html>
- Utterback, J. M. (1996). *Mastering the dynamics of innovation*. Cambridge: Harvard University Press.
- Utterback, J. M., & Abernathy, W. (1975). A dynamic model of process and product innovation. *Omega*, 33, 639–656.
- Utterback, J. M., & Suarez, F. F. (1993). Innovation, competition, and industry structure. *Research Policy*, 22(1), 1–21.
- Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 1–17.
- Weiß, E. (1989). *Management diskontinuierlicher Technologie-Übergänge*. Göttingen: Vandenhoeck & Ruprecht.
- Winter, S. G. (1984). Schumpeterian competition in alternative technological regimes. *Journal of Economic Behavior and Organization*, 5, 287–330.
- Yates, A. (2006). How business enterprises use technology: Extending the demand-side turn. *Enterprise & Society*, 7(3), 422–455.

Part 2

Transformational Shifts

3

Lost in Transformation: Strategy Formulation in a Digitized World

Nicole Gottschalck and Christina Günther

Ideas in Brief Assessing traditional industry analysis in the light of today's business reality, we provide insights into an alternative framework for strategy formulation and implementation in a digitalized world. The main purpose of this literature review and conceptual chapter is to discuss current challenges for strategic management and to illustrate a novel approach of strategic renewal and their practical implementation in a world lost in transformation. This chapter highlights the relevance of a new approach toward strategy formulation in the face of a changing competitive landscape and provides guidelines for its practical implication. Our findings offer the grounds for practical implications such as that companies ought to strive to manage the challenges of changing business environments via new approaches toward innovation processes. To promote strategic renewal, managers should think in terms of competitive arenas and pipelines of transient advantage. Instead of trying to procure stability in shifting environments by all means, firms should aim to grow with the flow of digital transformation.

Keywords Competitive arenas • Industry life cycle • Transformation • Transient advantage

N. Gottschalck (✉) • C. Günther
IHK-Chair of Small and Medium-Sized Enterprises, WHU – Otto Beisheim
School of Management, Vallendar, Germany
e-mail: nicole.gottschalck@whu.edu

Introduction

Imagine the market you once understood is no longer comprehensible. In the age of accelerating digitalization with increasing convergence of technologies and global networks of all kinds, the well-established concept of clearly distinguishable industry settings as a basis for market analysis is no longer fully valid. In the past decade, we have experienced dramatic developments with business models and industry life cycles evolving at accelerating speed. Digitalization has transformed customer needs and demands and created business environments in which change is continuously gaining momentum. This need-for-speed phenomenon, known as the Red Queen Effect, has intensified tremendously (Barnett and Hansen 1996; Derfus et al. 2008; Voelpel et al. 2005). Companies need to progress constantly at an increasing rate not merely to gain an advantage, but also solely to survive while fighting against ever-evolving competitors in a permanently changing environment. In short, the race is taking up speed—sharply.

Reviewing the classical approach toward competitor analysis in the light of today's business reality reveals that strategy formulation needs to be adapted given the changing "rules of the game". After depicting the idiosyncrasies of the prevailing competitive landscape and the resulting challenges, this chapter illustrates how a novel concept of strategic renewal complements Porter's traditional approach toward strategy formulation and offers practical implications for management in a world lost in transformation.

New Business Reality

It goes without saying that this chapter cannot offer a comprehensive literature overview of strategy tools in general. It rather highlights in how far one of the building blocks of today's managerial practice, that is, Porter's approaches toward strategy, is challenged by the new business reality. The concept of transient advantages (McGrath 2013a; McGrath 2013b) is presented as one possible framework to complement the traditional approach.

In addition to the increasing speed of industry life cycles, firms have to deal with the fact that not only the pace of competition per se is changing, but also the players as such. Business economy has arrived in a new, less-predictable reality, where competitors are increasingly difficult to identify. This poses an enormous challenge to general management. While the concept of industry settings with clearly set boundaries and actors used to be an undisputed basis for market analysis in the past, firms will have to find new approaches toward

strategy development. In order to identify future windows of opportunities, it is crucial to understand that transformation and digitalization affect all relevant areas of strategy planning. This includes technological progress, the decline of customer groups in some areas and changing consumer preferences.

In addition, the speed of transformation of traditional settings is spurred by a sociological phenomenon that might be described as a trend of increasing self-efficacy and self-fulfillment in (post-) industrial societies with virtual habitats (Laszlo and Zhexembayeva 2011). Indeed, digitalization affects people in their everyday lives just the same as management in daily business. In this context, time is a crucial aspect (Stalk 1990). Digital transformation has not only changed the speed of the act of communication as such but also our habits and expectations regarding interactions in general. In a hyper-connected world, where virtual interaction has become the norm, stimuli and respective responses are supposed to be immediate, instant, and intuitive. As a result, new lifestyles have developed. Digital Natives and Digital Immigrants alike are used to ongoing interaction, quick responses, immediate availability, and constant accessibility.

From a market analysis perspective, this determines the emergence of a new type of customer, whom Laszlo and Zhexembayeva (2011) refer to as a “change agent” (p. 14). The effects of this development on businesses are tremendous. With product life cycles shortening and consumer expectations changing, the dominance of standardized mass production is slowly disintegrating. Another important aspect in the context of customer preferences is a trend from ownership to utilization. People increasingly adopt a functional perspective on goods, focusing on services a product offers and not necessarily on its material value. Carsharing, the collective usage of a vehicle, is a popular example on this account. As a result, customers are less likely to be locked-in by certain products. This effect is catalyzed by an increasing attentiveness toward continuous optimization of solutions and “brand-new” products—in the very sense of the term. It makes winning customer loyalty more difficult and calls for constant renewals of stock. Thus said, serving a customer’s needs requires a much higher degree of flexibility and adaptability than it used to about a decade ago.

This becomes particularly evident with regard to buying decisions. For instance, ordering a coffee used to be a matter of “black, white, with or without sugar”. Today, a customer in any street café can order a perfectly individualized product, suiting one’s personal needs. Take car manufacturing as another example: While a car used to be a comparably simple and homogenous product, it evolved into a highly customized and sophisticated commodity—with an exponentially rising speed of change. In 1913, Henry Ford pointedly stated: “People can have the Model T in any color so long as

it's black." In 2003, Audi customers were able to choose between six models with a total of more than 1000 variations per car class. Only ten years later in 2013, this number rose to 13 models, covering compact cars, SUVs, and sport racers with a total of more than 1500 variations per car class. So while it took the car industry about 90 years to reach a stage where customers were able to choose from quite a high level of variety, it took no more than ten years for these numbers to triple (Wincheringer 2015).

These observations indicate fundamental changes of product setups and their respective life cycles. Firms are expected to come up with new ideas in shortening time intervals, resulting in higher pressure for innovation. In addition, companies are also confronted with growing rivalry with players from unexpected origin. In consequence, strategic management needs to look beyond established realms to detect potential threats and new competitors when conducting market analysis. While it is clear that changing conditions of business environments call for new approaches toward strategy genesis, the question remains how this difficult task can be fulfilled. To complicate matters, digital transformation does affect everyone and everything—but not at the same momentum of time and speed. While the *modus vivendi* has altered completely in some business environments, transformation has rarely or only slightly changed traditional settings in other areas of business activity. In relative terms, raw material processing, for instance, has not changed as much in the last decade with regard to the actual procedure of chemical processes, compared to the vertiginous evolution of “smart”-devices like wearables and mobile phones. In the light of such developments, the ability to constantly evaluate and simulate effects of alternative production systems in different scenarios becomes vital for business survival and strategy development. The good news is: companies will perform outstandingly in a transforming world if they are able to grasp the dynamics of their business environment, and in turn manage to pursue different business models in parallel. Thus said, competition in a digitalized world comes not only with great challenges—but also with great opportunities for all those willing to take up with the new business reality.

How We Used to Formulate Strategies

When formulating a company's strategy, the following questions are at center stage: How many and what types of companies are competing with each other? Where are the industry's boundaries and overlaps? What kind of product are business models based on?

If these characteristics of a business environment can be identified in a straightforward manner and industry settings are rather fixed, the industry can be expected to follow a predictable pattern of four stages, that is, introduction, growth, maturity, and decline (e.g. Suárez and Utterback 1995; Klepper 1996; Klepper and Simons 2005).

According to this framework, an industry comes into existence based on a few pioneers experimenting with a new product or technology. This is followed by an influx of entrants in the growth phase of an industry. Up until the maturing phase, the number of new entrants exceeds that of companies leaving the industry. After this buildup-phase, industries usually experience a shakeout-phase, wherein the number of firms falls sharply and a dominant design of the product comes into existence. Once this has happened, industry growth decelerates with the number of exits exceeding that of entries. In maturity, entries and exits level, resulting in a relatively stable population of competitors. The final stage of an industry life cycle is most likely determined by consolidation with a few remaining competitors and a clearly pegged out business environment (Klepper and Simons 2005). While the industry evolves following the depicted pattern, innovation activities change from product-centered activities toward process optimization, putting the most efficient producers of the dominant design in an advantageous position as the industry matures.

Given this rather foreseeable bell-shaped course of the number of competitors and clearly defined industry borders, the traditional framework toward strategy formulation, that is, Michael Porter's groundbreaking "Competitive Strategy" (1980) is the first choice for strategy formulation. This framework relies on a straightforward and thorough assessments of the present. Recommendations for future actions are usually drawn from evaluations of the current state of affairs (Teece 1984).

Within distinguished industry boundaries, companies can focus on long cycle advantages that should be exploited one at a time in order to maximize their respective output throughout the industry life cycle. Central to this framework is the question of strategic positioning in a given industry. Here, periodic realignments of business models turn into a key asset to outperform competitors with strategy serving as a mediating force and the environment as an organizing factor. As Porter (2008) states in a reaffirmation of his earlier works, "understanding industry structure is [...] essential to effective strategic positioning, [D]efending against the competitive forces and shaping them in a company's favor are crucial to strategy" (p. 80). Following Porter, the relative position of a company in an industry governs its profitability. The basis of above average performance in the long run is a sustainable competitive advan-

tage. In general, Porter proposes three alternative strategies for a company's strategic positioning: cost leadership, differentiation, and niche strategy.

Adapting a cost leadership strategy implies becoming the low-cost producer in an industry for a given level of quality. Once a firm is able to command prices either below or equal to the industry average, it can aim for greater market share. It may be achieved by means of price wars or when prices decline in the process of industry maturity. Following a cost leadership strategy often equals targeting broad markets. Potential sources of leadership, among other, can be privileged access to resources, economies of scale, and advanced technology. A differentiation strategy calls for a product or service with unique characteristics along some dimensions that are genuinely valued by customers. Following this approach, a firm will identify attributes that qualify a product as better than or different from others through the eyes of buyers. The company will then position itself to meet those specific needs. On the grounds of the thus established nimbus of exclusivity, it may charge premium prices for it. As long as customers cannot easily find substitutes, a company will more than cover potential extra costs associated with offering a unique product. Following a niche or focus strategy signifies a narrow market segment or group of segments in which a firm seeks to satisfy distinguished demands. Within the defined segments, a company can pursue a cost leadership or differentiation strategy. Due to its narrow competitive scope, the niche strategy is especially applicable for companies with lower volume aiming to gain market share through specialization or exclusivity.

Likewise, should an industry eventually reach the later stages of its life cycle and companies experience a decline in its industry, there are four classical strategies to be pursued to maneuver the company or the respective business unit through this critical stage. According to Porter (1980), the most crucial aspect in this regard is not whether or not the industry will eventually decline, but when is the right time to take action. A company may pursue a leadership strategy with the aim to become one of the remaining actors in the industry and to control the process of decline. Ultimately, a firm following this strategy would arrange itself with the other few remaining competitors in the stage of consolidation. Another plan of action would call for a focus on a (few) profitable niches within the industry. Under the prerequisite of disinvestment from all other previous segments, a firm would try to become the market leader in a niche. In that event, it might either profit from slower progress of decline or even grasp a chance for revitalization and reinvention. Should these options not be promising, a harvest strategy or quick divestment might serve as appropriate measures. While the former is accentuated by the aim to

maximize cash flow through controlled disinvestments, the latter is directed at selling the business unit at a very early point in time to minimize losses. The crucial aspect in all these approaches is to decide what to do—or what not to do—at the right point of time and respectively the right stage of the industry life cycle (Porter 1980).

How Strategy Should Be Adapted

It is important to note that Porter's framework remains a helpful tool as the basis of strategy analysis whenever tangible questions on a company's composition and constitution at a specific point of time require an answer. Yet what happens if a company faces rather capricious competitive conditions? What if industry boundaries are diminishing, a new phase of experimentation starts after a phase of consolidation, competitors are hard-to-grasp and customer demand is solution-oriented as opposed to being product and technology-centered? When transformation is raving a true success, strategy planning needs to be reconfigured against the objectives of flexibility, scalability, and adaptability of business models.

Touched upon in many studies in business literature and in various other fields, this new approach was pinpointed by Rita Gunther McGrath (2013b) as the framework of “transient competitive advantages”. It offers implications how to design a strategy against the background of changing environments. Her approach is in line with literature on dynamic capability theory, introduced by Teece et al. (1997), which emphasizes that some companies prosper in the light of changing environments since they have the necessary ability to adopt (see for instance Danneels 2011; Eisenhardt and Martin 2000; Teece et al. 1997). Notably, McGrath (2013a; 2013b) herself stresses that she does not want to replace traditional concepts but seeks to extend them. Yet inasmuch as she does not argue against Porter per se, the deviations she introduce are striking nevertheless. While other approaches toward strategic renewal by-and-large imply that traditional concepts do no longer hold true in the new business reality, the paradigm of sustainable competitive advantages by its very nature is never really challenged (e.g. Brynjolfsson and McAfee 2014; Doz and Kosonen 2010; Ghemawat 2002; Stalk 1990; Lubit 2001). The radical element of this idea is the proposition to give up the concept of *sustainability* as such. It questions the overall aim to create and defend a permanent and lasting competitive advantage, thereby challenging the static element of Porter's generic strategies. McGrath emphasizes that in a transient economy, a successful company maintains “enough diversity

in its portfolio that it could simultaneously invest in the renewal of its core businesses while exploring new alternatives” (McGrath 2013a, p. 49). In that sense, she contrasts the focus on the present as it is underlying the concept of sustainable competitive advantages. The focus is shifted to a greater emphasis toward anticipating the future by maintaining multiple parallel processes of business model innovation.

Instead of spending their time on crafting a single long-term strategy, companies should constantly start various new strategic initiatives. By pursuing multiple opportunities in many smaller subunits rather than relying on a terminated number of large subunits, they should be able to utilize several transient competitive advantages at once. In turn they can build what McGrath terms “pipelines of new advantages” (McGrath 2013a). Here, she explicitly builds on D’Aveni and Gunther (2007) and the concept of “hypercompetition”, characterizing market environments in which a company’s competitive advantage can be quickly competed away.

Central to this new idea of strategy formulation is the concept of “competitive arenas”. They encompass choices made about where to compete, based on prior definitions of “customer segments”. These segments are characterized by behavioral features, rather than on demographics, location, or individual products. She stresses that the defining element of competitive arenas is the connection between customer and solutions, with an arena being “a combination of a customer segment, an offer, and a place in which that offer is delivered” (McGrath 2013a, p. 9). In this context, “place” is an abstract term. It refers to any platform where interaction might happen, rather than indicating a given space or locality. Defining a competitive arena on these grounds signifies a range of new channels to reach potential customers. In addition, this conceptualization makes it easier to track potential competitors who offer similar solutions but do not have obvious “industrial” links to one’s area of economic activity (McGrath et al. 1996) (Fig. 3.1).

Referring to a competitive terrain or arena rather than a specific product segment is an approach also promoted by Hambrick and Frederickson (2005), who describe “arenas of competition” in their diamond-shaped model for strategy design. The Hambrick–Frederickson diamond outlines five facets of a strategy and five corresponding questions managers should ask themselves in the designing process of future goals. The aspect of arenas is one of these defining facets (Hambrick and Frederickson 2005). Therefore, Hambrick and Frederickson pose five central, interrelated and equally weighted questions as their basis for strategy formulation:

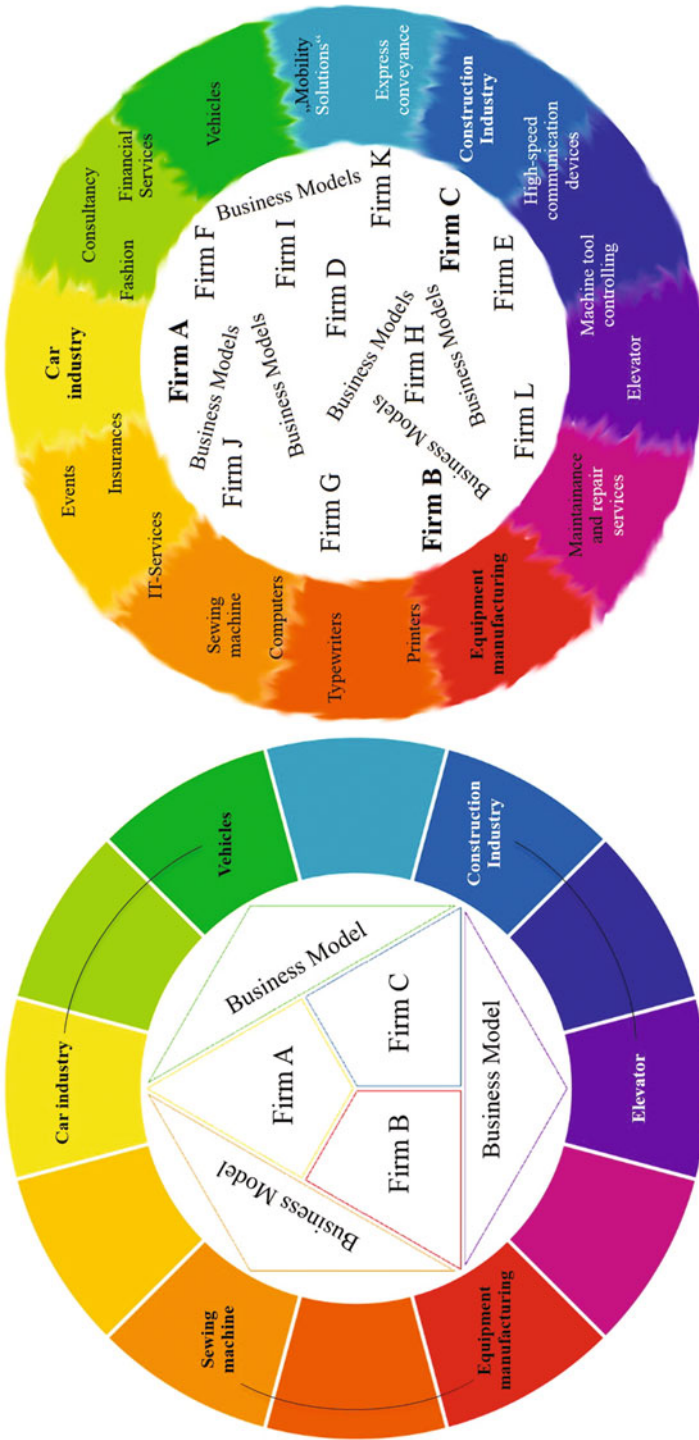


Fig. 3.1 Alternation of industry boundaries

- In which economic environment will the company be active in?
- What are the respective vehicles, that is, how and based on what means will the company get there?
- What are the respective differentiators, that is, how will it win in the market place?
- How does the respective staging look like, that is, what will be the speed and sequence of moves?
- What is the economic logic, that is, how will a company obtain its returns?

The notions underlying the diamond-model are paraphrased by McGrath accordingly: “Defining where you want to compete, how you intend to win, and how you are going to move from advantage to advantage is critical” (McGrath 2013b, p. 70). It is particularly crucial to consider these steps as banded-together. In fact, Hambrick and Frederickson point out that all domains of choice need to be reflected on as equals and a unified whole when designing a strategy. Ultimately, this supports the argument that the quality of a business option and respective competitive strategies needs to be constantly evaluated in the light of the current trends and conditions in the competitive arena.

However, while the idea of competitive terrains is often propagated, strategists might still be reluctant to adopt the concept of competitive arenas because of its nonspecific nature. Managers might criticize it for an alleged lack of substance. In the end, strategy planning needs to rely on predictions that are legitimized by valid assumptions. If a functional approach is the new *modus vivendi* instead of previous product orientation, a whole range of new factors of influence needs to be considered, evaluated, and estimated. This in turn could make strategy planning as such presumably more difficult, more complicated, and more complex. While this is a potential downside of the concept of competitive arenas, the upside counterbalances it by far. Indeed, the framework offers great advantages simply because it does not dictate any fixed scheme. This is because it implies broadly defined areas of potential business activities and thus offer the grounds for the exploration and exploitation of competitive advantages in entirely new fields (2013a and 2013b; see also Danneels 2011; Eisenhardt and Martin 2000; Teece et al. 1997). Thus said, the solutions-orientated concept of arenas serves as a catalyst of innovation in a firm. It also helps to identify value chain activities or value creation stages that are insourced or outsourced. Hence, a broader picture of competences of the very own company can be drawn. Contrasting the difficulties linked to competitive arenas, this effect makes strategy planning as such easier and more beneficial since more facets of available resources can be utilized.

Putting Transient Competitive Advantages into Practice

Once strategy planning is based on the general mindset of thinking in terms of competitive arenas and pipelines of transient advantage, the stage is prepared for business models to evolve into diverse directions in various settings at different points in time and at varying stages of product and industry life cycles. McGrath suggests five guidelines to implement the new approach toward strategy formulation and adaptation in a transient economy:

1. Design a business architecture that balances stability and agility with a sustainable core mission and flexible means of operation.
2. Foster a corporate identity through a culture of open communication and routinize innovation as an inherent part of the business architecture to ensure ongoing dynamic.
3. Make human resource management a top priority in order to nurture new talent and entrepreneurial activities.
4. Review the development of business ideas in the light of changing market dynamics on a regular base.
5. Establish processes of healthy (dis-)engagement to be able to maneuver in transient environments.

As a first step, general managements should seek to introduce a company structure based on flexibility with regard to entrepreneurial business activities and sustainability in terms of corporate identity, commitment, and core values. Here, McGrath's propositions are in accordance with Doz and Kosonen (2010) who support the argument that the major task for general management in strategy formulation is balancing challenges and opportunities by providing enough stability to draw on, while at the same time being flexible enough to ensure agility in ever changing environments. The source of stability and sustainability of strategy planning is the definition and company-wide communication of a core mission or unifying element of corporate identity. Thus said, the segmentation of customers as well as the layout of the arena of economic activities should be known to all employees. The aim is to create a common sense of ambition and feelings of commitment that provide an aiming point of identification with the company (McGrath 2013a, pp. 34–36). These directory guidelines and common values determine the sustainable core of a company and serve as an anchorage for all following business activities.

A prime example of a company that managed to unleash growth potential through the combination of stability and agility is Kone, a world leader in the elevator and escalator industries. Taking on a functional rather than product-based definition of its business model, the old traditional elevator company redefined itself in early 2008 as a “people flow” solutions provider (Doz and Kosonen 2010). Thus said, general management defined a customer segment and competitive arena for future business activities, without linking future growth toward a specific type of product. Referring to people-mobility solutions as the strategic aim in the light of rapid and continuing high-density urbanization opened the grounds for various business innovations beyond the sheer notion of elevators and escalators. Furthermore, general management ensured the distribution of this new concept on all levels of the firm by means of open communication. This in turn unleashed a stream of idea-generation among its employees. That way, the company established its very own pipeline of advantages, continuously nurtured with new ideas for mobility solutions.

Kone achieved this major breakthrough by means of reformulating the business model with the tools of “abstraction” and “generalization”. It was redefined from a product perceived as mature and uninteresting to a customer-oriented solution with the aim to be conceptually abstract while remaining contextually grounded. Combining these two elements in the strategy development process contributed tremendously to the company’s strategic agility. Freeing previously locked-in entrepreneurial activities and rendering formerly ad hoc entrepreneurial activities into a routine, Kone managed to generate multiple parallel processes of business model innovation.

As the case of Kone shows, directory guidelines and common values determine the sustainable core of a company and serve as an anchorage for all following business activities. This way, a certain degree of control and order can be established within the broadly set frames of transient competitive advantages. In fact, this is a necessity as thinking in terms of pipelines of advantages potentially results in multiple new business models that evolve in parallel but are not compatible with each other. It is a valid remark to question how a company can prevent to be torn apart under these conditions with many forces at work at the same time, pulling in many different directions. McGrath is aware of these doubts and accordingly states: “The dilemma is how one creates strategic coherence when strategy is increasingly distributed across multiple arenas, each of which might have competitive advantages created in somewhat different ways. [T]his is where the role of common values and corporate culture comes into play. If one has a common point of view about the right and the wrong things to do, it is much less likely that you will ride off the ranch” (McGrath 2013a, p. 148).

In this, she points at an important prerequisite to the establishment of pipelines of advantages. Before a firm can capitalize the benefits of transient advantages, it needs to clearly define and develop its core capabilities. In other words, rather than focusing on the exploitation of presumable advantages, companies should aim to exploit their competences. Thus said, management strategy needs to be directed at a sustainable corporate core so that many activities, some of which might be inconsistent with one another, can be orchestrated (McGrath 2013a and 2013b). Moreover, abstracting a business model to its conceptual essence without losing sight of its possible contextual dependency calls for stability in terms of core competences but also for a company structure based on flexibility in operations. Thinking in terms of competitive arenas requires a reconfiguration of the entire structural architecture of a firm from a holistic perspective. Pfeiffer et al. (1997) describe a similar scenario when referring to limits of traditional approaches of market analysis (p. 57). Taking the production of master-keyed systems as one example, they elaborate on the fact that from a traditional perspective, a mechanical locking system consists of a key, a lock, and unique mechanism to combine these two elements. However, thinking in more abstract and functional terms, a master-keyed-system may as well be described as a device to provide security and control as well as to personalize access. From an innovation management perspective, a broader definition of the term “key” turns the development of any means of identification, authorization, and verification, as well as transmitters and storages of information into potential fields of business activity.

With the key example, Pfeiffer et al. (1997) illustrate that thinking about opportunities in narrow industrial branches only leaves companies oblivious to developments beyond these borders that may have severe impact on all kinds of business dynamics. This includes idle growth potentials on the one hand and rivalry from emerging potential substitutes on the other. Thus said, a traditional key-manufacturer might suddenly be confronted with competitors from the IT industry, who happen to have developed locking mechanisms based on microelectronics and biometry—with a “key” in shape of a chipcard or even less, in shape of codes and PINs.

Hence, firms should broaden their understanding of the market fields they are active in. This way, companies are able to continuously evaluate business developments in the light of technological change and its impact on opportunities to innovate (Pfeiffer et al. 1997). Obviously, this abstraction of the company’s core does not only affect a company’s potential to integrate seemingly disconnected new areas of business, but also strongly influences the way in which competitors (particularly future competitors)

are identified as exemplified in the key example. At the same time, a broad definition of a company's business environment requires a high degree of complexity management. This in turn can only work with a sustainable core. A strong corporate identity and clearly set management strategies serve as an umbrella and help to prevent to be overwhelmed by possibilities or paralyzed by fear of omnipresent competition (Pfeiffer et al. 1997).

The Lohmann GmbH serves as an example to illustrate how the according entrepreneurial multitasking can look like. Founded in 1851 as a traditional producer of bandaging and medical tapes in Germany, today the company is one of the pioneering forces in adhesive tape technology, active on a global scale. Over the years of its existence, the company developed a strong corporate identity as "Bonding Engineers", offering high-tech solutions to its customers (Lohmann 2015a). When assessing future demand and market resources as well as technological development potentials, Lohmann's managers start from an abstract and functional definition of their own business model. This way, they are able to systematically explore opportunities to innovate on a large scale and on various levels. Broadening the understanding of their fields of business activities, they can figure growth potentials not only for their own company but also for competitors' businesses (potential threats) at an early stage.

Alongside the abstraction of the actual core business model—the provision of adhesives—the company has defined accountability, entrepreneurship, global thinking, performance, and trust as core values:

Advanced globalisation is opening up many promising new opportunities for us. [...] The Lohmann Group has everything it needs to achieve this: 160 years of tradition, impressive adhesive bonds and, last but not least, employees who act according to a clearly established set of values. (Lohmann 2015b)

The unifying element of Lohmann's various business models is the broad mission to create customized solutions and to provide adhesive expertise for their customers' success (Lohmann 2015a). Based on this self-conception, the company is able to configure and distribute resources between business model innovations in the course of their development or at various points over their life cycle. It also enables Lohmann to engage in various fields of business at the same time such as transportation, building and renewable energy, consumer goods and electronics, graphics and health care.

As the Lohmann case shows, abstraction supports multiple entrepreneurial activities evolving in parallel but separate to each other. This in turn offers innovators a choice of alternative business models. With agile company structures and

a non-sacrosanct approach toward resource allocation, capital can be assigned to products and market segments flexibly, nurturing different channels and logistics for different types of customer demands. Thus said, while stability and sustainability in corporate values and directory guidelines are one side of a coin in a transient economy, agility and flexibility in structural and institutional terms are the other (Pfeiffer et al. 1997; McGrath 2013a, pp. 27–52).

The second step toward the establishment of pipelines of transient advantages encompasses the systematization of processes of innovation and the implementation of a transient mindset. Here a culture of open communication and the overall (social) architecture of a company are of great importance. Ideally, a firm can rely on institutional structures that foster the development of a corporate identity with diverse company competences and the ability to operate in different settings. McGrath's claim that a company's architecture ought to ensure smooth and constant processes of resource reallocation and reconfiguration is in line with observations of other scholars. Kotter (2007), for instance, states that "institutionalizing change in corporate culture" (p. 8) is an important prerequisite to enhance a firm's ability to adapt to shifting environments. Companies often fail to grasp opportunities because they are reluctant to reorganize and change organizational structures, whenever potential opportunities do not fit established structures. In contrast to that, organic structures foster inner-firm innovation (Kotter 2007). This is an especially crucial asset since entrepreneurial growth is a prerequisite for constant flows of innovation, feeding the pipelines of transient advantages.

McGrath emphasizes that innovation should be regarded as an inherent part of an enterprise and its corporate identity, not like a sporadic and arbitrary event with ad-hoc relevance. This is also pointed out by Brynjolfsson and McAfee (2014) as well as Doz and Kosonen (2010), who jointly propagate the internalization of innovation. To achieve this, strategy planning and innovation management, who were traditionally seen as separate disciplines, should now be considered as interdependent variables. McGrath states that while it used to be possible to strategize about the future without necessarily bringing new business models to the table in the past, this differentiation is no longer valid in a transient economy. In order to evaluate new moves, strategists should follow the logic of real options, making "a small investment that conveys the right, but not the obligation, to make a more significant commitment in the future" and allowing the firm "to learn through trial and error" (McGrath 2013b, p. 67). This way, pipelines of advantages are constantly filled with innovations, which provide for greater flexibility. It is important to note that advantages will remain real options only as long as the corporate foundation remains agile enough to react to

changing conditions. Once the foundation of an advantage has eroded, a firm must abandon well-established strategic positions and move on, continuously looking for the next profitable window of opportunities.

At this point, a healthy culture of communication becomes a vital asset for strategy planning. In fact, greater transparency concerning the reasoning and underlying motivation to abandon business models will increase the acceptance of management decisions on the one hand and will offer the grounds to constructive criticism and inter-firm entrepreneurial activities on the other. In the framework of transient competitive advantages, developing a culture of transparent communication and increasing the awareness on all levels of an organization through free flows of information across the entire firm is categorized as a main concern of strategy planning. Whereas misinformation and a lack of communication pose potential setbacks to strategic renewal, the permeability of internal structures of knowledge distribution is a source of revitalization.

McGrath stresses that knowing when it is the right time to change a strategy, for example, to foster and follow another advantage requires gradual and continuous critical reviews of corporate operation and a willingness to communicate criticism—actively by uttering it and passively by receiving and accepting it. A vital aspect in this regard is a feeling of mutual trust and security among employees on all levels of management, both horizontally and vertically. Otherwise, crucial information might not be distributed, for example, for fear of loss of employment. Establishing a corporate culture in which resource reallocation is embraced like a regular process and not as a threat to current working positions will not only promote the individual development of employees but will be beneficial for the progress of the entire company (McGrath 2013a; 2013b).

It should be noted that permeable structures will not only change dynamics within a firm but will also have an effect on a company's external relations. In fact, the level of openness goes beyond inter-firm processes of exchange forasmuch as knowledge may be generated through strategic partnerships and collaborations with other organizations, too. In this context, Hamel, Doz and Prahalad (1989) stress that potential benefits of strategic networking go far beyond business model innovation. In fact, it can be a vital source for structural renewal. While strategic networking does not always provide enough opportunities to wholly internalize a collaborator's skills, "just acquiring new and more precise benchmarks of a partner's performance can be of great value. A new benchmark can provoke a thorough review of internal performance levels and may spur a round of competitive innovation" (Hamel et al. 1989, p. 139).

Thus said, collaboration may serve as a tool to restate a business model in conceptual terms (Doz and Kosonen 2010). As Hamel et al. (1989) further emphasize, “competitive renewal depends on building new process capabilities and winning new product and technology battles. Collaboration can be a low-cost strategy for doing both” (p. 139). Gaining new perspectives through strategic cooperation and pooling of innovation is a source of strategic renewal especially interesting for small- and medium-sized enterprises with limited capacities for internal laboratories of innovation. This accounts regardless of whether these partners are direct competitors or occupy an entirely different area in the value chain or industry. In fact, in the light of digital transformation with entirely new opportunities to share resources at comparably low cost, networking becomes even more attractive. Along these lines, strategic networking can serve as a suitable vehicle to enter new competitive arenas and to outsource innovation—either to specified or unspecified partners. The latter approach is known as open innovation. Here, companies pay heed to the trend of hyperconnectivity and use open innovation as a source of strategic renewal in order to exploit the creativity of customers for product and process development.

Boehringer Ingelheim, for example, a pharmaceutical company from Germany, successfully utilized open innovation in its search for a model to predict the biological responses of molecules more accurately. Boehringer challenged an online science community to come up with ideas for an algorithm that would be able to predict a biological endpoint to a molecule by only knowing its structure and composition. Triggering a specifically targeted stimulus, the company knowingly took a certain risk of losing a competitive advantage. In fact, due to the transparent nature of open innovation, the public challenge offered insights into Boehringer’s research aims and its current state of development in molecular studies. However, general management apparently decided that the potential advantages exceeded the risks. In the end, the company was rewarded for this approach, since the solution the winning team came up with is now in effective use as a part of Boehringer’s drug development efforts. Interestingly, some participants of the open innovation challenge had no formal training in chemistry and still provided solutions that were at least equal to those produced by members of the academic field (IdeaConnection 2015). Apparently, opening up to online communities offers chances to get impulses from entirely different fields and thus utilizes unknown sources and potentials. This applies to non-virtual networking activities, too. Hence, the ability to interconnect on inter-firm and intra-organization levels becomes a crucial asset in a constantly transforming business environment.

So far, the practical implications of the paradigm of transient advantages we highlighted were predominantly of structural nature. A third step to apply the concept relates to long-term strategy planning and tackles “the human side of business model and technology shifts” (McGrath 2013a, 37-38). In fact, establishing transient business architectures (e.g. balancing stability and agility) and routinizing innovation bears significance for recruiting processes, too. In the light of the prerequisites to maintain pipelines of transient advantages, human resource development turns into a top priority of general management. Indeed, the constant process of innovation on which the maintenance of pipelines of transient advantages relies on, feeds on knowledge creation among employees. In that sense, the new business reality with arenas of competition calls for a new type of employees and new job concepts. Here, the focus is shifted from existing skills to the ability to learn new competences and adapt to changing business conditions.

The breeding ground for these valuable characteristics is a new understanding of the working environment. Digital transformation has altered traditional concepts of jobs with fixedly assigned tasks and areas of responsibility. Time, space, and clearly defined role models have been replaced by the notion of employability as a determining factor in the modeling of job descriptions. Especially in the context of intra-firm transfers of knowledge, so-called soft-skills and extra-role behavior of employees turn into vital assets (Frese and Fay 2000). Corresponding attitudes encompass proactive engagement with problem solving, thinking beyond assigned responsibilities and tasks, commitment to a firm’s core mission on one’s own initiative and treating missteps not as setbacks but as a challenge (Frese and Fay 2000). This accounts for all levels of employment, including the highest ranks of management. In that sense, the new business reality calls for a new type of leadership, too.

Naturally, a general manager will seek to avoid losses by all means, secure investments, and defend established, well-functioning business models. In the end, one should never change a running system—right? Wrong conclusion, says McGrath, who stresses that general management needs to “abandon many of the traditional notions about competitive strategy” which in their turn “exacerbate the challenge of strategy reinvention” (McGrath 2013b, 66). Hence, continuous advancement is a concept that should be applied to strategic renewal and to development of the individual alike. Core qualities of strategic management in this regard are tolerance toward mistakes, the attitude to reinterpret setbacks as triggers for new initiatives, and the ability to establish structured processes of healthy disentanglement of failing projects. That includes judging employees not on the ultimate results but on the overall performance in the event of a failure and how it was handled. In fact, asking

for entrepreneurial activities and warranting fault tolerance are two sides of the same coin. Offering room for experimentation and encouraging employees to think outside the box will ideally result in greater numbers of unconventional ideas—some of which may turn out as genuine innovations and some of which will remain fruitless. With various parallel developments of new business models, it is obvious that not all rockets will ultimately hit and thus not all investments in new activities will pay off. However, even though an initial idea may not develop into a fully fledged business model, it may still prove to be beneficial for the firm. As also indicated by Bolinger and Brown (2015), “failure can be simultaneously painful and productive for entrepreneurs” (p. 454). Experimenting with various proposals will aid in the discovery of hidden elements for potential real innovations. Thus said, the positive learning effects of unsuccessful projects should not be underestimated.

From this perspective, being able to understand the rationale behind certain processes and to draw generic knowledge for future use are crucial competences of employees on all levels when it comes to a company’s capacity to innovate. In addition, the capability to communicate criticism constructively and the willingness to share experience and new ideas turn into major assets. Garud, Kumaraswamy and Sambamurthy (2006) refer to these characteristics as learnability, that is, “an individual’s ability to derive generic lessons from specific situations and apply those lessons to unstructured problems” (p. 279). McGrath (2013a) paraphrases this approach in the context of transient advantages accordingly: “Investing in people’s capacity to move around removes a tremendous barrier to change and suggests a redirection of emphasis from pure deployment to creating transition capability” (p. 37). A company that has incorporated this concept and thus optimized the utilization of human entrepreneurial capital is General Electric (GE), a multinational conglomerate, headquartered in Fairfield, Connecticut. The core of GE’s competitive advantage lies within its human resources development and knowledge management strategy. The strong culture of learnability within GE is founded on the Work-Out Philosophy. It is based on three pillars: encouraging challenge and simplicity to systems, engendering self-confidence, and utilizing working practices that result in speed of responsiveness (Garavan and Carbery 2012). Employees on all levels can get involved in the process of ongoing business innovation since they can rely on organizational structures stimulating the exchange of experience and newly generated knowledge. The company’s strong emphasis on the development of the skills of its employees resulted in the introduction of change management initiatives and extensive training programs. By creating an atmosphere of sharing new ideas and recruiting on the maxim of learnability, GE has fashioned its very own engine-for-innovations—a unique competitive advantage.

As the example of GE shows, human resource development aiming at learnability and a high degree of diversity among employees helps to ensure that new talent and entrepreneurial activities are constantly nurtured. The case also highlights the importance of company structures and the careful orchestration of an entire architecture of processes for organizational transformation. This is especially important since pursuing multiple innovation streams or ideas does not come without risk. Alongside the pro-verb “where wood is chopped, splinters must fall”, experimentation with business ideas, dynamic developments, and continuous reconfiguration imply punctual setbacks per se. From a cost accounting perspective, it is difficult to accept the fact that putting effort into sets of innovations means embracing potential failure and losses, too. However, discontinuing a business idea is not necessarily equal to failure. It rather constitutes mindful management as part of a natural process within a firm. Accordingly, the two final steps to implement the concept of competitive arenas into strategic management are based on routinized processes of constant review of business ideas and healthy (dis-)entanglement of company segments under the impression of changing market dynamics: “One of the most significant differences between the assumption of sustainable competitive advantage and more dynamic strategy is that disengagement – the process of moving out of an exhausted opportunity – is as core to the business as innovation, growth, and exploitation are. [...] Disengagement is seen as a way to free up and repurpose valuable resources rather than a dismaying signal of lost glory” (McGrath 2013a, p. 21).

To limit the costs of failing business models and to be able to maneuver in transient environments, McGrath advocates a healthy willingness to discontinue existing businesses, products, and practices in the overall processes of continuous reconfiguration. Her underlying assumption in this regard is that a business does not have to last forever to constitute a net economic gain. Accordingly, the challenge for strategic management is to determine at what point of time it starts to fail and turns non-profitable. In that sense, she relates to Porter (1996) who pointed out that “the essence of strategy is choosing what not to do” (p. 70). Indeed, it is crucial that the disentanglement from assets and capabilities is timed correctly and is initiated when the firm is still vital and alternatives are at hand—not when times are desperate and divestment is the only choice left (McGrath 2013a, p. 14).

The subsequent main task is to find suitable means to drop failing models in a smooth way while at the same time securing all potential benefits that might be drawn from the initial business idea. Thus said, timing and processing are vital to healthy disentanglement. Once again, the considerations

alongside the concept of transient competitive advantages are based on the classical approach of strategic management in which timing of disengagement is at center stage. But the approach modifies the classical strategies in declining industries (Porter 1980) in the light of transient business environments to achieve a successful discontinuity of business activities in the following sense. Here, orderly migration, non-sacrosanct attitudes toward business model assessment, a shrink-to-the-right-size approach and a spring-clean mentality are defined as determining factors. Orderly migration as a routinized process is based upon two principles for effective disentanglement: First, capturing and conserving core capabilities and competences linked to a business model that is failing; second, involving stakeholders who are adversely affected by the decision to divest in the overall process (McGrath 2013a; 2013b). Assessing all available business models by equal terms, regardless of their current or past state, is another important aspect in strategic discontinuity. Arguing against a “golden-cow-mentality”, McGrath emphasizes that nothing and no one should be sacrosanct, that is, undisputable when it comes to measuring performance in the dawn of failing business. Reluctance with regard to assessment will delay crucial decision-making processes, increasing the danger to miss the right time window for divestment with severe consequences. Nunes and Breene (2011) support this line of argument by stating that “companies fail to reinvent themselves not necessarily because they are bad at fixing what’s broken, but because they wait much too long before repairing the deteriorating bulwarks of the company” (p. 32).

A potential outcome of the disentanglement process might be shrinking a business model back to an appropriate size. This aspect becomes particularly important in the declining phase of the industry. Here, flexibility and agility in business model innovation and human resource capital come into play. Companies adopting the framework of transient competitive advantages should be able to reconfigure their businesses whenever they face decline since their internal structure and external orientation enable them to exit exhausted opportunities in a flexible manner (McGrath 2013a; 2013b).

Moreover, growth outliers, maintaining pipelines of advantages, are able to enter new life cycles comparably easy, as they combine stability and dynamism—stability in terms of the firm’s core values and proposition, inherent in flexible and agile structures and processes. Thus said, they rely on a regime favorable of change. From the perspective of the new paradigm of transient economies, firms cultivating entrepreneurial activities on a continual base and large scale will always outperform their competitors, even if the industry is in decline. This goes in line with the common baseline of industry life cycle literature. Here, a widespread consensus exists on the claim “that innovative

firms are more likely survivors [, supporting] the notion that innovativeness provides advantage” (Peltoniemi 2011, p. 361).

Supporting a broad frame for entrepreneurial activities and revaluation all business models regardless of their previous history also prevents companies from getting stuck in what McGrath terms a “hostage-resource trap” (McGrath 2013b, p. 66). She observes that shifting capital toward new ventures gets especially difficult when innovations have to compete with established business models that involve too many resources too tightly fixed to them with too many people clinging too hard to. Instead, in a pattern that is termed “continuous morphing” (McGrath 2013b, p. 28), successful organizations are continually “freeing up of resources from old advantages in order to fund the development of new ones” (McGrath 2013b, p. 28). Metaphorically speaking, strategic management should periodically adopt a spring-cleaning mentality, whereas divestment equals garage sales.

A company that managed to reinvent itself by these terms is the easyGroup. Facing diminishing returns of investment, the business model of easyGroup’s flagship, the low-budget airline EasyJet, was restated in more abstract terms than would normally apply to an airline. Distancing provided a way for the easyGroup to conceptualize a range of new business domains while building and leveraging on its core competencies. Through this conceptual distancing, it was defined as a high fixed cost service with limited capacities and price elastic demand. Airplanes with their characteristics to be redeployed relatively flexibly were conceptualized as its key assets and the ability to learn how to forecast demand was identified as a core competence. This way, a whole range of other potential fields of activity with similar business models from low-cost cruise ships to internet cafés were revealed (Fig. 3.2).

While this perfectly applied in theory, reality proved to be more complex and not all projects initially launched turned into successful businesses. However, since failure was accepted as a potential outcome from the very start, unsuccessful projects did not necessarily pose a downturn in the long run. Experimenting with several comparable potential models revealed the limits of some ideas for business model innovation and thus helped to sharpen the definition of the company’s core competences—which was in fact the initial aim. Hence, the group’s openness toward unconventional ideas and firmness in core values turned into a source of product and process innovation. As setbacks were reinterpreted as triggers for new initiatives, failures added to the company’s abilities to grasp key aspects of potential new domains of business activities.

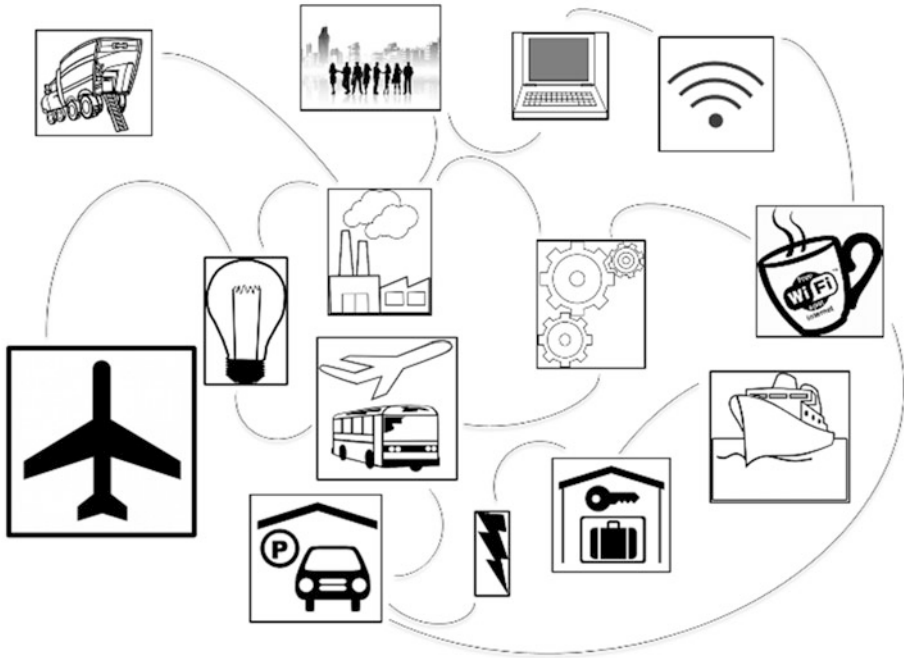


Fig. 3.2 Reinventing business models through conceptual distancing

Conclusion

This chapter illustrates in how far Porter's strategy framework as one of our building blocks in management is challenged by the new business reality that comes with digitalization. Of course, also Porter's approaches are not based on a static environment, but the changes that come with digitalization lead at some points to reaching the limits of the traditional approach. In this context, McGrath's concept of transient competitive advantages is presented as one of the newly emerged frameworks that pinpoint the fundamental changes in our approaches toward strategy formulation that should be implemented to master the challenges of the new era.

Firm survival under the conditions of digital transformation, dissolving industry boundaries, changing customer demands, and multifaceted competition depends greatly on carefully orchestrated strategy planning. The good news is that the paradigm of transient advantages offers valuable guidelines for strategic management to companies lost in transformation. Three major aspects form the basis for this paradigm shift: first, the focus should be shifted toward competitive arenas as opposed to products. Second, nothing is undisputable anymore; instead of

preserving the (re-)sources, and ways of deploying them that generated past success, attention should be drawn to new ways of deployment and acquiring new/different resources, including a human resource strategy toward this end. Finally, companies are advised to generate and keep several pipelines of new advantages, instead of primarily optimizing around the generators of past success. Thinking in terms of competitive arenas and pipelines of transient advantage, strategy should be formulated from a holistic perspective against the background of the firm's arena of competitive activities. This combines the two core assumptions that markets are dynamic and that the basis for competition changes over time, even at an increasing pace as we are witnessing it currently. Accordingly, strategy formulation in a transient economy should include the following five elements:

1. Design a business architecture that balances stability and agility with a sustainable core mission and flexible means of operation—Introduce a company structure based on flexibility with regard to entrepreneurial business activities and sustainability in terms of corporate identity, commitment, and core values.
2. Foster a corporate identity through a culture of open communication and routinize innovation as an inherent part of business architecture to ensure ongoing dynamic—Generate multiple parallel processes of business model innovation with the help of platforms for transparent flows of information and knowledge-exchange internally as well as with external cooperation partners based on mutual trust and the willingness to accept and express constructive criticism.
3. Turn human resource management into a top priority in order to nurture new talent and entrepreneurial activities—Emphasize learnability as a focal point of human resource management to foster the capability to model alternative production systems to simulate effects of alternative business ideas in different scenarios based on the pursuit of new arenas of business activity.
4. Review the development of business ideas in the light of changing market dynamics on a regular base—Pursue ongoing strategic renewal through constant reallocation of resources.
5. Establish processes of healthy (dis-)engagement to be able to maneuver in transient environments—Accept potential failure, reinterpret setbacks as triggers for new initiatives and establish structured processes of smooth disentanglement.

The ability to internalize these five elements is crucial for those companies who seek to be future champions in competitive environments. Apparently, implementing constant evolution, configuration, and reconceptualization is

easier said than done. However, while the conditions in a world lost in transformation pose great challenges, they also imply that companies who are able to accomplish these abilities perform outstandingly.

Bibliography

- Aldrich, H. E., & Fiol, C. M. (1984). Fools rush in? The institutional context of industry creation. *Academy of Management Review*, 19(4), 645–670.
- Ashkenas, R., Kaiser, D., Simmons, K. M., & Caropreso, M. (2013). Change management needs to change: Interaction. *Harvard Business Review*, 91(6), 18–19.
- Barley, S. R. (2015). Why the internet makes buying a car less loathsome: How technologies change role relations. *Academy of Management Discoveries*, 1(1), 5–35.
- Barnett, W. P., & Hansen, M. T. (1996). The red queen in organizational evolution. *Strategic Management Journal*, 17, 139–157.
- Bell, G. (2013). The end of the strategy world as we know it? Rita Gunther McGrath on how sustainable competitive advantage may be a thing of the past. *Strategic Direction*, 29(8), 37–40.
- Boersch, C., & Elschen, R. (Eds.). (2007). *Das Summa Summarum des Management*. Wiesbaden: Gabler.
- Bolinger, A. R., & Brown, K. D. (2015). Entrepreneurial failure as a threshold concept: The effects of student experiences. *Journal of Management Education*, 39(4), 452–475.
- Brynjolfsson, E., & McAfee, A. (2014). *The second machine age. Work, progress, and prosperity in a time of brilliant technologies* (1st ed.). New York: W. W. Norton & Company.
- Chandler, A. D. (1977). *The visible hand. The managerial revolution in American business*. Cambridge, MA: Belknap Press.
- D'Aveni, R. A., & Gunther, R. (2007). Hypercompetition. Managing the dynamics of strategic maneuvering. In C. Boersch & R. Elschen (Eds.), *Das Summa Summarum des Management* (pp. 83–93). Wiesbaden: Gabler.
- D'Aveni, R. A., Dagnino, G. B., & Smith, K. G. (2010). The age of temporary advantage. *Strategic Management Journal*, 31(13), 1371–1385.
- Danneels, E. (2011). Trying to become a different type of company: Dynamic capability at Smith Corona. *Strategic Management Journal*, 32(1), 1–31.
- Derfus, P. J., Maggitti, P. G., Grimm, C. M., & Smith, K. G. (2008). The red queen effect. Competitive actions and firm performance. *Academy of Management Journal*, 51(1), 61–80.
- Doz, Y. L., & Kosonen, M. (2010). Embedding strategic agility. *Long Range Planning*, 43(2–3), 370–382.
- Eisenhardt K. M. & Martin J. A. (2000). Dynamic capabilities: What are they? *Strategic Management Journal*, October–November Special Issue 21, 1105–1121.
- Frese, M., & Fay, D. (2000). Entwicklung von Eigeninitiative. Neue Herausforderungen für Mitarbeiter und Manager. In M. K. Welge, K. Häring, & A. Voss (Eds.), *Management development* (pp. 63–79). Stuttgart: Schäffer-Poeschel.

- Garavan, T. N., & Carbery, R. (2012). Strategic human resource development. In J. P. Wilson (Ed.), *International human resource development. Learning, education and training for individuals and organizations* (pp. 23–44). Philadelphia: Kogan Page.
- Garud, R., Kumaraswamy, A., & Sambamurthy, V. (2006). Emergent by design. Performance and transformation at Infosys technologies. *Organization Science*, 17(2), 277–286.
- Ghemawat, P. (2002). Competition and business strategy in historical perspective. *Business History Review*, 76(01), 37–74.
- Lohmann GmbH. (2015a). *The bonding engineers*. Retrieved August 22, 2015, from: Lohmann GmbH: http://www.lohmann-tapes.com/en/the-bonding-engineers__1059/
- Lohmann GmbH. (2015b). *Growth needs values*. Retrieved August 22, 2015, from: Lohmann GmbH: http://www.lohmann-tapes.com/en/lohmann-values__995/
- Hambrick, D. C., & Fredrickson, J. W. (2005). Are you sure you have a strategy? *Academy of Management Executive*, 19(4), 51–62.
- Hamel, G., Doz, Y. L., & Prahalad, C. K. (1989). Collaborate with your competitors and win. *Harvard Business Review*, 67(1), 133–139.
- IdeaConnection. (2015). *Open innovation success story: Boosting the pace of scientific discovery with open innovation*. Retrieved June 24, 2015, from IdeaConnection: <http://www.ideaconnection.com/open-innovation-success/Boosting-the-Pace-of-Scientific-Discovery-with-Open-I-00383.html>
- Klepper, Steven (1996). Entry, exit, growth, and innovation over the product life cycle. In: *The American economic review*, 562–583.
- Klepper, S., & Simons, K. L. (2005). Industry shakeouts and technological change. *International Journal of Industrial Organization*, 23(1), 23–43.
- Kotter, J. P. (2007). Leading change. *Harvard Business Review*, 85(1), 96–103.
- Kotter, J. P. (2014). *Accelerate. Building strategic agility for a faster moving world*. Boston: Harvard Business Review Press.
- Laszlo, C., & Zhexembayeva, N. (2011). *Embedded sustainability. The next big competitive advantage*. Stanford: Stanford Business Books.
- Leavy, B. (2014). Strategy, organization and leadership in a new “transient-advantage” world. *Strategy & Leadership*, 42(4), 3–13.
- Lindgardt, Z., Reeves, M., Stalk, G., & Deimler, M. (2009). *Business model innovation. When the game gets tough, change the game*. Boston: The Boston Consulting Group.
- Lubit, R. (2001). Tacit knowledge and knowledge management. The keys to sustainable competitive advantage. *Organizational Dynamics*, 29(3), 164–178.
- McGrath, R. G. (1999). Falling forward. Real options reasoning and entrepreneurial failure. *Academy of Management Review*, 24(1), 13–30.
- McGrath, R. G. (2013a). *The end of competitive advantage. How to keep your strategy moving as fast as your business*. Boston: Harvard Business Review Press.
- McGrath, R. G. (2013b). Transient advantage. *Harvard Business Review*, 91(6), 62–70.
- McGrath, R. G., Ming-Hone, T., Venkataraman, S., & Macmillan, I. C. (1996). Innovation, competitive advantage and rent. A model and test. *Management Science*, 42(3), 389–403.

- Murmann, J. P., & Frenken, K. (2005). Toward a systematic framework for research on dominant designs, technological innovations, and industrial change. *Research Policy*, 35(7), 925–952.
- Nunes, P., & Breene, T. (2011). Reinvent your business before it's too late. *Harvard Business Review*, 89(1/2), 80–87.
- Peltoniemi, M. (2011). Reviewing industry life-cycle theory. Avenues for future research. *International Journal of Management Reviews*, 13(4), 349–375.
- Pfeiffer, W., Weill, E., Volz, T., & Wettengl, S. (1997). *Funktionalmarkt-Konzept zum strategischen Management prinzipieller technologischer Innovationen, Innovative Unternehmensführung* (Vol. 28). Göttingen: Vandenhoeck & Ruprecht.
- Porter, M. E. (1980). *Competitive strategy. Techniques for analyzing industries and competitors*. New York: Free Press.
- Porter, M. E. (1996). What is strategy? *Harvard Business Review*, 74(6), 61–78.
- Porter, M. E. (2008). The five competitive forces that shape competition. *Harvard Business Review*, 1, 80–93.
- Ryall, M. D. (2013). The new dynamics of competition. *Harvard Business Review*, 91(6), 80–87.
- Smith, R. (2013). The end of competitive advantage: How to keep your strategy moving as fast as your business. *Research-Technology Management*, 5, 64.
- Soloduchko-Pelc, L. (2014). Competitive advantage. The courage in formulating objectives and expansiveness of a strategy. *Procedia – Social and Behavioral Sciences*, 150, 271–280.
- Stalk, G., & Hout, T. M. (1990). Competing against time. *Research Technology Management*, 33(2), 19–24.
- Stead, E., & Smallman, C. (1999). Understanding business failure: Learning and unlearning lessons from industrial crises. *Journal of Contingencies and Crisis Management*, 7, 1–18.
- Suárez, F., & Utterback, J. (1995). Dominant designs and the survival of firms. *Strategic Management Journal*, 16(5), 415–430.
- Teece, D. J. (1984). Economic analysis and strategic management. *California Management Review*, 26(3), 87–110.
- Teece, D. J., Pisaro, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Ulwick, A. W. (2002). Turn customer input into innovation. *Harvard Business Review*, 80(1), 91–97.
- van Knippenberg, D., Dahlander, L., Haas, M. R., & George, G. (2015). Information, attention, and decision making. *Academy of Management Journal*, 58(3), 649–657.
- Voelpel, S., Leibold, M., Tekie, E., & von Krogh, G. (2005). Escaping the red queen effect in competitive strategy. *European Management Journal*, 23(1), 37–49.
- Wilson, J. P. (2012). *International human resource development. Learning, education and training for individuals and organizations* (3rd ed.). London/Philadelphia: Kogan Page.
- Wincheringer, W. (2015). *Industrie 4.0. Lean Management, Digitalisierung, Digitales Produktionslabor* [Speech, 16 June 2015], Arbeitskreis Digitale Wirtschaft/Industrie 4.0, Koblenz.
- Wirtz, B. W. (2006). *Ganzheitliches Direktmarketing*. Wiesbaden: Gabler.

4

An Exponential World: Nature, Patterns, and How to Leverage Them

Hans-Martin Hellebrand

Ideas in Brief Today's world is shaped by the impact of exponential technologies. To harvest their huge potential and to not be disrupted by their immense power, today's entrepreneurs and business leaders have to gain a solid understanding of exponentials and how to design organizations around them. Building this knowledge and management capacity in an applicable and very structured manner is the key focus and the key value of this paper. To best fulfill its purpose, it is structured in four main sections: first, it explains the nature of exponential technologies. Using this understanding as a foundation, six general phases of exponential development are described in the second part; knowledge of these phases is crucial for detecting new trends and developments as early as possible. In the third section, these more general findings are enriched by a short overview about today's exponential technologies and their future potential. Based on this theoretical (but also practical and current) foundation, clear guidance is given in the fourth section on setting up optimal structures and processes, which enable organizations to turn the potential of exponentials into company value.

Keywords Disruption • Exponential technologies • Leverage • Moore's law • 6D exponential framework

H.-M. Hellebrand (✉)
RWE New Ventures LLC, Menlo Park, CA, USA
e-mail: Hans-Martin.Hellebrand@rwe.com

© The Editor(s) (if applicable) and The Author(s) 2017
H. Ellermann et al. (eds.), *The Palgrave Handbook of Managing Continuous Business Transformation*, DOI 10.1057/978-1-137-60228-2_4

Introduction

The world we live in is changing. While this fact is not new, the speed and the impact of change seem to have accelerated, as the following observations indicate. The average lifespan of companies, and even entire industries, is continuously decreasing. As a study conducted by Innosight (2012) shows, the average lifespan of companies in the S&P 500 Index fell from 61 years in 1958 to 25 years in 1980 to 18 years in 2012—and it's now just 15 years, according to Ismail et al. (2014, p. 16). This trend led the Babson Olin School of Business (2011) to predict that “in 10 years 40 % of the Fortune 500 companies will no longer exist”. We are halfway through the predicted timeline for this claim, and it is on track to becoming true. Furthermore, this is not a one-time change. It seems to be a persistent pattern, causing Cisco CEO John Chambers to state it on the 2015 CES in present tense and nearly as a “nature law” that will persist into the future, perhaps only with an even higher company death rate (Consumer Technology Association 2015).

In the last decade, a large and ever-increasing number of *unicorns* has been observed. Unicorns are start-up companies able to achieve a valuation of more than \$1 billion based on fundraising, so prior to a valuation by the open capital market. By 2013, when the term *unicorn* was coined, 39 had been counted in the past decade, an amount that then has doubled in only 2 years from 2013 to 2015 (Griffith and Primack 2015). That was reason enough for Fortune magazine to call this the “Age of Unicorns” in their cover story in February 2015.

But it is not only the number of companies with a \$1 billion valuation that has changed. The average time from founding to this \$1 billion market cap also has changed significantly—in fact, it has declined. While it took today's Fortune 500 companies an average of approximately 20 years to get to the \$1 billion market cap, companies founded in the late 1990s to early 2000s—for example, Google, Facebook, and Tesla—needed only five to eight years to reach this magic valuation. This trend is not only ongoing, but has accelerated, demonstrated by recently founded companies such as Uber and WhatsApp (both founded in 2009) and Oculus (founded in 2012), which all reached this magic valuation mark after three years—or fewer, as outlined by Ismail et al. (2014, p. 14).

What do these observations tell us about the evolution of economic systems around the world? First, the decreasing lifespan of companies and the accelerated rise of new players are a clear indication of an overall increase in the intensity of competition. Furthermore, they indicate that the market reach of companies has been significantly enhanced, primarily by the ability to access customers globally, easily, and at nearly no cost. These larger prospective markets translate to higher potential business volumes and revenues, leading to huge \$1 billion-plus valuations. But the number of unicorns is

also evidence of an increasing entrepreneurship in society and an increasing number of start-ups that are founded, which also implies a higher probability that one of these unicorns will grow into a world-changing corporation. Finally, the fast growth of new companies means the existence of more digital products that can be developed fast and easily into marketable maturity. These *minimal viable products* can then be quickly improved in fast feedback adjustment *sprints* and can finally be scaled quickly, as no physical production ramp-up or laborious walk-through of production learning curves is needed.

In summary, the effects we observed can be attributed to what is often called *digitalization* or *globalization*. What lies behind these terms, which are sufficient to get an initial impression but are too general to understand and act upon (i.e., leverage) the underlying patterns, is that the (economic) world has changed from local to global, from physical to digital, and finally from linear to exponential. The objective of this chapter is to create an understanding of the latter change's effect, which is essential to leverage its huge potential for business' value and to mitigate the risk of being disrupted by this trend.

The Structure of Exponential Patterns: Moore's Law

The phenomenon of exponential technological growth was first described by Gordon E. Moore, co-founder of Intel and Fairchild Semiconductor and thus a father of today's innovation hot spot Silicon Valley. In his famous article, Moore (1965) observed that the number of components per integrated circuit has doubled every year. In addition, he predicted that this trend would persist in the coming years because of technological and social changes, as well as growth in productivity. According to Brock's research (2006), it was Professor Carver Mead who then popularized the phrase *Moore's Law* in 1975 as a more general term after this exponential growth prediction turned out to be true for several other technologies apart from the chip industry. In 1975, Moore then corrected it to a doubling not on a yearly basis but only in biyearly cycles. It seemed as if the exponential growth phase had slowed down. In an interview published in IEEE Spectrum (Courtland 2015), Moore eventually even predicted that a saturation point would be reached, leading to his drastic conclusion: "I see Moore's Law dying here in the next decade or so, but that's not surprising".

So, is the exponential growth observed for several technologies in several industries only a phase that is now reaching "saturation"? Definitely not. As Kurzweil writes (2006, p. 48), it is important to distinguish between an exponential technology and the underlying paradigm, defined as the "method or approach [for] solving a problem". When reading Moore's statements and

articles carefully, he always referred to a doubling of the transistor density of microchips, the predominant paradigm enabling computational power in the preceding decades, but not to computational performance in general! The slowdown that Moore describes in 1975 and the standstill he states in 2015 are the saturation evidence of this single paradigm. As previously observed for other precursor paradigms forming the basis for computation, the improvement of microchips slowly reaches either its technological or commercial limit. This slowdown does not imply that the exponential growth of the technology itself, so the computational power in this case slows down as well. As in the past, other paradigms will appear, replacing the slowed-down, currently predominant one—thus enabling further exponential growth of technology in general. To put it simply, the growth of exponential technologies is nearly infinite and accelerating over time, resulting in unlimited performance!

Besides this crucial distinction between technology and paradigm, another important aspect was added to Moore’s initial findings to form the definition of “Moore’s Law” that is commonly used today: unit cost. Diamandis and Kotler, for example, describe Moore’s Law as “rentless progress in price and performance” (2015, p. 7) and Kurzweil uses “calculations per second per \$” as a metric for Moore’s Law in its original computational context (2006, p. 70). So, in addition to a doubling of performance, a significant reduction in unit cost can be observed in various technologies; a famous case is DNA sequencing costs, which Kurzweil uses as an example (2006, p. 76). To put it simply, increasing performance is becoming cheaper and cheaper. This reciprocal relationship gives exponential technologies their game-changing force in today’s world! (see Fig. 4.1; Kurzweil 2006, p. 49).

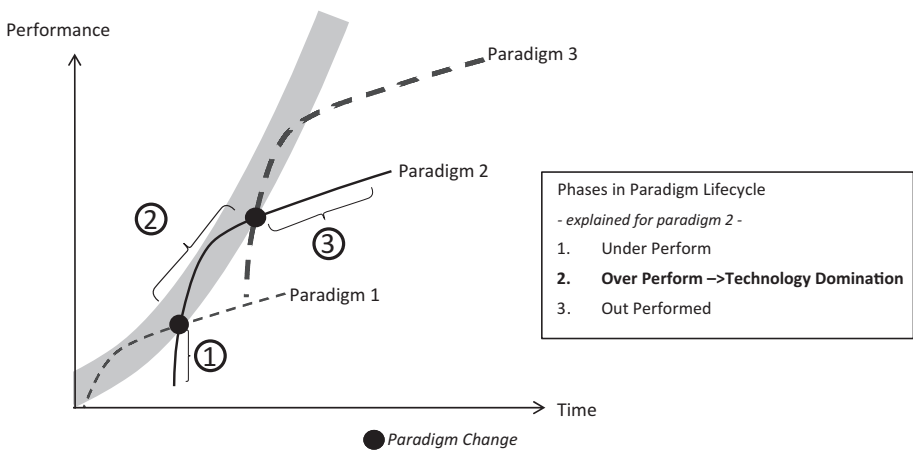


Fig. 4.1 Exponential growth driven by paradigms

Steps of Exponential Development: The “Six D” Framework

In order to leverage the opportunities posed by exponential technologies and to mitigate the risk of being disrupted by them, it is important “to have a better understanding of how this change unfolds – and that means understanding the hallmark characteristics of exponentials” (Diamandis and Kotler 2015, p. 8). For exactly this purpose, Diamandis and Kotler developed the “Six Ds of Exponentials” framework published in Diamandis and Kotler (2015) and supplemented with videos and deep dives on Diamandis’ website, www.diamandis.com. This framework outlines six steps in the exponential growth process of technology.

Digitalization is the starting point of exponential growth cycles. It allows insights, products, or services to be shared instantaneously with a large population, allowing for the possibility of parallel development. In addition to worldwide accessibility and spread, the nearly unlimited availability of distributed cloud-based computational power allows for further exponential improvement in these technologies. Although digitalization is surely a massive accelerator of exponential development, it is, from my perspective, not a necessary one. A good piece of evidence for this theory is the exponential growth of computational power based on pre-microchip paradigms, in which the underlying paradigms—such as vacuum tube solutions or other paradigms enumerated, for example, in Kurzweil (2006, p. 70)—also have not been digitalized initially.

The second phase is the period of deception. Exponential growth tends to start “mostly unnoticed” (Diamandis and Kotler 2015, p. 9). This slow start can be explained by the normal starting steps of ramping up and making the first (costly and time-consuming) steps on the learning curve. Its developmental progress is represented by the upward concavity of the exponential curve, which is much lower than expected by the human mind; the mind has evolved in a linear world over millions of years and thus expects linearity. That’s why in this early stage people tend to doubt the power of the rising technology and sometimes even say “It’s dead!”

Disruption is the third phase, the one in which technological improvements exceed linear expectations. In this stage, the technology has reached sufficient maturity to be deployed at reasonable costs and with a reasonable performance in the targeted scope of application. This usability leads to a market breakthrough, materializing in increasing sales volumes that then trigger an “explosion-like” enhancement of functionalities and price-point decreases.

In this phase, completely new markets often are created, while existing markets are disrupted as their underlying technologies are outperformed (see Fig. 4.2; Ismail et al. 2014, p. 20).

The fourth phase is demonetization. With continuously improving production processes, the technology continuously becomes less expensive. Formerly costly services suddenly become free.

In the fifth phase, labeled dematerialization, the services and goods themselves mostly vanish as their functionality is replaced by other technologies that provide additional features and thus enhanced benefits to the user/customer.

Democratization is the final phase in which the costs for a product or service finally marginalize at such large volumes so that they finally become affordable to nearly everyone. This is the final step, in which a formerly scarce resource or technology has become abundant.

Although these six phases comprise an exponential technology cycle, I believe it makes sense to split them into two clusters based on their impact on society. Phases 1–3 can be characterized as technology exchange. This means that new technologies rise and take over, leading to the death of existing companies, which have based their business models strongly on the disrupted technology, while new players enter the market. From an end-user perspective, these phases lead to new products and services and, through these, to a change in customers' behavior. In contrast, the second cluster has a much more macro- and socio-economic influence. Phases 4–6 impact the deep structures of social systems as the new technologies change the entire problem space. While the precursor technology might have solved a scarcity problem, the exponential

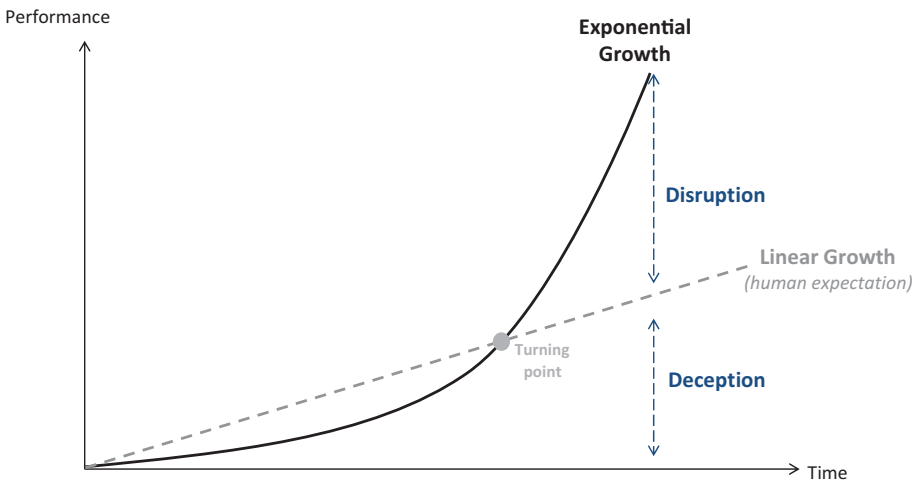


Fig. 4.2 Exponential growth versus linear expectations

may have turned the scarcity into abundance—with new “problems” arising that require new business models to solve them. This is a phenomenon described and analyzed in depth by Diamandis and Kotler (2012).

The effect of the exponential growth cycle on companies can be extreme, as shown in recent examples. On the one hand, many organizations have been quickly and completely disrupted because they were unaware of the developments or did not know how to react to them. The most famous and widely quoted example of this is Kodak. Kodak-based large parts of its business model on selling products for “physical” photography; satisfied with this booming business model and its dominant market position, Kodak totally underestimated the impact of digital photography; and this even though it was Kodak that invented and tested this early technology (a good example of the deception phase described above). After the rather slow development of the first digital cameras, the exponential turning point was reached and the technology “suddenly” became attractive in terms of cost and performance. This disrupted Kodak’s core market (Phase 3 of the Six D framework) and with it Kodak itself became insolvent as a result. By then, digital photography had already entered the next three phases of the framework: Digital cameras became cheaper and cheaper (demonetization) and the technology merged with—and thus “vanished” into—other devices such as smartphones (dematerialization). Today, the democratization phase has been reached, with digital cameras in nearly every device, allowing unlimited ability to take digital pictures. With this abundance of visual capturing ability, new problems, like, for example, the issue of sorting an infinite number of digital pictures, have emerged that now require new services to solve them.

On the other hand, there are also companies that achieved tremendous success by leveraging the power of rising exponential technologies. Apple is one of the companies that has understood the nature of exponential developments and has mastered developing, growing, and monetizing them. It was the iTunes Store that predominantly disrupted the “physical” music and film industry by providing digital content. Furthermore, the iPhone revolutionized the communication industry by merging telephones, music players, cameras, and many other digital services, and by providing apps. And for sure there will not only be *One more thing* ... coming from Apple changing our lives, but much more than that.

These examples show that understanding and being able to detect this “chain reaction of technological progression ... [is the fundament to leverage the] enormous upheaval and opportunity” (Diamandis and Kotler 2015, p. 8), that lie within exponentials—a must-know for every entrepreneur and every company in today’s world!

Today’s Exponential Technologies and Their Future Impact

Because new technologies emerge and “hyped” ones disappear in the course of every normal development cycle, an exhaustive enumeration of exponential technologies cannot be given. However, by comparing various sources, two large, overlapping clusters of technologies can be identified: The first cluster of “enabling technologies” includes all technologies that generally have no direct impact on the end customer, but that enable the exponential development in the second group of “core exponential technologies”; this second cluster includes the technologies having a direct disruptive impact on today’s world (Fig. 4.3).

Enabling Technologies

Connectivity The most influential, widely used exponential enabling technology is the Internet. The World Wide Web connects billions of people without time offset and at nearly zero cost. It has thus become the foundation of information sharing and ideation, as well as resource allocation, especially time and money, today.

Connectivity in general is already very mature and thus technical improvements enhancing its impact are not expected in the next few years. From my

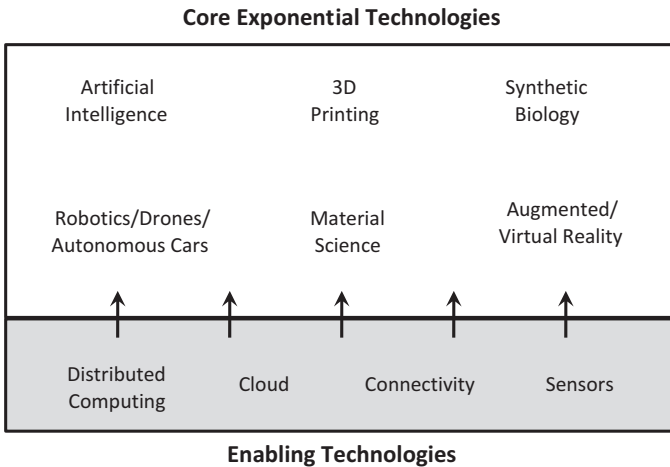


Fig. 4.3 Clustering exponential technologies

perspective, it is the growing number of Internet users through initiatives such as [Internet.org](#) by Facebook or the Loon Project by Google that will boost the Internet's influence. Based on an analysis published by Internet.org (2015), only approximately 40 percent of the world's population are currently connected. Imagine the huge impact on knowledge and joint capabilities when the remaining 60 percent get online!

Cloud Computing Although in itself very basic and mature, cloud computing was an important step for enabling other technologies to go on the exponential path. While in the early days, more “pure” information technologies were offered (such as storage-as-a-service or web space), today general cloud-hosted software products as well as specified platforms-as-a-service conquer the markets. The latter can be distinguished between functional-specific platforms, such as those offered by Salesforce in the early years of providing a web-based customer relations management service to fulfill marketing and sales functions within companies, and vertical-specific platforms like C3Energy, providing enterprise application software solutions for the global energy industry.

The exponential impact of cloud computing for companies lies in its scalability and in scale-related rate schemes, which enable small companies to grow fast and cheaply. As with the Web, no significant technological improvements are expected for that technology. A volume effect may occur, resulting in more specialized platform-as-a-service offerings, as well as a wider scope of the provided services. This already happened at Salesforce, which now offers Internet of Things (IoT) and community features. Both kinds of volume effects will mean significant price decreases for these services.

Distributed Computation Closely related to cloud computing and its result of making information accessible from anywhere and allowing a seamless scale-up is the ability to parallelize computational tasks. While cloud computing enables unlimited growth of data volume and digitalized task volume, distributed computing leads to unlimited calculation power for the data. Complex operations can now be conducted in general generally and this even in in real-time if needed. This enables for example autonomously driving cars, in which decisions have to be made real-time with a huge amount of data, as well as artificial intelligence (AI), another exponential technology that can now be trained in only a few days or even hours to conduct intelligent tasks.

For this enabling technology, continuous, exponential growth of computational power by new paradigms is most likely, which will lead to speeding up for a variety of other technologies.

Sensors The connectivity of machines and devices—most often not only referred to as “Internet of Things”, but also as “Internet of Everything” in order to highlight also the connection between humans and machines and also as “Industry 4.0” in industrial contexts—is the newest and likely the most game-changing technology in the enabling technology cluster in the coming years. At the end of 2014, Gartner (2014) predicted the number of connected things in 2020 would be about 25 billion. A prediction that has been corrected significantly upward in more recent studies such as by Business Insider Intelligence (Camhi 2015), which forecasted 34 billion connected devices at the end of this decade. Various extrapolations of this trend, summarized well in the overview given by Stanford University (2013, p. 1), conclude that the world in 2025 will be covered by a trillion connected devices. The associated potential economic impact will be between \$3.9 trillion and \$11.1 trillion, according to the McKinsey Global Institute (Manyika et al. 2015). This impact is likely an underestimate given the information and insights that can be generated by these devices and the potential services that can be built upon them.

Future developments in this technology will be around all of its attributes: sensors’ functionality will increase as costs decrease, leading to a wider spectrum of application areas. In addition to the sensors itself, platforms will develop allowing companies to leverage the information gathered from the explosion-like increasing amount of sensors. More and more sensor-based services will occur. This technology will surely impact nearly every industry and every aspect of human life.

Core Exponential Technologies

Artificial Intelligence John McCarthy, one of the first researchers and thus the founding father of AI as a science, defined AI as “the science and engineering [of] intelligent machines” (McCarthy 2007). In this context, intelligence is understood as the ability to process environmental influences in order to make optimal decisions and take action. In other words, the main target is to replicate (and even outcompete) the key asset of humankind.

The complexity space that is spun up in order to achieve that target is gigantic, leading to the conclusion that AI is perhaps the most complex science ever. On the technical side, it focuses on hardware such as *artificial brains* for fulfilling tasks associated with intelligence, as well as on software for computing

influences and deriving decisions. In terms of the science, a wide variety of disciplines are involved, ranging from computer science to math and statistics to biology and neuroscience to linguistics. Finally, the main target of general super-intelligence needs to be dismantled in accordance to the standard literature in the field—such as Luger and Stubblefield (2004) or Russell and Norvig (2003)—into the following manageable subcomponents, which all represent current research areas: reasoning (finding causalities—implemented mainly using statistical methods), knowledge representation (gaining and improving knowledge), planning (setting goals and taking actions to achieve these targets), learning (methodologies to build intelligence by training), and natural language and picture/video recognition (instruments to interpret the environment as inputs for intelligent decisions).

Today's AI application is already very broad. In the retail business, it is common practice to group consumers based on their behavior and launch targeted marketing campaigns tailored to these categories. As such, concrete recommendations are given according to preferences determined using knowledge of the associated group. In the financial sector, intelligent algorithms trade based on market and other information. In the personal device and connected home segments, AI lets *Siri* and *Alexa* (respectively) communicate intuitively with human beings. Beside these very specialized applications, IBM fosters its WATSON system, which is a generalized AI platform that should in its final state be able to conduct any intelligence-required task. On the hardware side, initiatives such as SyNAPSE by the Defense Advanced Research Projects Agency (DARPA) utilize biological principles and materials to build an “artificial brain” as the performant host for intelligent applications. The intelligence of all these systems is sure to grow exponentially over the next few years, enabling more intelligent services.

3D Printing 3D printing, also referred to as additive manufacturing, can be defined as computer-aided procedures and processes to create three-dimensional objects by a successive layering of various materials. More intuitively, these methods allow building up structures slice by slice like images from an MRI scan! What at the first glimpse looks like just another production method is for Rifkin (2011), one of the key enablers of the third Industrial Revolution. This is essentially due to four key attributes: first, the size of 3D printers and the resulting mobility of production are revolutionary, as they allow the production of goods not only anywhere but also at changing locations. Second, an increasing variety of materials serving as inputs allows an increasing scope of products/goods to be printed—ranging from plastic or metal products to foods to organs and transplants. Third, today's printers allow objects of any size to be created. While in the early stage of 3D printing

only small items could be created in cube-like printing devices, printers today even allow the production of cars, as mastered by Local Motors, and houses such as those printed by WASP. Finally, layer-wise forming processes mean complexity, for example, a huge amount of moving connected parts when printing cars, is no longer a restriction. While classical processes in these applications also had to ensure “assembly-ability”, this constraining condition simply collapses with 3D printing since objects are build up layer by layer.

To summarize, every object regardless of its complexity, size, and material will be printed easily in a few years at exponentially decreasing costs. Therefore, every industry involving not only physical goods but also medicine will be revolutionized by this technology.

Robotics As defined by the Oxford Dictionaries ([n.d.](#)), robotics is the “branch of technology that deals with the design, construction, operation, and application of robots”, whereas robots are “machine[s] capable of carrying out a complex series of actions automatically”. In general, robots have been deployed in the industrial sector for decades and are thus already a usual and accepted part of daily life. Recent enhancements in that space aim at increasing the abilities of the robots. A good indicator of their increased abilities is the DARPA Robotics Challenge, in which robots have to pass eight different tasks, described at www.theroboticschallenge.org. In the competition’s first round in 2012, none of the robots passed every task. Only three years later, every team completed the challenge. Furthermore, the winner completed all the tasks in only one hour, which was originally the leading time for just one of the eight tasks. Once again, this example demonstrates the exponential curve for improvement of this technology. Besides the increase in abilities, recent research also aims at increasing the intelligence of the robots through applied AI, allowing them to learn intuitively and react to influences from the environment. In addition, there is also research on decreasing robots to nano-size, which opens up completely new application areas such as microsurgery on human veins (as shown on the platform WYSS Institute).

Although they are just a specialized subcluster of robots, I want to highlight the developments of drones and autonomous vehicles. In the near future, both will surely revolutionize not only transportation, but also deeper layers of society and behavior. Driving will become a non-attention-demanding and time-consuming task for humans implying freedom and time to do other things.

Virtual and Augmented Reality Virtual reality (VR) can be defined as the creation of a simulated artificial environment that allows the user to interact with that environment as if it were real. In contrast to this fully artificial reality, augmented reality (AR) describes the overlaying of artificial objects onto the real world—for example, the virtual projection of solar panels onto an existing rooftop to simulate how the house will look like after panel assembly. Both technologies have progressed rapidly in the past few years, leading to products such as Oculus Rift in the VR space and Microsoft HoloLens in the AR segment, with excellent performance parameters at reasonable and acceptable costs. In contrast to this recently available hardware, software and application development is still lagging behind. But I predict it will catch up very soon.

The application areas for this technology are huge: VR will revolutionize the whole entertainment industry, from games to movies, because the customer can now be “in” these worlds. But it is not only this obvious industry that will be influenced; I also expect the travel and leisure industry to take a hard hit from this rising technology, as nearly every place in the world will be able to be reached from the sofa; this virtual alternative will have the same impact on human beings because the brain cannot distinguish between actual and virtual realities. Of course, to achieve this vision of full substitution, the hardware must improve to allow other senses to be simulated, something that is already been worked on. In addition, personnel training and personal interactions, such as virtual parties, will be newly defined by VR. Will we go to the office in the future, or will we work from home in a virtual office with “avatars” of our colleagues also working from home? It’s a vision that totally changes our society.

In contrast, in the application of AR, there will be cases in which the merger of reality and simulation is essential, starting with simulated changes to structures such as the solar panel and reaching the projection of information in real-time through the glasses, for example, on people and the structures around people using various Internet resources.

I believe VR and AR technology has a huge potential to change human behavior and personal interactions, and thus the whole of society.

Materials Science Briefly summarized, the key target of materials science is to enhance the attributes of all kinds of solid materials. Therefore, new materials are created and the production of materials is enhanced, often by mimicking structures that are found in nature. In addition, especially in more recent research, a subdiscipline of materials science referred to as 4D printing

focuses on giving materials additional functionalities, mainly the ability to change their form.

Like 3D printing, I expect this research to affect nearly every area of physical goods production, and thus day-to-day life, in the next few years.

Synthetic Biology According to Osbourn, O'Maille et al. (2012) synthetic biology can be defined as the “artificial design and engineering of biological systems and living organisms for purposes of improving applications for industry or biological research”. Of all exponential technologies, this is surely the most controversial because this discipline changes the attributes of living things and grows life artificially—including plants, animals, and, finally, human beings.

Naturally, the primary application area of synthetic biology is medicine. Here, the researchers focus on enhancing drugs, growing organs, synthesizing blood, and other tasks focused on the betterment of humanity. But other sectors such as materials science and computational hardware development have started utilizing synthetic biology. So, many impacts of that technology in unexpected application areas will be likely in the near future.

Each of these technologies (and others not mentioned here) and their exponential enhancements to performance and functionalities—and thus application areas—will change the world we live in. However, it is the unexpected convergence of these changes that leads to additional, structure-shaping “shocks”. Therefore, today’s entrepreneurs and organizations should carefully monitor the development of existing technologies, as well as monitor rising technologies and continuously simulate what could happen if technologies merge or are applied to new markets and application areas. This should be the crucial groundwork for companies earning money in the exponential world.

Leveraging Exponential Growth For Business: Exponential Organizations

How should companies adapt to the exponential nature of the information-based world? According to Ismail, Malone, and Van Geest (2014), the fundamental basis of a successful company is to outline a massive transformative purpose (MTP): an inspirational, big target that the company wants to achieve. Answering this *why question* regarding the organization itself enables it, even

without explicit leadership, to align all actions and tasks autonomously and thus with zero downtime in reaching that target. This is what forms an agile organization. As an inspiration, this *fixed star* will also unleash the power, creativity, and enthusiasm of employees to reach that target, a drive that should not be underestimated! Finally, the vision has to be big in order to foster totally different problem-solving behavior, as recent studies show and as Dwight Eisenhower sensed when saying, “If a problem cannot be solved, enlarge it”.

Based on this essential MTP foundation, Ismail, Malone, and Van Geest (2014) point out five external and five internal attributes that, through their implementation and subsequent development, increase the likelihood of companies being successful in an exponential world. Although not all of these attributes need to be implemented fully, the study by Ismail, Malone, and Van Geest discusses “a minimum of four implemented attributes” (2014, p. 53) as a lower bound to be sustainably successful.

The first attributes, fostering creativity and growth and reducing the impact of uncertainty, are grouped into the cluster labeled with the acronym SCALE. Regarding the workforce, Ismail, Malone, and Van Geest propose the need for a large proportion of staff on demand. They write, “For a company today, having a permanent fulltime workforce is with growing peril as employees fail to keep their skills up to date, resulting in personnel in need of greater management” (Ismail et al. 2014, p. 59). Instead, companies should deploy external and temporary workforces in order to be able to adapt to the rapidly changing world and fill their expertise gaps flexibly. In other words, they call for the increasing application of crowdsourcing in order to accelerate the reach and impact of organizations. With only a few clicks, tasks—varying from simple, repetitive tasks to highly specialized expert jobs—can be advertised to a worldwide community. By this process, even small companies can scale their workforce within hours and can access highly specialized knowledge. Famous examples for crowdsourcing platforms are Upwork and Experfy.

A modification of crowdsourcing is online competitions such as Kaggle, which is the leading platform for data science-related challenges. These have the great advantage that mostly very “wicked”, so difficult or nearly impossible problems can be presented to a large population of experts, but only the winner of the competition needs to be paid.

Another measure to enhance knowledge, exchange, and creativity within an organization is to create a community. For this, internal team members and close external stakeholders, such as customers, alumni, and vendors, first need to be attracted by and engaged under a visionary and inspirational MTP. By investing time, awareness, and resources, this community should then be grown to a platform to automate peer-to-peer engagement. By establishing its own identity, this group will then discuss topics, incubate and accelerate

ideas, and share and grow relevant knowledge. This is the breeding ground for customer-centric products and optimal processes.

The successful organizations in today's world are data-driven organizations. These companies do not rely "almost solely on the intuitive guesses of their leaders" (Ismail et al. 2014, p. 71), but try to base these decisions as much as possible on accurate data and algorithms. Algorithms are implemented in four basic steps and are enabled by several exponential technologies. In the first two steps, data must be gathered from sensors and organized based on cloud solutions and sufficient connectivity. In the third step, AI and distributed computing are applied to "extract insights, identify trends, and tune new algorithms" (Ismail et al. 2014, p. 73). In the final step, the information is disseminated in an addressee-tailored way to enable the exponential community, and potentially experts in the crowd, "to develop valuable services, new functionalities and innovation" (Ismail et al. 2014, p. 73).

As a result of the *sharing economy*, nearly all types of specialized assets are available today for rent and lease. These very agile forms of leveraged assets allow organizations to be totally scalable at low marginal costs. Furthermore, the market-entry barrier of high investments in machinery for certain industries have been totally removed, allowing increased competition and, therefore, increased customer value.

The final externally focused attribute of MTP is information-enabled, elaborated, and socialized user engagement. Actively engaging the customers in the product or service is one key element of the lean start-up approach. For example, getting representative, timely feedback allows products and services to be developed that perfectly serve the customer's needs. This ensures a strong market position at lower marketing costs. Besides these product-related aspects, an intense customer engagement also positively affects the customer behavior by increasing loyalty to the organization and its products or services.

In addition to these attributes that focus on the operational aspects of organizations, I would like to add one attribute that focuses on funding a business. Crowdfunding is defined as the financing of projects, ideas, or businesses by many individuals, mainly through web platforms such as Kickstarter or Indiegogo. These platforms reduce the transaction costs of financing to nearly zero. Organizations with inspirational MTPs that foster promising products or services can thus be easily funded and rapidly scaled.

The second cluster of attributes, which is labeled with the acronym IDEAS, consists of internally focused attributes ensuring stability, control, and order, as well as leveraging learning and internal communication within organizations. In an exponential world, it is crucial that companies establish "filtering and matching processes" that link in the most optimal way the output of SCALE attributes to the right people and processes in the organization.

Through these interfaces, the timely usage and filtering of information are ensured, and as Ismail, Malone, and Van Geest phrase it, a “bridge between external growth drivers and internal stabilization factors” (2014, p. 90) is built to ensure the best possible decisions are made within the organization.

Closely linked to this, real-time, adoptable dashboards help decision-makers access information, for example, from algorithms implemented in SCALE, in an appropriate way. Furthermore, metrics given by the dashboards help in steering the company based on facts.

Using these attributes as its information base, the company should foster an experimentation culture based on the lean start-up principles defined by Ries (2011). Simply put, this means short and agile development cycles of prototypes respecting minimal viable products and customer feedback loops to ensure products are created that generate customer value and thus company value. Furthermore, this methodology allows a fast go-to market, which is essential in today’s rapidly changing world.

In addition, companies should encourage autonomy in their decision structures. Giving decision-making power to employees in accordance with fulfilling certain tasks can unleash their full creative potential and enable decisions and actions to be made quickly. This contrasts with the long process in which nobody feels accountable, such as in very hierarchical organizations. Finally, the use of social technologies builds communities, leverages ideation processes, and improves access to information within an organization.

In addition to the MTP and the internal and external attributes that foster success, I firmly believe that environments fostering innovation also strongly support the success of organizations in this changing world. Environments such as Silicon Valley are captivated by the easy access to venture capital, which is needed to grow businesses, as well as by the exchange of information and knowledge needed to incubate ideas and business models. This results in a uniquely innovative mindset, which stimulates the creative potential of people and organizations as outlined in Hellebrand (2015).

Conclusion

We live in the age of exponentials. The performance of a variety of existing and rising technologies is, in itself, amplifying changes in the world. When unfolding in the typical six steps and especially when unexpectedly emerging, these technologies contain tremendous potential to boost or to destroy companies.

Entrepreneurs and organizations, that understand the nature of exponentials, that monitor their development, and that experiment on their applications, are able to unlock tremendous business potential. If these organizations have optimal internal processes and instruments that leverage the potential arising outside the company, they have the ideal basis to define and provide products and services that optimally serve customer needs in the changing world. As a result, the company's valuation will potentially rise beyond the magic \$1 billion mark.

For me, this is the encryption of the DNA of unicorns!

Acknowledgments This article is dedicated to my wife, Julia, and my sons, Alexander and Florian, who always support me. Thanks for being curious and brave enough to move with me to the other end of the world and right into the future—already present here in Silicon Valley!

Bibliography

- Babson Olin School of Business. (2011). Advertisement in *Fast Company*, 154, p. 121.
- Brock, D. C. (2006). The backdrop to Moore's Law: Developments in semiconductor electronics to 1965. In D. C. Brock (Ed.), *Understanding Moore's law: Four decades of innovation* (pp. 7–21). Philadelphia: Chemical Heritage Foundation.
- Camhi, J. (2015, November 6). BI intelligence projects 34 billion devices will be connected by 2020. *Business Insider*. Retrieved November 27, 2015, from <http://www.businessinsider.com/bi-intelligence-34-billion-connected-devices-2020-2015-11>
- Consumer Technology Association (Producer). (2015). Fast innovation: Disrupt or be disrupted – Keynote 2015 [Video file]. Retrieved November 27, 2015, from <http://www.cesweb.org/News/CES-TV/Video-Detail?vID=UtQoydr8llsq&dID=DliGIusJiD1C&sID=OhYr3WpdgEMj>
- Courtland, R. (2015). Gordon Moore: The man whose name means progress. *IEEE Spectrum*. Retrieved November 27, 2015, from <http://spectrum.ieee.org/computing/hardware/gordon-moore-the-man-whose-name-means-progress>
- Diamandis, P. H., & Kotler, S. (2012). *Abundance: The future is better than you think*. New York: Free Press.
- Diamandis, P. H., & Kotler, S. (2015). *Bold: How to go big, create wealth and impact the world*. New York: Simon & Schuster.
- Oxford Dictionaries. (n.d.). *Oxford dictionaries – Robotics*. Retrieved November 27, 2015, from <http://www.oxforddictionaries.com/definition/english/robotics>

- Gartner. (2014). *Gartner says 4.9 billion connected “things” will be in use in 2015*. Retrieved November 27, 2015, from <http://www.gartner.com/newsroom/id/2905717>
- Griffith, E., & Primack, D. (2015, February). The age of unicorns. *Fortune*, 171(2), Retrieved from <http://fortune.com/2015/01/22/the-age-of-unicorns/>
- Hellebrand, H. M. (2015). Keine Chance – Das Valley gibt auch in 10 Jahren die Innovationen vor. *Jahrbuch 2016 – Neue Prognosen zur Zukunft der IT*, pp. 30–37.
- Innosight. (2012, February). *Creative destruction whips through corporate America: An Innosight executive briefing on corporate strategy*. Retrieved November 27, 2015, from <http://www.innosight.com/innovation-resources/strategy-innovation/creative-destruction-whips-through-corporate-america.cfm>
- Internet.org. (2015). *State of connectivity: 2014: A report on global Internet access*. Retrieved November 27, 2015, from <https://fbnewsroomus.files.wordpress.com/2015/02/state-of-connectivity1.pdf>
- Ismail, S., Malone, M. S., & Van Geest, Y. (2014). *Exponential organizations: Why new organizations are ten times better, faster, and cheaper than yours (and what to do about it)*. New York: Diversion Books.
- Kurzweil, R. (2006). *The singularity is near: When humans transcend biology*. New York: Penguin Books.
- Luger, G., & Stubblefield, W. (2004). *Artificial intelligence: Structures and strategies for complex problem solving* (5th ed.). Menlo Park: The Benjamin/Cummings Publishing Company.
- Manyika, J., Chui, M., Bisson, P., Woetzel, J., Dobbs, R., Bughin, J., & Aharon, D. (2015). *The Internet of things: Mapping the value beyond the hype*. McKinsey Global Institute.
- McCarthy, J. (2007, November 12). *What is artificial intelligence?* Retrieved November 27, 2015, from <http://www-formal.stanford.edu/jmc/whatisai/whatisai.html>
- Moore, G. E. (1965, April 19). Cramming more components onto integrated circuits. *Electronics*, 38(8), 114–117.
- Moore, G. E. (1975). Progress in digital integrated electronics. *Electron Devices Meeting, 1975 International*, 21, 11–13.
- Osbourn, A. E., O’Maille, P. E., Rosser, S. J., & Lindsey, K. (2012). Synthetic biology. *New Phytologist*, 196(3), 671–677.
- Ries, E. (2011). *The lean startup: How today’s entrepreneurs use continuous innovation to create radically successful businesses*. New York: Crown Business.
- Rifkin, J. (2011). *The third Industrial Revolution: How lateral power is transforming energy, the economy, and the world*. New York: St. Martin’s Press.
- Russell, S. J., & Norvig, P. (2003). *Artificial intelligence: A modern approach*. New Jersey: Prentice Hall.
- Stanford University. (2013). *TSensors summit for trillion sensors roadmap*. Retrieved November 27, 2015, from <http://tsensorsummit.org/Resources/TSensors%20Roadmap%20v1.pdf>

5

The Effect of Digitalization on the Labor Market

Christian Bühler and Christian Hagist

Ideas in Brief Digitalization has opposing effects on labor markets. Although the overall pie might grow bigger, severe structural changes and therefore challenges for society at large will definitely occur. For this reason, we want to address the following questions: How will digitalization change the division of work? Which jobs are at stake? And will demography be a factor in this regard? In economic textbooks, we normally assume that new technology drives growth and therefore has also a net positive impact on employment. For the past, this was certainly true, as the replacement of the typewriter by personal computers still required a person behind a desk, which now however could offer more and better services. This relationship between technology and the labor market might be about to change in our digitalization era. Already today, some news are written by the computer itself—without human fingers typing. The new feature of this technological change is therefore that not only muscle but also brain work will be replaced by robots—given it is not only technological feasible but also cost-efficient. In addition to the general change by digitalization of work processes, it could be the case that societies have to react differently to this ongoing process given their demographic transition and their education system. Research suggests that the conflict will not only evolve between capital and labor but also between young and old

C. Bühler (✉) • C. Hagist

Chair of Intergenerational Economic Policy, WHU – Otto Beisheim School of Management, Vallendar, Germany

e-mail: christian.buehrer@whu.edu

workers, as rationing will disproportionately affect the young. Perplexedly, it might even be the case that rapid aging countries like Japan or Germany will have less problems regarding the labor market.

Keywords Demography • Digitalization • Labor market • Long-term • Smart machines

Introduction

The list of famous economists who studied the influence of technological shocks on the labor market is fairly long. One of them, John Maynard Keynes stated: “We are being afflicted with a new disease of which some readers may not yet have heard the name, but of which they will hear a great deal in the years to come – namely, technological unemployment. This means unemployment due to our discovery of means of economizing the use of labor outrunning the pace at which we can find new uses for labor” Keynes (1963, p. 360).

First Nobel Laureate in Economics, Jan Tinbergen, supposed that the evolution of technology tends to increase the demand for more-educated labor and characterized the evolution of the wage structure as a race between technological development and access to education. This theory was recently echoed by Goldin and Katz (2007), refined by Acemoglu and Autor (2012) and applied to *digitalization* as the major source of technological advances in last decades. What exactly is to be understood by this term is difficult to grasp. The existing literature usually resorts to enumerations such as computer hardware, software and networks, descriptions like computer-based technology, computer-controlled equipment, information technology (IT), or simply other synonyms such as computerization and automation. In the following, we will join this logic and use the terms as substitutes in order to cover the entire spectrum.

According to Bresnahan et al. (1999), digitization features the characteristic, not only to enhance the skills of people working with it, but to trigger broad-based changes also on the organizational level. This is why Bresnahan (2002) classified it as a general purpose technology (GPT), which may substantially impact long-run growth and congruently employment. Thus, we will first provide an empirical overview of the impact and analyze the source of technological advances in recent decades. In the second part, we open up this picture and expand it to forecast challenges for the decades to come, using the example of the German labor market. Subject of the third part is finally the question which social groups are preeminently affected and the proposition and discussion of solving approaches. The chapter concludes with a summary.

Skill-Biased Technical Change and the Polarization of the Labor Market

Starting in the late 1970s, Goldin and Katz (2007) observe a significant rise in relative wages in the US labor market for high-skilled workers, measured by an increase in the college wage premium. The questions arise what causes this trend, how is the effect on wages and what significance has the advent of computer technology in this regard? Generally speaking, and somewhat simplified, wages arise as a consequence of supply and demand for specific skills. The supply of the labor force and its skills in one country depends essentially on the level of education and, subsequently, the performance of the educational system. In addition, labor supply and demand are also determined by external factors such as migration and globalization. Via offshoring, the latter influences opportunities and international trade patterns. The demand for specific skills and their level, however, is determined to a large extent by the state of technology, as this defines the scope to which human labor can be replaced by capital. Goldin and Katz (2007) find evidence that the external factors are of minor importance for the recent spreading of the wage distribution. Referring to Goos et al. (2009), globalization in general and concerning Blinder (2007) offshoring in particular are of some but not major relevance. The empirically demonstrable effect of wage-setting institutions, one might like to add, is specified as rather negligible. Consequently, the widening of the wage development with a substantial increase in returns to skill is therefore basically the result of a race between education and technology, which in recent decades has passed in favor of the latter.

During the 1990s, an extensive literature developed which shows a robust correlation between the implementation of computer-based technologies and the increase in relative demand for college graduates. The related literature is summarized by Katz and Autor (1999) and interpreted as evidence for the presence of a skill-biased-technical change (SBTC). They conclude a dominant role of digitalization-driven SBTC for the observable continuous shift in the demand for high-skilled workers that is still ongoing, although relative wages for those groups are rising. Furthermore, Acemoglu (2002) highlights sharply rising returns to schooling during the past three decades despite an infrequent rapid increase in the supply of educated workers. More interestingly, a relevant meaning of the aforementioned globalization impact would not inevitably contradict the hypothesis of the prevailing role of digitalization. Offshoring is, at least in part, indirectly related to advances in computing and communication technology (partially as, e.g., man-made trade barriers might also account for

a substantial share). New technologies allow for the lifting of the geographical proximity of activities that formerly had to be provided close to the customer. Following Acemoglu and Autor (2011, p. 1045), these tasks can therefore be outsourced which generates additional pressure on the domestic labor market. Consistently, Katz and Autor (1999, p. 1534) point out “that increased computer intensity is associated with increased employment shares of managers, professionals and other highly educated workers, and with decreased employment shares of clericals, production workers, and less educated workers”.

But facing a SBTC that increases the marginal product of skilled labor to a higher extent than for the unskilled, one would expect a monotonous shift in the skill level that is required by workers throughout all lower and middle-skill levels, see for instance Card and DiNardo (2002). An m is provided by Acemoglu (1999). He emphasizes that the increase was a result of the shift in the supply of college workers in the 1970s. Reacting to such an environment, firms start to specifically design jobs for high-skilled workers if they become more abundant. Without a sufficiently large supply, searching costs for such positions are very high and creating a high-skilled job that is occupied with a lower-skilled worker is unproductive (p. 1265). Such a supply shock fosters the change from a pooling equilibrium generating middle jobs to a separating equilibrium creating preferable high- and low-skill jobs while abolishing occupations in the middle of the spectrum. Acemoglu (1999) based his theory on the unexpected opposing trends of low and middle-skill occupations, noting that “during the 1980s and the early 1990s. In part, part of the employment in job categories that typically pay close to the median of the wage distribution appears to have been replaced by employment in higher- and lower-quality jobs” (p. 1275). However, the hypothesis of supply shocks as the main cause could not be verified on a broader base.

Addressing these unresolved issues, Autor et al. (2003) developed the *routinization hypothesis*, a more nuanced view which can be seen as the main framework for recent SBTC. They refer to computerization in terms of a qualitative enlargement of the potential of machines to perform tasks. The new abilities like storing, retrieving, and acting upon information contain the possibility to augment or even supplant tasks that were not feasible to mechanization in beforehand. The new scope includes calculating and coordinating functions like those of bookkeepers, cashiers, other information-processing tasks, and clerking occupations in general. One might exemplarily think about an ATM instead of a teller to get cash. The theoretical key argument of Autor et al. (2003) explaining this change in labor demand is that computers complement higher educated professions and substitute for simpler processes. This routinization hypothesis argues “that computer capital substitutes for workers in carrying out a limited and well-defined set of cognitive and manual activities, those that can be accomplished by following explicit rules” (p. 1280), so-

called *routine tasks*, as their main advantage is the rapid execution of stored instructions. These tasks consist of a limited and repetitive set of actions and methods, which allows for a satisfying and programmable specification.

Furthermore, “computer capital complements workers in carrying out problem-solving and complex communication activities”. (p. 1280). These *non-routine tasks* follow rules that are not sufficiently understood to be expressed in a computer code and subsequent executed by a machine. The logic behind this statement of complementarity relies on the fact that if human routine work is replaced by automation, it implicitly assumes that these tasks are executed at lower marginal costs, otherwise one would not substitute. Falling costs for routine work increase the marginal productivity of non-routine tasks, which use these activities as input to their production process. For example following Frey and Osborne (2013, p. 12), the quality of legal research has been enhanced by text and data mining which in turn improves the efficiency of managerial decision-making as this is highly dependent on constant access to market information. Finally, productivity growth raises the demand for non-routine tasks like creativity, problem-solving, and communications tasks or occupations dealing with responding to discrepancies, improving production processes, coordinating and managing the activities of others.

Summarizing the effects of computerization as demonstrated in Table 5.1, one can say that the considered technological progress changes the composition of tasks where human interaction is necessary and consequently the demand for skills that are able to handle these tasks. In a simulation Autor et al. (2003) find evidence that, facing a decline in computer-based capital prices as a proxy of technological progress, in particular labor-intensive occupations that are based on routine tasks are substituted while the demand

Table 5.1 Impact of computerization on four categories of workplace tasks

Task category/impact	Routine tasks	Non-routine tasks
Analytic and interactive cognitive tasks	Examples: Record-keeping Calculation Repetitive customer service (e.g., bank teller)	Examples: Medical diagnosis Legal writing Persuading/selling Managing others
Computerization impact	Substantial substitution	Strong complementarities
Manual tasks	Examples: Picking or sorting Repetitive assembly	Examples: Truck driving Janitorial services
Computerization impact	Substantial substitution	Limited opportunities for substitution or complementarity

Source: Own sketch based on Autor et al. (2003, p. 1286)

for non-routine work increases as productivity rises due to computer capital complements.

A rich set of literature confirms the previous thesis, see, for example, the survey in Acemoglu and Autor (2011) or the papers by Autor et al. (2006, 2008), which are two of the most influential articles. In the latter it is argued that the rising wage inequality is determined by an increased demand for specific skills which is induced by a routinizing SBTC, moderately accompanied by a reduced supply of college workers and slightly effects by the erosion of labor market institutions. Most of this shift took part since the early 1990s, while growth was most rapid for occupations that are intensive in non-routine cognitive tasks which are typically the most complementary with computerization. The most rapid decline, however, can be found for occupations that are intensive in routine cognitive and manual tasks, which were emphasized to be the most vulnerable to computers. They find evidence for a divergence of upper and lower-tail wage trends, stating a faster wage growth in the bottom quartile than in the two middle quartiles of the wage distribution, while the most rapid rise took part in the top quartile. Changes in occupational employment shares support this argumentation. Occupations located in the lower part of the educational distribution show a slight increase in past decades, while employment shares at the top exhibit an even stronger rise. Correspondingly an erosion of the employment share of middle-skill occupations can be observed. Illustrating the hollowing out of middle-skill-jobs, Goos and Manning (2007) introduced the expression of a *U-shaped polarization* of the labor market.

As Autor et al. (2006) point out, polarization is the result of middle-skill displacement following a three-step logic: first, computational substitution directly lowers the wage of middle-skilled tasks, but increases wages of high-skilled workers as complementarity is present. Effects on low-skilled jobs are ambitious regarding additional labor supply due to displaced workers from the middle spectrum, but also the offsetting impact of partial complementarity. So to say, the gap between high-skilled and others is always explained, but the change in low-skilled wages can be either expanded or compressed. This remaining gap in the reasoning could eventually be included by Autor and Dorn (2013). They find that the category which is substantially responsible for the growth of employment in the low-skilled sector is service occupations (occupations that involve caring for others or assisting them, e.g., food service workers, janitors, gardeners, home health aides, child care workers). Between 1980 and 2005, the share of hours worked in service occupations among non-college workers in the US labor market rose by more than 50 percent (p. 1589), after having been flat or even declining in the three prior decades. This is all the

more remarkable as similarly low-skilled professions like production and craft occupations or machine operators and assemblers are shrinking massively. The increase of service occupations and the decrease in other non-service occupations took place consistently during the 1980s, 1990s, and 2000s. The decline of low-skilled jobs in total observed by Autor et al. (2006) in the 1980s results in a negative net effect, however, service occupations were rising throughout.

The main hypothesis of Autor and Dorn (2013) is first that consumers favor variety over specialization and second the presence of technological progress which reduces the costs of accomplishing routine, codifiable tasks but whose impact on in-person services remains minor. The reason for this is the heavy dependency of service occupations on dexterity, flexible interpersonal communication, and direct physical proximity (p. 1590). An illustrating example for the future, even increasing demand of such service-oriented workforce is the labor market for nursing staff. Given the increase in life expectancy, it can be assumed that the number of people requiring long-term care will increase greatly, compare for instance Hackmann (2010). In addition to related technical problems, in particular the preferences for a human caregiver counter the computer-based substitution potential. Thus, general wage developments in this category are at least partially based on wage improvements of the high qualified. This is, in a border sense, nothing else than the original intuition of wage convergence between labor-intensive services and goods production by Baumol (1967).

Consequently, low-skilled workers reallocate their labor supply to service occupations which are not tangled. The process of skill-dependent technological diffusion is illustrated by Beaudry et al. (2010) and can be thought of as follows: first, routine-task intensive industries adopt computer technology and substitute labor by computer capital which displaces workers employed in these industries.¹ Second, workers who are not able to reach a technology equivalent skill level reallocate their labor supply into manual task intensive in-person services. Polarization results. Different approaches like the ones of Manning (2004) and Mazzolari and Ragusa (2013) impose the idea of a link between job polarization and wage inequality, emphasizing the increasingly richer are creating additional demand for low-skilled service oriented work, as rising returns to skill stimulate incentives to substitute home-based production of household services by the market. Another explanation in the same direction would be the outsourcing of chores due to increased female labor participation. However, this concept could not (yet) attain general validity for a significant impact.

¹ It is somehow argued that technological progress can influence firms' behavior and wage decisions even before the technology is mature, as actors form rational expectations about it, see Manuelli (2000)

Further research contributes to a deeper understanding of the transformation process of digitalization on the labor market by targeting the chronological procedure. Referring to Jaimovich and Siu (2012), recessions are an accelerator of the polarization trend. The term *jobless recoveries* refers to the occurrence that in periods after recessions the rebound in aggregate output is much faster than the rebound in aggregate employment. In contrast to recessions until the mid-1980s, recent recessions (1991, 2001, and 2009) which took place in the era of strong digitalization influence were characterized by jobless recoveries (p. 6). But this is only true for middle-skill employments as low- and high-skill occupations were either not contracted at all or rebounded afterward. Concluding, job polarization seems rather to be a business cycle phenomenon than a time trend (p. 31), implying a partial erosion of the well-known fundamental relationship of a positive correlation between growth and employment, called Okun's law. A recent paper by Charles et al. (2013) finds evidence describing precisely this phenomenon, noting that the Lehman recession made the process of a structurally declining manufacturing in the USA visible which was previously masked by the housing boom. Subsequently after the crunch investments in equipment and software returned to pre-crisis levels, but middle-skill employment didn't. Firms bought machines, but did not hire new people, what fits into the big picture of the observable falling trend in labor share of GDP, see Brynjolfsson and McAfee (2011, p. 46), and supports the theory of jobless recoveries for middle-skill jobs.

Since the majority of analyzed data depends on the US labor market, a view across the pond seems to be reasonable. Outside the USA, evidence was first detected in the UK by Goos and Manning (2007) and subsequently in Germany, Europe's largest economy by Spitz-Oener (2006) or Dustmann et al. (2009), although findings for lower-tail wage developments slightly differ. Antonczyk et al. (2010) find wage dispersion rather than polarization, mentioning a countervailing influence of institutional factors. According to Goos et al. (2009, 2011), labor market polarization can be identified throughout Europe where the trend can be found not only superior, but also separately for almost all European countries. Their observation period from 1993 to 2006 is all the more interesting, as it is somehow argued that US data show a slowdown in wage inequality in that period. This finding seems to be inconsistent with the SBTC argument, according for instance Card and DiNardo (2002) and Lemieux (2006). Summarizing, this pattern is not unique to the USA but applies to several advanced economies and could possibly be generalized in this regard. Congruently, the routinization hypothesis of Autor et al. (2003), meaning sustained technological progress and the associated replacement of routine activities, is considered the most likely explanation, while offshoring apparently is of some, albeit subordinate importance.

The Next Step; Digitalization Beyond Routine Tasks

The starting point for the analysis of challenges induced by digitalization is the understanding of substitutable tasks as in Autor et al. (2003). In their opinion, “navigating a car through city traffic or deciphering the scrawled handwriting on a personal check – minor undertakings for most adults – are not routine tasks by our definition” (p. 1283). Thus, these tasks are not exposed to effects from digitalization as they cannot be described in terms of programmable rules. Merely ten years later, Frey and Osborne (2013) state in their startling paper that “today, the problems of navigating a car and deciphering handwriting are sufficiently well understood that many related tasks can be specified in computer code and automated” (p. 15). Recent developments in the automotive sector show that it has rather become a legal question than a technical issue until we will see self-driving cars. This example displays that assumed boundaries in the scope of computerization always remain a snapshot in time. SBTC is no longer confined to routine tasks but enhanced to other, non-routine manual and cognitive tasks. “Computers and networks bring an ever-expanding set of opportunities to companies. Digitalization [...] is not a single project providing one-time benefits. Instead, it’s an ongoing process of creative destruction; innovators use both new and established technologies to make deep changes at the level of the task, the job, the process, even the organization itself” (Brynjolfsson and McAfee 2011, p. 21).

One crucial assumption of Autor et al. (2003) is that very few computer-based technologies are capable of drawing inferences from models in a sense to transfer it to solve novel problems or form persuasive arguments. Following Frey and Osborne (2013), the solution to these problems has made substantial progress by the emergence of two mega trends, namely the presence of large and complex datasets (Big Data) and pattern recognition via sophisticated algorithms. The fundamental issue arises in which areas information technology might have significant advantages relative to human labor in this regard. The first enhancement can be summed up under the heading of scalability. Networks of machines and computers scale considerably more efficient than the corresponding human counterpart in performing tasks of laborious computations that are required for dealing with large amounts of data. Consequently, they are more appropriate to scrutinize these data sets on patterns and relationships as well. Finally, it is called for a reason “to err is human”. Machines don’t have a human bias in decision making or detecting bugs. They simply shape decisions by objectively defined criteria.

These comparative advantages of computer technology correspond perfectly to prevailing technical innovations. Steady improvements like those in sensor technology are an accelerator in the spectrum of robotics. The ever-expanding cross-use of information-gathering sensors ensures the availability of vast amounts of data which in turn are the basis of the pattern analysis via algorithms. Referring to our systematic in Table 5.1, Frey and Osborne (2013) emphasize a sturdy computerization effect exactly on the two sections that haven't been subject to substitutional effects so far: non-routine cognitive and non-routine manual tasks. They expect a gradual replacement especially of service-oriented occupations that were responsible for most of the growth in low-skilled jobs in the last decades as described by Autor and Dorn (2013).

We transfer the analysis of Frey and Osborne (2013) for the USA to Germany using 2014 employment data and present the results differentiated by the superordinate professional sector in Fig. 5.1. Illustrated production activities mainly consist of metal processing employment, vehicle construction and power engineering, featuring a rather wide risk distribution. The nevertheless rather predominantly share of higher probabilities, roughly half of employment faces a probability of computerization of about 67 percent or higher, is due to the advances in pattern recognition that enable an even more versatile implementation of general purpose industrial robots. To interpret

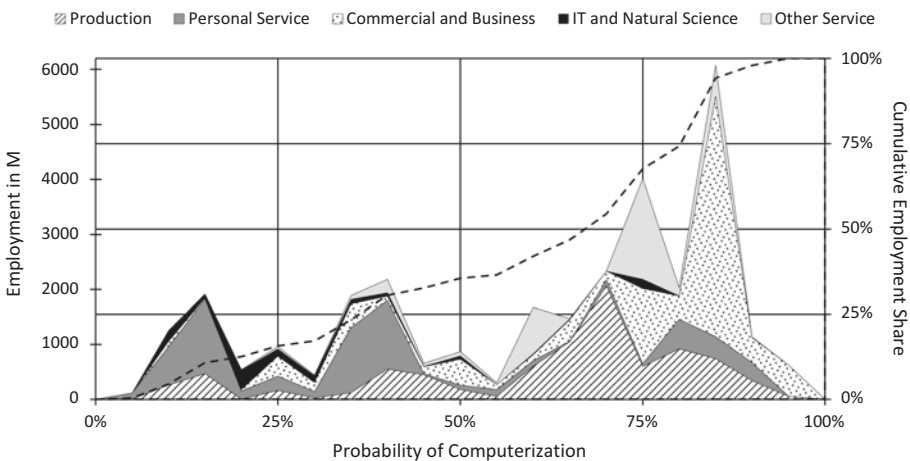


Fig. 5.1 The distribution of employment by occupational sector over the probability of computerization, along with a division in employment quartiles. The total area under all curves is equal to total German employment subject to social insurance contribution

(Source: Own calculation based on probabilities by Frey and Osborne (2013) and employment statistics by Bundesagentur für Arbeit (2014))

these probabilities, consider this example: If the probability of computerization for a certain profession accounts for 30 percent and a company supplies ten such jobs, you can imagine that the same amount of work could technically be mastered with seven people using expected technological advances.

Personal services essentially describe occupations in the fields of education, health, tourism, and gastronomy. Half of related employment is equipped with a probability of approximately 33 percent or higher, and thus half of the risk compared to the production segment, confirming the established theory regarding the relatively low vulnerability of in-person professions. However, we also observe employment shares in the top quartile showing some sensitivity (around 47 percent of susceptibility) to automated competition. If we recall why in-person services could not be computerized following our previous logic, one main argument was that they heavily rely on flexible and complex interpersonal communication. But advances in user interfaces like Apple's Siri or Google Now allow for improved processing of human requests replacing for instance service center occupations. The impact covers even highest requirement levels, as the recent rise in Massive Open Online Courses in higher education suggests. Vulnerable non-routine cognitive tasks are located in the field of health care as well. IBM's supercomputer Watson competes with complex diagnostics. It uses evidence from disease courses and specialized medical literature to develop treatment plans based upon patient-specific characteristics such as symptoms or genetic predispositions. Besides, an increasing number of operation types are performed by flexible surgical robots. As Cowen (2013, p. 89) expresses, the most frequently cited doctor in the USA is no longer a human being but Google. Moreover, mentioned technological advances are expected to exceed the range of household robots. Already today, there are numerous little helpers taking over vacuuming, mopping, lawn mowing, and gutter cleaning. Activities that are typically assigned to the low-wage service sector and other classically low-wage professions in food preparation, health and long-term care are captured as well. Finalizing, the hypothesis of comparably high computerization resistance of in-person services remains for large parts, but smart machines are keeping up.

The bulk of employment in the commercial and business sector are administrative activities, while sales, financial and legal services also represent substantial shares. The computerization probability which is attached to the first quartile is roughly 73 percent. Therefore, this segment exhibits a significantly greater automation potential than all other sectors. The effects are already noticeable, regarding for instance Barclays Bank's recent announcement to automate every fourth employee, targeting in particular middle management and transaction administration activities (Frankfurter Allgemeine Zeitung

2015). Another rather unusual example for occupations in this field, which is revealing the range of developments, are trained level professionals in editorial and journalistic fields that are facing a 72 percent probability of computerization. This may be surprising at first glance, and algorithms will most likely don't write Pulitzer Prize stories in the future. However, simple news articles like the first robot-written report which was dealing with an earthquake and published in the L.A. Times are not only possible but part of reality. Looking at legal professions, we can see that sophisticated algorithms are increasingly capable to execute tasks previously performed by paralegals. Software is able to scan and interpret large amounts of legal briefs and precedents in very short time assisting in pre-trial research.

The numerically rather small sector of IT and Natural Science employs only 4.2 percent of all employees and consists of approximately equal parts of information technology-oriented and natural science activities. This group is characterized by complex requirement profiles; this ensures that three quarters are equipped with probabilities of about 33 percent or even lower. However, advances in sensor technology in combination with pioneering developments in creating three-dimensional road maps shift the ability of computer-controlled cars in new dimensions. Existing implementation obstacles such as changing conditions, like the variation between sunny and snowy streets, can be eradicated by the collection of appropriate large amounts of data that simply cover all possible states. The use of such computerized cars influences a variety of logistics ranging from agriculture to transportation and cargo, as their capabilities exceed human drivers by far (just think about looking both forward, backward, and navigating at the same time). The frequently cited car driver is attached with a fairly high 55 percent probability, following the afore-mentioned logic. Vehicle guidance in general constitutes the residual category of other services along with a large extent of delivery or cargo services and cleaning workers, explaining the relatively high computerization probabilities which are higher than 70 percent for more than half of sector employment.

Summarizing, we see that the median probability of the employment distribution is about 67 percent. In other words, half of employees face a technical risk of being substituted that is 67 percent or even higher. If we attach the 70 percent or higher threshold to Germany that Frey and Osborne (2013) applied to the USA and interpreted as high-risk category, 46 percent of total employment is potentially susceptible to computerization. This finding is very close to the 47 percent identified for the US labor market. An analysis by Bowles (2014) find similarly high values for each of EU-28 countries, reaching a maximum of almost 62 percent for Romania.

Thinking about how to classify the meaning of these results, we identify three bottlenecks of economic, legal, and moral nature that could eventually hinder the spread or lead to a delay in the use of advanced technologies. Regarding the economic aspect, we should keep in mind that Frey and Osborne (2013) are modeling technical possibilities for substitution. As explained by the example of the nursing robot, technical feasibility is not necessarily linked to the creation of demand. Preferences for the care of people go beyond purely mechanical aspects, such as talking, company, or empathy. However, there is no reason for investments without corresponding demand. Extending the perspective of investment decisions, we see that these are based on comparative cost–benefit analysis and the resulting contribution margins. Frey and Osborne (2013) run the argument of the experienced tremendous decline in prices for computer capital described by Moore’s Law and expect an even accelerated course in the future. Yet, that should improve marginal returns of computer capital, the question whether it is sufficient to induce replacement, however, is still not answered.

We can illustrate these thoughts by looking at Fig. 5.2. It shows the distribution of computerization probabilities referring to minor employment in Germany. An overwhelming proportion of these jobs can be classified to office administration, sales and logistics, which have been previously categorized as high-risk groups. Considering the stark facts, around three quarters

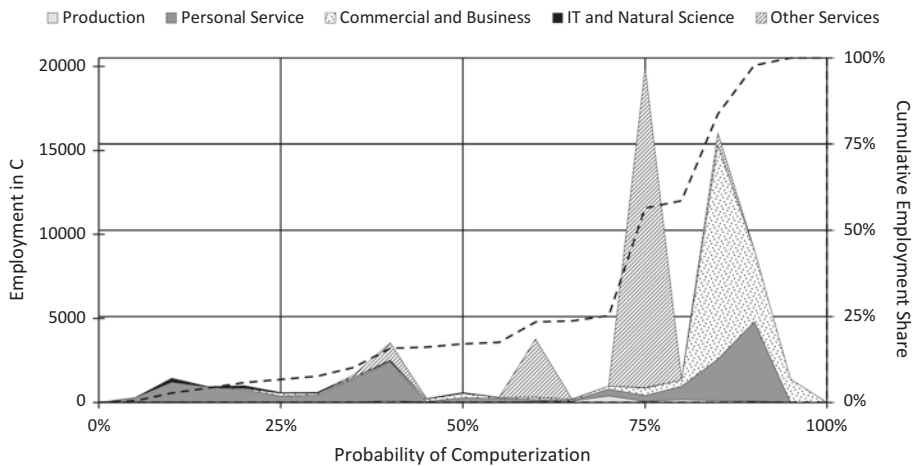


Fig. 5.2 The distribution of employment by occupational sector over the probability of computerization, along with a division in employment quartiles. The total area under all curves is equal to total German minor employment (Source: Own calculation based on probabilities by Frey and Osborne (2013) and employment statistics by Bundesagentur für Arbeit (2014))

are facing a computerization risk of 70 percent or even higher. Should we consequently expect three quarters of them to disappear? We think it is more likely that even in the future temporary salespersons are going to stand by our side during Summer Sales to prevent fashion fails. In addition to the high flexibility which these tasks typically require, their costs are simply very low, which limits their automation potential significantly.

The second bottleneck targets legal and political regulations resulting out of social trends or the influence of particular groups. Especially in the German public, the issue of data protection has a high perceived value. The implementation of Big Data, identified as a crucial determinant of computerization, could therefore be negatively influenced by privacy laws especially in sensitive sectors like health care. Protectionist regulations or subsidies could prevent the establishment of new and (theoretically) efficient structures. Such rent-seeking examples are the mining and agricultural industry which would certainly not exist in its present extent without political intervention. Other forms demonstrating the influence of the public opinion on the potential of change can be found in the passionately debated free trade agreement TTIP, although economic theory states a beneficial win–win situation. These rent-seeking efforts could intensify if technological advances do not only lead to changes in employment composition, but also to structurally higher unemployment, if displaced middle-class workers cannot find work outside of their ancestral territory. A phenomenon already famous economist David Riccardo recognized in the nineteenth century and called *technological unemployment*. Supporting evidence for this hypothesis can be found in the paper of Beaudry et al. (2013) document support for this hypothesis. They notice a general decline in the demand for skill over the past decade, despite an ongoing growth in the supply of higher educated workers, indicating a great reversal compared to the situation during the decades before the millennium.

The motivation of the third bottleneck might appear close to the second, but is a slightly nuanced outlook, specializing on moral values and attitudes encouraging critical thoughts and regulations. An illustrating example is the film Robocop from 1987 (or its obviously way worse reboot from 2014), which arises the question if we as a society may not want to apply technical improvements for ethical reasons. Although we could replace policemen by way more efficient robots, we might still want a human being to decide when to shoot and when not. We can also rely to the example of self-driving cars. A car that is controlled by computers would probably do even better than humans in preventing accidents or could react superior in case of emergency and early braking. But what happens when exactly this action leads to a collision with cars driving behind? Even if the surrounding cars and the

resulting colliding risk are included in the calculations of the computer, how should the risk of colliding in front be weighed against the risk of causing a collision behind? The answer to such questions might lead to prohibitive regulations, limiting the extent of computerization. Just recently, an appeal including famous physicist Stephen Hawking and computer pioneer Steve Wozniak was announced that cautions society about the use of self-controlled combat robots which are expected be available soon.

Summarizing subject to prior objections and relating to the previous chapter, we can see that technological advances might still be far away from being perfect substitutes for the very high-skill level in the first place, think about health diagnostics where intuition is of major importance (do patients hold something back, are there other psychological issues that might matter, etc.). These task bottlenecks that Frey and Osborne (2013) expect to stay outside the range of smart machines are characterized by the ability of creative and social intelligence. But computerized support like algorithmic recommendations serve as an input shifting up the required benchmark. Brynjolfsson and McAfee (2014, pp. 147–162) describe that only the very top end of the skill distribution, so-called Superstars, is retained and increases its distance to all others, as people are willing to pay a premium for the very best and digital technology allows for scaling processes at low marginal cost. This causes high-skilled workers to move down the occupational ladder, accepting jobs traditionally performed by low-skilled workers. They, in turn, are pushed down the occupational ladder even further and, to some extent, even out of the labor force. Overall, at least the considered *destruction effects* point to a tightening of polarization. At the same time, the U-distribution seems to be generally moving toward higher requirements with the consequence that at the rear end employees are increasingly left behind.

Who Are the De-Skilled? Effects on Groups and Societies

So, who are those groups that cover large parts of employment and that might be forced either to the edge of the occupation distribution or to the very out of it? A first indication is provided by the distribution of German employment differentiated by skill level in Fig. 5.3. Let's start with a brief explanation of concepts. Listed untrained occupations are typically simple, less complex (routine) activities. Generally little or no specific technical knowledge is required. As Fig. 5.3 illustrates, the vast majority of these jobs is located in the

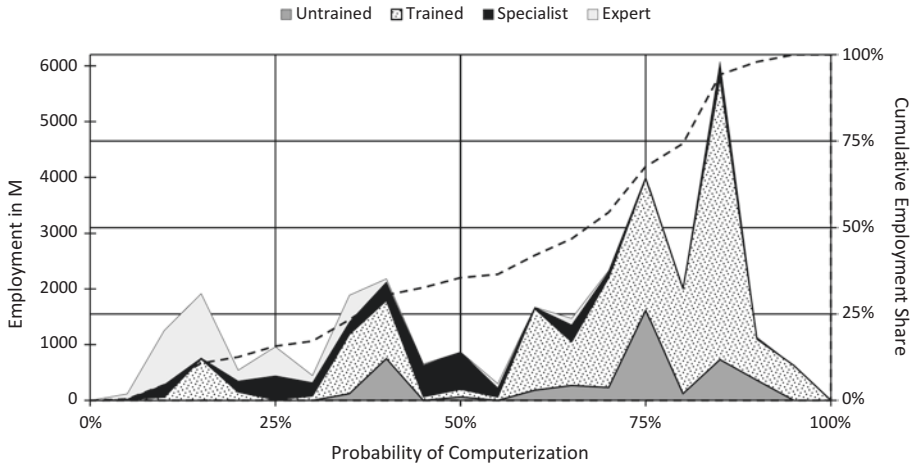


Fig. 5.3 The distribution of employment by requirement level over the probability of computerization, along with a division in employment quartiles. The total area under all curves is equal to total German employment subject to social insurance contribution

(Source: Own calculation based on probabilities by Frey and Osborne (2013) and employment statistics by Bundesagentur für Arbeit (2014))

two upper employment quartiles that face relative high substitution susceptibility. Comparably much more complex and more technical issues are aligned to trained occupations. For the proper exercise of those activities, sound professional knowledge and skills are necessary. Again we find the main part of the respective distribution right of the median, but some peaks are also characterized by lower probabilities. Considerably more complex tasks that are associated with special knowledge and skills are described as specialist level. In addition, these jobs require the ability to cope with sophisticated technical and management tasks. As expected, we can see these activities mostly on the left-hand side of the median.

Expert level occupations, finally, are associated with a task bundle characterized by a very high degree of complexity and require a correspondingly high level of knowledge and skill. These include, for example, not only development, research and diagnostic activities, but also abilities with regard to knowledge transfer, management and leadership roles. As almost the entire distribution is marked by low probabilities, we state a great advantage and protection against substitution regarding groups equipped with very high-skill levels.

An important proxy that is commonly used for the classification of occupations in each of the four skill categories is the required professional experience. But acquiring this kind of experience and related skills takes time. In particular

when targeting, as outlined above, rather soft abilities. Both creative as well as social intelligence require a large amount of experience and go beyond the abilities that can be exclusively learned from school-based training. Sachs and Kotlikoff (2012) show in their model that this may affect the welfare relationship between older and younger workers in two respects. First, older workers have in relative terms more skills and are thus able to assert comparably better against the emerging computer abilities. Second, these older workers and retirees own a disproportionate amount of capital equipment. The improved machine-based abilities lead to an increase in marginal productivity and associated increased revenues. Accordingly, they conclude a welfare redistribution from relatively unskilled younger workers to relatively skilled older ones induced by job losses and changes in job and capital income.

Reduced prospects for work or well-paid work draw some second-round effects by itself. Lower income is associated with less savings and in turn the ability for investments in human as well as smart machines capital. For the overall economy, this leads to a future environment which is characterized by a reduction in both. Thinking the circle further, first-period wages of subsequent young generations will be even more depressed, again with the consequences previously described. Sachs and Kotlikoff (2012, p. 5) conclude that: “In short, better machines can spell universal and permanent misery for our progeny”.

At this point we would like to draw attention on two objections which illustrate, that in contrast to the above-described adverse effects of digitization for the younger generation and the economy as a whole, some benefits might also be conceivable. These objections are advantages in terms of adaptability and the demographic situation. Relying on the first argument, we suspect that younger people which are rooted in the digital world could do better in taking advantage of digital economy properties. The studies by Frey and Osborne (2013) and Sachs and Kotlikoff (2012) are limited to this regard, as the job-creating potential is not taken into account. Labeling it *creative destruction*, already path breaking economist Schumpeter (1942) pointed out that innovations are a necessity for the creation of new businesses and jobs that leverage ever-advancing technology and human skill, although this might be linked to the destruction of old labor. Hence, as Aghion and Howitt (1994) explained in short, technological progress has two competing effects on employment. First, a negative substitution effect, forcing workers to reallocate their labor supply. Second, a positive capitalization effect, as more companies enter industries where productivity is relatively high, leading employment in those industries to expand. In our environment, this could be the Internet economy. It should also be noticed that macroeconomic goods demand feedbacks are not considered. Technical progress, that reduces the price of one good, will in turn

increase real income of households and thus raise demand for other goods, leading to increased employment needs.

Brynjolfsson and McAfee (2011, pp. 39–52) refer to this argument and embrace chances for innovation and entrepreneurs as scaling abilities of digital technologies enable so-called *hyperspecialization*, meaning opening macro-markets for micro-experts. That's basically the second, positive side of the scaling argument we already mentioned with respect to the expected increasing distance of superstars to everyone else. New technology firms like Google or Facebook are characterized by tremendous employment growth. The average age of these employees is below 30, indicating a comparative advantage of younger workers for these kinds of tasks. Put it another perspective, this is only one illustrative example of what we could already conclude from the figures above and several studies. Certain abilities such as computer science-based professions are not needed in decreasing, but increasing dimensions. A related study by the European Commission is forecasting a substantial increase in demand for workers in the field of information and communication technology over the coming years, constituting significant demand overhangs, which accumulate in the EU to over 800,000 in 2020 and 145,000 in Germany, respectively (Hüsing et al. 2015). As pointed out, these demands require primarily e-skills like creativity or the ability to think analytically, which could be more pronounced for younger workers. However, it should also be mentioned that this additional includes executive occupations where younger workers are likely to be underrepresented.

This line of reasoning takes us to our second objection referring to the demographic situation of a country. In their baseline scenario, Ehing and Moog (2013) calculate that demographic change in Germany will lead to a reduction in the labor force by 9 percent until 2030, and by 26 percent until 2060 compared to 2010. The retirement of the baby boomer generation will leave a skilled labor gap which numerically cannot be operated by the younger with all its consequences, in particular for the financing of the social security system. Smart machines could at least partially compensate for this crumbling skilled man power by replacing it. It becomes clearer if we look at the employment distribution for employees that are 55 years and older. Concerning Bundesagentur für Arbeit (2014), more than three quarters of them work in the segments of production, commercial and business and other services that on average exhibit relatively high computerization vulnerability as shown in Fig. 5.1. If we take the statement by Frey and Osborne (2013) purely, meaning ever expanding skills that enable smart machines to take over activities in particular in these three profession segments within the next two decades. Then this timeframe fits pretty well to the retirement phase of the

baby boomer generation in the next five to ten years. However, we should still keep in mind that the share of experts and generally high-skilled as pointed out will probably be above average in this group.

The crucial issue, which is common to both objections, is that people need to be empowered to perceive and implement these digitalization induced changes and close the vacant job gaps. In summary, an appropriate education policy that is aligned to new requirements is advantageous to reduce the negative impact of digitalization on the labor market and society in any case. In certain demographic situations as they exist in Germany or Japan, such a presence may even help to solve the serious problem of skilled labor shortage. Other policies could take advantage of certain characteristics of the education distribution. As women tend to be better educated and therefore higher-skilled, one implication to match these needs is to make sure that this potential is used in the most effective way. Measures that allow the compatibility of work and family might be a chance to take advantage in this regard. Following Sachs and Kotlikoff (2012) and Benzell et al. (2015), intergenerational tax-and-transfer policy is another option. Targeting older generations' windfall profit and redistributing it to the younger may create a situation that is beneficial overall, as this will prevent the capital stock from falling.

Conclusion

The findings about recent and future developments of the labor market and their referring source can be suitably prepared chronologically. Concerning the cause, Autor et al. (2003) established the *routinization hypothesis*, which is a nuanced evolution of the SBTC approach. It points out that digital innovations do not generally lead to an increasing demand for skilled workers relative to unskilled ones, but to a high substitution susceptibility of routine tasks in contrast to low ones for non-routine tasks. Based on this hypothesis, Autor et al. (2006) and Goos and Manning (2007) further developed the theory of a polarizing effect of digitalization on the labor market. They illustrated that in past decades the share of employees working in occupations located in the lower part and at the top of the educational distribution was characterized by an increase, while correspondingly an erosion of the employment share of middle-skill occupations took place. Autor and Dorn (2013) reasoned this increase in low-skilled employment by the difficulty of replacing low-skill service occupations which heavily rely on dexterity, flexible interpersonal communication, and direct physical proximity.

Frey and Osborne (2013) projected the effects of digitalization for the upcoming decades stating that SBTC is no longer confined to routine tasks but enhanced to other, non-routine manual and cognitive tasks. They expect a gradual replacement especially of those low-skill service-oriented occupations that previously were expected to be less affected. We transfer their methodology to the German labor market and find 46 percent of total employment exposed to relatively high computerization susceptibility. Confirming the findings of Frey and Osborne (2013) for the USA, in particular middle-skill occupations in office and administration, logistics and production are at stake. However, they still expect tasks requiring characteristics such as creativity and social intelligence to be difficult to automate. In addition to these task bottlenecks, we identify three barriers of economic, legal, and moral nature that could impair technological spreading. Briefly outlined: Technical feasibility does not necessarily attract an economically sensible investment by itself, social movements and rent-seeking activities might lead to restrictive regulations, and moral or ethical concerns could influence the implementation of technical possibilities.

Answering the question which groups might be affected the most, Sachs and Kotlikoff (2012) suspect a welfare redistribution at the expense of younger generations due to the disproportioned higher qualification of older workers. We substantiate this hypothesis by demonstrating that an increasing work experience entails a declining likelihood of substitution. However, we also identify two objections. First, the studies by Frey and Osborne (2013) and Sachs and Kotlikoff (2012) do not take into account the creation potential of technological innovations and the suspected greater adaptability of the younger to take these chances. Second, replacing smart machines could partially compensate for the shortage of skilled labor that is emerging in countries such as Germany or Japan, leading to an overall beneficial situation.

The final answer if human labor is going to win or lose the race against the machine remains, typically economist, without clear-cut reply. Considering Goldin and Katz (2007), the question if man can prevail relates to its ability to embrace and acquire new skills and abilities by means of education. It will become increasingly challenging to keep up the pace as computerization enters more cognitive domains, as shown by Brynjolfsson and McAfee (2011). Sachs and Kotlikoff (2012) additionally suggest that intergenerational tax-and-transfer policy might contribute to avoid negative effects for the young and the economy as a whole.

Given all the discussions of the enormously increased capabilities of smart machines, we shouldn't forget that even sophisticated artificial intelligence like IBM's Watson is—at the moment—not capable to transfer the knowl-

edge that it is learning from, let's say playing chess, to any other field, as long as it is not reprogrammed by human labor. In Cowen (2013, pp. 77–94), future developments are illustrated by referring to a chess variant called *free-style* where man–machine collaborations are explicitly permitted. The results of duels of various compositions demonstrate that synergies resulting out of such interactions are capable to outperform any human—or machine—taken alone. In other words, denoting a quote attributed to a 1965 NASA report advocating manned flight that is cited by Brynjolfsson and McAfee (2011, p. 25) we should keep in mind: “Man is the lowest-cost, 150-pound, nonlinear, all-purpose computer system which can be mass-produced by unskilled labor”.

Bibliography

- Acemoglu, D. (1999). Changes in unemployment and inequality: An alternative theory and some evidence. *American Economic Review*, 89(5), 1259–1278.
- Acemoglu, D. (2002). Technical change, inequality, and the labor market. *Journal of Economic Literature*, 40(1), 7–72.
- Acemoglu, D., & Autor, D. (2011). Skills, tasks and technologies: Implications for employment and earnings. In D. Card & O. Ashenfelter (Eds.), *Handbook of labor economics, Part B* (Vol. 4, pp. 1043–1171). Amsterdam: Elsevier-North Holland.
- Acemoglu, D., & Autor, D. (2012). What does human capital do? A review of Goldin and Katz's the race between education and technology. *Journal of Economic Literature*, 50(2), 426–463.
- Aghion, P., & Howitt, P. (1994). Growth and unemployment. *The Review of Economic Studies*, 61(3), 477–494.
- Antonczyk, D., Fitzenberger, B., & Sommerfeld, K. (2010). Rising wage inequality, the decline of collective bargaining, and the gender wage gap. *Labour Economics*, 17(5), 835–847.
- Autor, D., & Dorn, D. (2013). The growth of low-skill service jobs and the polarization of the US labor market. *American Economic Review*, 103(5), 1553–1597.
- Autor, D., Levy, F., & Murnane, R. (2003). The skill content of recent technological change: An empirical exploration. *Quarterly Journal of Economics*, 118(4), 1279–1333.
- Autor, D. H., Katz, L. F., & Kearney, M. S. (2006). The polarization of the U.S. labor market. *AEA Papers and Proceedings*, 96(2), 189–194.
- Autor, D. H., Katz, L. F., & Kearney, M. S. (2008). Trends in U.S. wage inequality: Re-assessing the revisionists. *Review of Economics and Statistics*, 90, 300–323.
- Baumol, W. J. (1967). Macroeconomics of unbalanced growth: The anatomy of urban crisis. *American Economic Review*, 57(3), 415–426.
- Beaudry, P., Doms, M., & Lewis, E. (2010). Should the personal computer be considered a technological revolution? Evidence from U.S. metropolitan areas. *Journal of Political Economy*, 118(5), 988–1036.

- Beaudry, P., Green, D. A., & Sand, B. M. (2013). The great reversal in the demand for skill and cognitive tasks. NBER working paper series, no. 18901.
- Benzell, S. G., Kotlikoff, L. J., LaGarda, G., & Sachs, J. (2015). Robots are us: Some economics of human replacement. NBER working paper series, no. 20941.
- Blinder, A. S. (2007). How many U.S. jobs might be offshorable? *CEPS working paper, no. 142*.
- Bowles, J. (2014). The computerisation of European jobs – Who will win and who will lose from the impact of new technology onto old areas of employment? Retrieved July 15, 2015, from <http://www.bruegel.org/nc/blog/detail/article/1394-the-computerisation-of-european-jobs/>
- Bresnahan, T. F., Brynjolfsson, E., & Hitt, L. M. (1999). Information technology, workplace organization, and the demand for skilled labor: Firm-level evidence. NBER working paper series, no. 7136.
- Bresnahan, T. F. (2002). Prospects for an information-technology-led productivity surge. In A. B. Jaffe, J. Lerner, & S. Stern (Eds.), *Innovation policy and the economy, volume 2* (pp. 135–161). Cambridge: MIT Press.
- Brynjolfsson, E., & McAfee, A. (2011). *Race against the machine: How the digital revolution is accelerating innovation, driving productivity, and irreversibly transforming employment and the economy*. Lexington: Digital Frontier Press.
- Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies* (First Edition). New York: W. W. Norton & Company.
- Bundesagentur für Arbeit. (2014). Beschäftigte nach Berufen (Klassifikation der Berufe 2010) – Deutschland, Länder – September 2014. Retrieved 07. 10, 2014, from <https://statistik.arbeitsagentur.de/Statistikdaten/Detail/201409/iiiia6/beschaeftigung-sozbe-bo-heft-bo-heft-d-0-201409-xls.xls>
- Card, D., & DiNardo, J. E. (2002). Skill-biased technological change and rising wage inequality: Some problems and puzzles. *Journal of Labor Economics, 20*(4), 733–783.
- Charles, K. K., Hurst, E., & Notowidigdo, M. (2013). Manufacturing decline, housing booms, and non-employment. NBER working paper series, no. 18949.
- Cowen, T. (2013). Average is over: Powering America beyond the age of the great stagnation. New York, New York: Dutton.
- Dustmann, C., Ludsteck, J., & Schönberg, U. (2009). Revisiting the German wage structure. *The Quarterly Journal of Economics, 124*(2), 843–881.
- Eckl-Dorna, W. (2015). Werksroboter tötet Arbeiter – Debatte um Automatisierung geht weiter. *Manager Magazin*.
- Ehing, D., & Moog, S. (2013). Erwerbspersonen- und Arbeitsvolumenprojektionen bis ins Jahr 2060. *Journal for Labour Market Research, 46*(2), 167–182.
- Frankfurter Allgemeine Zeitung. (2015). Daimlers Premiere mit selbstfahrenden LKW. *FAZ*.
- Frey, C. B., & Osborne, M. (2013). *The future of employment: How susceptible are jobs to computerisation?* Oxford: Oxford Martin School.

- Goldin, C., & Katz, L. F. (2007). The race between education and technology: The evolution of U.S. Educational Wage Differentials, 1890 to 2005. *NBER working paper, no. 12984*.
- Goos, M., & Manning, A. (2007). Lousy and lovely jobs: The rising polarization of work in Britain. *The Review of Economics and Statistics*, 89(1), 118–133.
- Goos, M., Manning, A., & Salomons, A. (2009). Job polarization in Europe. *American Economic Review*, 99(2), 58–63.
- Goos, M., Manning, A., & Salomons, A. (2011). Explaining job polarization: The roles of technology, offshoring and institutions. *University of Leuven, Center for Economic Studies: Discussion paper series, no. 11.34*.
- Hackmann, T. (2010). Arbeitsmarkt Pflege: Bestimmung der künftigen Altenpflegekräfte unter Berücksichtigung der Berufsverweildauer. *Sozialer Fortschritt*, 59(9), 235–244.
- Hüsing, T., Korte, W. B., & Dashja, E. (2015). E-skills and e-leadership skills 2020: Trends and forecasts for the European ICT professional and digital leadership labour market (empirica Working Paper). Bonn: empirica.
- Jaimovich, N., & Siu, H. E. (2012). The trend is the cycle: Job polarization and jobless recoveries. *NBER working paper, no. 18334*.
- Katz, L. F., & Autor, D. H. (1999). Changes in the wage structure and earnings inequality. In O. Ashenfelter & D. Card (Eds.), *Handbook of labor economics, Part B* (Vol. 3, pp. 1463–1555).
- Keynes, J. M. (1963). Economic possibilities for our grandchildren. *Essays in Persuasion*, 358–373. Retrieved July 17, 2015, from <http://www.econ.yale.edu/smith/econ116a/keynes1.pdf>.
- Lemieux, T. (2006). Increasing residual wage inequality: Composition effects, noisy data, or rising demand for skill? *American Economic Review*, 96(3), 461–498.
- Manning, A. (2004). We can work it out: The impact of technological change on the demand for low-skill workers. *Scottish Journal of Political Economy*, 51(5), 581–608.
- Manuelli, R. E. (2000). Technological change, the labor market and the stock market. *NBER working paper, no. 8022*.
- Marouani, M. A., & Nilsson, B. (2014). The labor market effects of skill-biased technological change in Malaysia. *Documente de travail UMR DIAL, DT/2014-24*.
- Mazzolari, F., & Ragusa, G. (2013). Spillovers from high-skill consumption to low-skill labor markets. *Review of Economics and Statistics*, 95(1), 74–86.
- Sachs, J. D., & Kotlikoff, L. J. (2012). Smart machines and long-term misery. *NBER working paper, no. 18629*.
- Schumpeter, J. A. (1942). *Capitalism, socialism, and democracy*. New York: Harper & Row.
- Spitz-Oener, A. (2006). Technical change, job tasks, and rising educational demands: Looking outside the wage structure. *Journal of Labor Economics*, 24(2), 235–270.

6

Outcome-Driven Transformation

Adam Bujak and Marcus Esser

Ideas in Brief Frequent change is the new normal in today's market environment—being both an opportunity and a threat to companies and individuals alike. This chapter addresses the challenge of responding to change in a structured way and offers the reader guidance toward achieving successful, outcome-driven transformation. It starts with a review of well-documented economic cycles and the transformation pressures they inevitably exert. Relying on Kondratieff cycle theory, we demonstrate the necessity of a paradigm shift corresponding with the current fifth cycle. The disruption—resulting primarily from the emergence of new technologies—requires a structured model, one which allows for confident navigation through a fast-moving environment. Our dynamic model consists of five transformation levers, working together within an integrated framework covering three dimensions: people, process, and technology. It offers an opportunity to benefit from booming markets as well as provides a protective shield in times of deflation and recession. After a thorough explanation of all levers, we look at the human aspect of the transformation examining capabilities required at CXO and transformation leadership level. This is enriched by a case study describing employee involvement stimulation, achieved through a targeted gamification approach

A. Bujak (✉) • M. Esser
Capgemini, Berlin, Germany
e-mail: adam.bujak@capgemini.com

developed by one of the authors and implemented in the multinational corporate environment on five continents.

Keywords Gamification • Improvement levers • Kondratieff cycle • Long wave • Transformation

Introduction

We observe that organizations and individuals are confronted with an ever growing, potentially overwhelming frequency of discoveries: novel or innovative products, services, and business models. Many of those novelties are related to technology. At the same time, economies show periodic trends (see e.g. Freeman 1982; Wagner-Döbler 1998), resulting in opportunities and risks to the stakeholders mentioned above. Both phenomena multiply complexity and many questions arise: How do innovations and economic cycles interrelate or depend on each other? How can organizations in a timely manner foresee the influence of innovations and economic trends on their current business and operating models and initiate corresponding transformations to stay competitive? How can individuals prepare for and respond to the changes in an appropriate way? Do current structures suffice in supporting organizations and individuals coping with change characterized by increasing speed and complexity?

While theories and models assessing economic cycles remain a topic of dispute among scientists, the analysis starts with a description of Kondratieff theory and cycles (also referred to as “long waves”) to familiarize the reader with the frequency and repetition of changes taking place in the economy since the beginning of industrial revolution. The emergence of new disruptive technologies—being a key driver of the fifth Kondratieff cycle—requires not only a paradigm shift, but also a guiding model used to navigate through changing environments, offering an opportunity to benefit from booming markets while providing a protective shield in times of deflation and recession.

The following description addresses the transformation model. It consists of five levers which make up an integrated framework. It can be seen as our recommendation to organizations seeking a structured transformational approach accompanied by measurable outcomes. After a thorough explanation of all levers, we look at the human aspect of the transformation examining capabilities required at CXO and transformation leadership level. This is enriched by a case study describing employee involvement stimulation achieved through a targeted gamification approach developed by one of the authors and implemented in the multinational corporate environment on five continents.

In essence, the authors, representing many years of professional experience combined with profound insight into key transformation levers, are confident that the aspects described in this chapter can significantly help organizations to better cope with growing challenges and complexity driving outcome-oriented transformation at all levels of an organization.

Economic Cycles

World economy typically displays cyclical behavior. Besides shorter-term cycles like the Kitchin inventory, Juglar cycle, and cattle cycle, authors have described (see e.g. de Groot and Franses 2008; Bormotov 2010) longer-term cycle periods from 40 to 60 years. Kondratieff mentions 40–60 yearlong cycles with a slight asymmetry—the rise taking longer than the descent (see Fig. 6.1). The cycles comprise intervals with high sectoral growth (improvement, prosperity) and intervals of slow or negative growth (recession, depression).

A key characteristic of a cycle according to Kondratieff is that during the years of descent, important discoveries or inventions (called “basis innovations”) are made. Those often disruptive inventions are believed to be caused by demands which cannot be fulfilled by regular rises in productivity based on existing technologies or approaches.

Other authors express a different view; for example, Schumpeter (1939) suggests that longer cycles are rather triggered by the broader usage (thus less the invention) of key technology innovations, leading to change in production and organizational approaches. In any case, the usage of the inventions is believed to trigger large-scale investments, causing an economic upturn (Grinin et al. 2012).

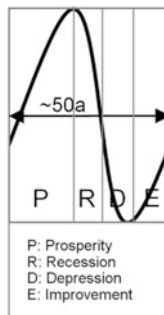


Fig. 6.1 Kondratieff cycle—basics

The advocates of the theory of long-term cycles typically agree on the existence of at least the following so-called *Kondratieff cycles* (see Fig. 6.2):

1. Approx. 1775–1835: “Steam engine Kondratieff”—start of the industrialization in Germany, mechanization of production.
2. Approx. 1835–1885: “Railroad Kondratieff”—second industrial revolution, period of promoterism/Wilhelminian time.
3. Approx. 1885–1940: “Electrical engineering/heavy industries Kondratieff”—including progress in the chemical industry.
4. Approx. 1940–1990: “Automation Kondratieff”—including transistor, integrated circuit, computer, petrochemicals, car, nuclear energy.
5. Approx. from 1990: “Information technology Kondratieff”—including Internet, Social Media, mobile devices, digitalization.

This definition of the cycles gives rise to the question which technologies could play an important role for the potentially upcoming sixth Kondratieff. Among others, the following candidates are being discussed (e.g. Coccia 2010; Wonglimpiyarat 2004; Wonglimpiyarat 2005; Laing 2011; Mathews 2013; Mayer 2011; Pacholski 2012):

- Novel approaches to food production/agriculture,
- Biotechnology,
- Nanotechnology,
- Mobile computing, cloud computing, Internet of Things,
- Energy and resource efficiency,
- Robotics, artificial intelligence,
- Health/wellbeing, and
- Financial market instruments.

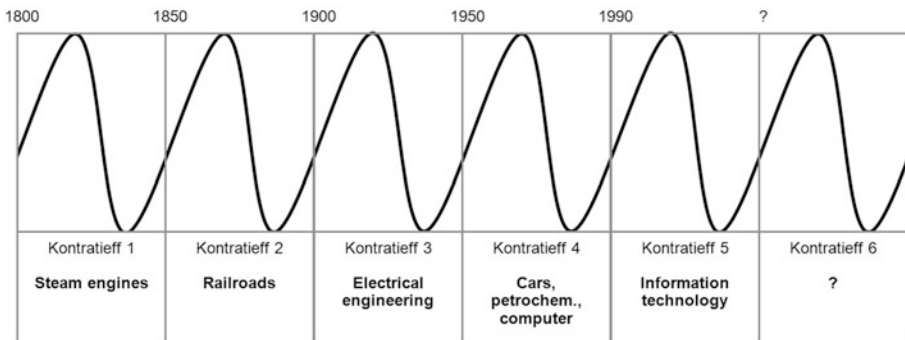


Fig. 6.2 Kondratieff cycles in the past and today

Several authors also elaborate on the relation between Kondratieff cycles (long waves) and life cycles, such as the *industry life cycle*. Klepper (1997, p. 145) describes the relationship between *industry life cycles* and *product life cycles* and shows that “the product life cycle captures the way many industries evolve through their formative eras, but regular patterns occur when industries are mature that are not provided by the product life cycle.” Brusoni and Sgalari (2007, p. 192) argue that “one has to look beyond life cycle theory ... to frame the ... evolution ... as unfolding of ‘long waves’ of economic and technological development.” Van Duijn (2006, p. 9) points out that long waves “will have some impact on the long-term development of industries.” As Van Duijn explains further, “Sectoral output ... will be depressed ... during a downswing phase ...” of a long wave even if the related life cycle is not on the decline.

The key challenge around long waves remains to define a theory or model which can be confirmed based on data available consistently over quite long periods of time (200 years and more) providing statistical evidence. Critics say that distinguishing long waves from long-term trends continues to be the key problem based on the available data material. As a consequence, many researchers do not accept the long wave theory.

Without doubt though, novel technology concepts or innovations are on a regular basis imposing significant changes to product and service markets (paradigm shifts). Organizations and individuals acting in such markets need to be prepared for those changes to be able to persist during the economic descent phases and profit during growth periods.

Integrated Transformation

Every transformation—independently of its objectives—requires successful and timely execution in line with quality- and cost-related expectations. A fast-moving environment, characteristic for the descent phase of the fifth Kondratieff cycle, accompanied by strong profit orientation, eliminates expensive and lengthy programs before takeoff. Therefore, this chapter focuses on three critical success factors ensuring pragmatic execution targeted at desired outcomes:

- Transformation levers,
- Leadership, and
- Employee mobilization.

Transformation Levers

Our experience shows that building a broader improvement framework around people, processes, and technology dimensions of change streamlines subsequent planning and structures execution, enabling better risk control and providing more targeted setup for a change.

The first improvement lever we recommend to look at within the people dimension is the grade mix. Does it reflect the level of supervision required by each process? Are there sufficient staff development opportunities to naturally influence the grade mix? Is the grade pyramid flexible enough to manage short-term or project-driven demands? Does the existing grade mix provide the best possible business case? The right team constellation ensures seniority and experience matching the desired outcome. The resulting transformation projects and activities need to address the above points, including a definition and assessment of an existing grade mix against a target model.

The second improvement lever is the location mix. A competitive mix of locations should address all relevant criteria required to create value for the client—these include, for example, language, proximity to the client, political stability, or availability of talent pools. Is the location strategy aligned with the optimal business case? Does the location mix support an optimal split of responsibilities between different types of locations creating for instance research centers in knowledge hubs and moving production to more cost attractive areas? Does the location mix mitigate sufficiently the existing risks? The identification process of new sites and optimization of existing locations is complex and often expensive. It opens, however, vast opportunities and is often critical to driving competitiveness.

Grade and location mix improvement levers require a strong focus on the third people-related lever—the competency model. This lever defines capabilities that determine a level of resource skill needed. It empowers managers to match these skills to each job family requirement to create the ideal proficiency level for each grade. Selecting and matching the necessary abilities and competencies ensure not only the right structure for each skill set, but also adequate management and leadership within each job family. This lever also involves adjusting the competencies and skills required by staff to deliver precisely defined results. Do you have the competencies needed for each process formally assessed? Are the competencies aligned to an associated job family for optimal performance? Is there a structured plan to assess the future expected competency requirements? Are the as-is and ongoing team proficiency levels assessed? Are the identified gaps addressed with a progress tracking of improvement

execution? Answering these questions reveals the difference between well-implemented competency models and those existing only in the file systems of human resources departments.

The next improvement dimension complementing people-related improvement levers constitutes process improvement. Bujak, Sriramulu, and Carvalho argue that “in a business environment marked by an unstable macroeconomic environment, rapidly changing customer expectations, and escalating costs—process improvement has never been more important” (2012, p. 96). The process improvement lever depends on both proven methodologies and involvement of individuals. Taiichi Ohno, the co-creator of the Toyota Production System (TPS), shared once his view on process improvement: “People don’t go to Toyota to work, they go there to think” (Hrivnak 2008). This is the desired employee state of mind ensuring constant questioning of the status quo and resulting in improvement delivered on a daily basis. The key to success is a consequent improvement of quality (through Six Sigma) and elimination of non-value-adding steps in the processes, delivering accelerated value to the customer (using Lean). Furthermore, it requires a clear process model, resulting in a unique approach designed to deliver standardized best practices for all business activities in a rapid and cost-effective way and driving an ongoing bottom-line improvement. Are all processes operating at the highest efficiency? Is there an effective documentation process and support material to ensure continuity of production or service? Do processes have sufficient control points to ensure adequate compliance? Is the extent of standardization appropriate to minimize cost? Is it clear how your processes are performing against those of your peers in your industry? How many improvements are your employees generating on a monthly, quarterly, and yearly basis? Are you monitoring the improvement progress? These questions may help to assess the level of process improvement maturity and streamline identification of further improvement areas.

Finally, the technology lever complements the above-described improvement dimensions. We concur Dunning’s view on changing the focus of technology as a single-purpose input toward multipurpose technology. This requires integration of the new with the existing technologies for effective deployment (Dunning 2013). Using digital technology allows boosting client experience, business models, and operational processes (Westerman et al. 2014). Improving client experience through digital transformation has a significant impact on numerous industries. A good example is the newspaper industry threatened by disruptive pressure of free content available on the Internet and decreasing print advertising revenues. In spite of this trend, some of the brick-and-mortar news companies managed to transform into digital content providers with significantly improved client experience and rising revenues and profitability from Internet-based publishing.

Innovative business models are key to stay ahead of competitors. Whereas many companies, driven by the traditional approach to innovation, invest primarily in their new products, we witness more and more organizations deriving their market capitalization from an innovative business model. Companies like Uber, Alibaba, DriveNow, or Airbnb do not invest in inventing new products. They innovate on business models.

Digitalization of operational processes relies on benefits generated from big data and analytics, allowing organizations to run more targeted marketing campaigns. Analysis of big data enables personalized advertising and communication, as well as proportionate adjustments of pricing models based on better judgment of data gathered from multiple systems. The automation of processes combined with real-time monitoring of operations allows more elastic response to external demand. Last but not least, digitally streamlined collaboration stimulates improved sharing of knowledge and best practices, use of videoconferencing to cut travel cost, and offer more flexible working models as well as integration of the internal social networks. The triggers for improvement ideas resulting from the technology lever originate from answering such questions as: Do I have a fully integrated data landscape? Is there a more disruptive digital business model allowing me to outperform competitors? Do I enable my employees to work anytime, anywhere using various devices? Digital transformation is key to survival in every fast-moving environment.

Transformation Leadership

Outcome-driven transformation requires strong leadership involvement. It starts with transformation objectives aligned with the company strategy. The definition of the overall objective and vision triggers a target cascade within improvement levers and involved organization units. The main purpose of the target cascade is to ensure commitment at all levels of the organization. The distribution of objectives ends at the individual level, driving ownership of the overall target. A target cascade is more effective when employees understand the desired change. We observe that great leaders are able to instill change into the mindset of their teams presenting a compelling story supporting the transformation. The organization must feel that the desired change is squarely on the agenda at the CXO level, and see leaders as role models demonstrating positive attitude toward change through own actions. Moss Kanter argues that the leadership needs to create a stimulating environment with ongoing communication; it needs to have the necessary toolset, clear milestones, reminders ahead of deadlines, and reward the progress achieved (2014). Last but not

least, the nomination of dedicated change agents is a critical step to increasing the probability of transformation success. Battilana and Casciaro argue that the most critical success factor is the selection of change agents, who are “*central in the organization’s informal network*” independently of their position in the hierarchy and building bridges between independent teams as well as individuals (2014). Well-networked change agents complement leadership efforts by operationalizing their vision and high-level objectives.

Employee Mobilization: Gamification Case Study

The pace of change is facing a constant acceleration. We notice that organizations are increasingly struggling with that trend. Employee expectations are undergoing a dramatic shift, making the firms dependent on individual’s emotional engagement. A natural implication is a necessity to ensure that employee development and needs are matched with organizational objectives. Nowadays, technology is becoming a key digital transformation enabler to stimulate employee workplace experience toward desired changes, aiming at more value for client and improving profitability. The case study described below shows our experience and results gained from a gamification journey supporting a global transformation program.

In order to stimulate 16,000 employees across more than 20 locations on 5 continents, we decided to use gamification techniques, encouraging contribution to our transformation program run for one of the Capgemini strategic business units (SBU). The intention was to find a reward mechanism that encourages identification and execution of improvements—measuring at the same time their impact on client projects and our profitability. We launched an innovation platform called iPortal to stimulate collaboration and share best practices across the entire organization. The system captures improvement ideas, which are approved or rejected based on their impact on client value as well as our profitability. The resulting improvement projects are monitored during their execution against both targets and budgets. This allows an effective target cascade at all levels, starting from an overall SBU ambition and ending at an individual employee level. Every project contains detailed information on:

- Benefit value in Euro,
- Benefit type (cost savings, additional or new revenue, value for the client),
- Phasing of the project impact,
- Cost of the improvement project,
- Improvement lever (people, process, technology),
- Improvement methodology (e.g. Lean, Six Sigma, automation),

- Project team members, and
- Project charter.

Submission of an approved idea as well as completion of a project yield employees iPoints used for recognition and improvement of performance rankings. The higher the savings, revenue, or client value generated, the more iPoints are granted. The iPoints also act as an “internal currency” that can be exchanged for tangible rewards such as cinema tickets, vouchers, and other items from the local benefit system. In this way, a rewarded employee defines “what’s in it” for her or him in terms of recognition. At the same time, the SBU is able to drive target achievement in a very motivating and participative way, defining clear expectations on:

- Improvement numbers to be realized,
- Investment required to achieve the objectives (iPoint/currency exchange rate), and
- Improvement lever’s focus (iPoint algorithm allowing, e.g. more points for technology-driven improvements).

The iPortal allows voting on ideas and projects, drives expansion of iShare (the best practice sharing component of the platform), and stimulates competition for reward iPoints (see Fig. 6.3).

We have managed to stimulate completion of more than 3500 improvement projects granting our employees over 535,000 iPoints within just one year. The grassroots-level engagement, best practice sharing, and encouraged collaboration resulted in exceeding expected transformation outcome in spite of initial challenges.

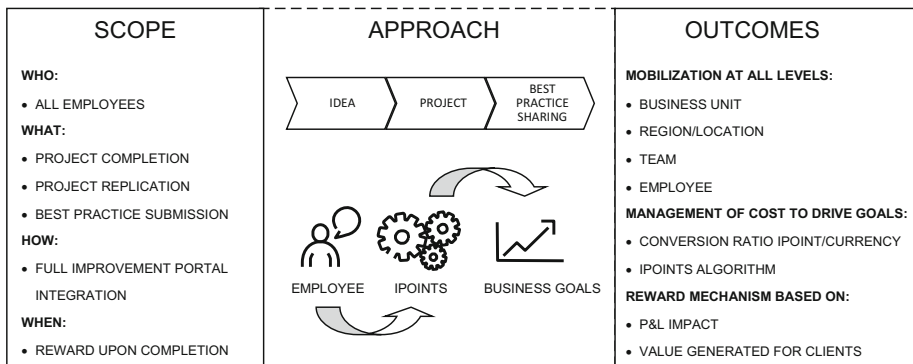


Fig. 6.3 Gamification

Conclusion

New disruptive technologies, being a key driver of the fifth Kondratieff cycle, require organizations and individuals to undergo a paradigm shift. They need strong readiness to drive changes in order to survive in the descent phase. We have presented proven transformation success factors, including improvement levers, a leadership success formula, and employee mobilization through gamification. The successful application of the recommended approach within our organization is a strong indication for the reusability of the concept in other organizations.

Bibliography

- Battilana, J., & Casciaro, T. (2014). *Harvard Business Review*. Retrieved December 7, 2015, from <https://hbr.org/2013/07/the-network-secrets-of-great-change-agents/>
- Bormotov, M. (2010, January 01). *Economic cycles: historical evidence, classification and explication*. Retrieved December 12, 2015, from Munich Personal RePEc Archive: https://mpra.ub.uni-muenchen.de/19660/2/MPRA_paper_19660.pdf
- Brusoni, S., & Sgalari, G. (2007). New combinations in old industries: The introduction of radical innovations in tire manufacturing. In U. Canter & F. Malerba (Eds.), *Innovation, industrial dynamics and structural transformation—Schumpeterian legacies* (pp. 189–207). Berlin: Springer.
- Bujak, A., Sriramulu, R., & Carvalho, W. (2012). Lean management and operations in the global professional services industry. In U. Bäumer, P. Kreutter, & W. Messner (Eds.), *Globalization of professional services: Innovative strategies, successful processes, inspired talent management, and first-hand experiences* (pp. 95–104). Berlin: Springer.
- Coccia, M. (2010). Foresight of technological determinants and primary energy resources of future economic long waves. *International Journal of Foresight and Innovation Policy*, 6(4), 225–232.
- de Groot, B., & Franses, P. H. (2008). Stability through cycles. *Technological Forecasting and Social Change*, 75(3), 301–311.
- Dunning, J. (2013). *Multinationals, technology & competitiveness*. New York: Routledge.
- Freeman, C. (1982). *Long waves in the world economy*. London/Dover: Frances Pinter.
- Grinin, L. E., Devezas, T. C., & Korotayev, A. V. (2012). Kondratieff waves in the world system perspective. In *Kondratieff waves: Dimensions and perspectives at the dawn of the 21st century*. Volgograd: Uchitel Publishing House.
- Hrivnak, M. (2008). *Matt Hrivnak*. Retrieved July 28, 2015, from <http://mattrivnak.com/2008/05/05/taiichi-ohno-quotes/>

- Klepper, S. (1997). Industry life cycles. *Industrial and Corporate Change*, 6(1), 145–181.
- Laing, G. K. (2011). The sixth Kondratieff cycle the era of financial market instruments: A reflection on the Australia vs US subprime Mortgage market. *International Journal of Economics and Finance*, 3(5), 37–41.
- Mathews, J. A. (2013). The renewable energies technology surge: A new techno-economic paradigm in the making? *Futures*, 46(2), 10–22.
- Mayer, W. (2011). Evidence-Based agricultural and rural policy making: Methodological and empirical challenges of policy evaluation. *Proceedings 122nd EAAE seminar*, (pp. 1–15).
- Moss Kanter, R. (2014). Seven truths about change to lead by and live by. *Harvard Business Review OnPoint*, 24–25.
- Pacholski, L. (2012). Human factors and well-balanced improvements of engineering. In P. Vink (Ed.), *Advances in social and organizational factors*. Boca Raton: CRC Press/Taylor & Francis Group.
- Schumpeter, J. A. (1939). *Business cycles*. New York: McGraw-Hill.
- Van Duijn, J. (2006). *The long wave in economic life*. New York: Routledge (Reprint).
- Wagner-Döbler, R. (1998). Scientometric evidence for the existence of long economic growth cycles in Europe 1500–1900. *Scientometrics*, 41(1), 201–208.
- Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. New York: Harvard Business Review Press.
- Wonglimpiyarat, J. (2004). Nanotechnology: A successive industrial revolution of Schumpeter's long wave theory. *International Journal of Nanotechnology*, 1(4), 480–490.
- Wonglimpiyarat, J. (2005). The nano-revolution of Schumpeter's Kondratieff cycle. *Technovation*, 25(11), 1349–1354.

7

Transformation of Banking Institutions: Comparing Germany and India

Michael G. Schmitt and Taruna Gautam

Ideas in Brief This chapter sheds light on the understanding and the proposed impact factors of new banking imperatives. It demonstrates that traditional banks located in developed countries should show increased interest in partnering with institutions from developing markets. Banks in India versus Germany operate in very different environments. However, to some extent, they face the same challenges of global banking transformation. By comparing India and Germany, mutual interrelations are analyzed according to a set of proposed impact factors. Through providing an in-depth view on the impact of future success factors in banking, we contribute to the discussion about the transformational forces for banking institutions and point to potential opportunities. We identified opportunities in each other's home market to support growth. Further, we point to the fact that sharing best practices, for example, with regulation could improve each other's efficiency. Moreover, we see indications for further consolidation by foreign players in India.

Keywords Banking • Transformation • Technology • India • Germany

M.G. Schmitt (✉)

ISM – International School of Management, Frankfurt/Main, Germany

e-mail: michael.g.schmitt@ism.de

T. Gautam

Economics and International Business IILM Graduate School of Management,
Greater Noida, India

Introduction

Following to the global financial crisis, tradition-rich banking institutions are currently undergoing a severe phase of depression and even major global banks are experiencing performance depression due to the financial crisis. In particular, shareholders stand to be most disappointed by banks' current performance and to compound the issue, and there is no indication that the banking industry is experiencing a simple seasonal phase of low profits. Rather, their entire business model seems to be challenged. Encompassing issues of customer acquisition and retention, as well as in the war for future talents, banks continue to lose competitive advantage. Even the renowned Wharton school revealed that only 25 percent of their 2013 graduates have accepted jobs in the financial services industry, compared to 48 percent in 2007 (EY 2015). Perhaps the time of Bill Gates' quote that banking is essential, but banks are not, has come (Ruhr-Universität Bochum 2014). Moreover, banks face increasing pressures and competition from a variety of segments, for example, through payment transaction service providers, crowdfunding platforms, or low-cost security dealers. The diversity of these challenges indicates that global banks need to rethink their traditional business models. It is to this challenge that this contribution responds in reviewing a number of proposed changes that traditional banks need to master if they are to ensure future success. Furthermore, we compare the challenges experienced by European banks, in particular German ones, with those from India and highlight potential synergies in addressing global challenges.

Sources for Transformational Changes for Banking Institutions

Transformational change within organizations can be assessed according to various perspectives, for example, the rational, population ecology, and institutional perspective (Wischnevsky and Damanpour 2006). The rational perspective proposes that managers respond to massive performance pressures with transformational changes (Tushman and Romanelli 1985). Managers are perceived as agents to shareholders and, therefore, are inclined to act in the shareholders' interest. Once facing a situation of deteriorating performance, managers see a need to take action to restore performance again. According to the rational view, their transformational measures taken are deemed to payoff and cause performance to rise again. Shifts in the technological environment, regulatory changes, as well as changes in the competitive landscape

are identified as factors driving transformational change. (Rindova and Kotha 2001; Romanelli and Tushman 1994).

However, transformational changes are not assessed as solely positive, but as risky as well. The population ecology perspective highlights a “renewed liability of newness” (Hannan and Freeman 1984, p. 159). Organizations having undergone a phase of transformational changes need to reset themselves and associate themselves to their stakeholders anew—just as a newly established organization is required to do. This process refers to external relationships, for example, to suppliers and customers, as well as to internal ones between employees. After a transformational change, these relationships follow new patterns, which comprise an increased risk of failure. Therefore, transformational shifts are deemed as a challenge to organizations with an ambiguous ending.

In contrast, the institutional perspective does not propose a certain outcome with transformational changes: it neither focuses on the restored performance nor on the risk of failure, but assumes a tendency to homogeneity among organizations (DiMaggio and Powell 1983). In situations of high environmental uncertainty, the institutional perspective describes impact factors which promote organizations mimicking successful role models. These pressures can be effective via coercive rational or normative factors. While coercive factors are found with dependent subsidiaries, normative ones can result, for example, from adapted professional standards.

Having described the theory of transformational change, we need to find out in how these factors fit to the challenges banking institutions are facing. To the best of our knowledge, we are not aware of any piece of work which applies such an analysis specific to banking institutions from India and Germany.

Technological Advancements

Almost everyone would agree that information technology advancements are able to transform an industry. While this fact can be researched from different perspectives (Crowston and Myers 2004), the progress of digital banking is about to become an integral part of the modern banking. As modern banking includes a multi-channel approach most banking institutions now are offering Internet and/or mobile services in addition to branch services. This meant that banking institutions needed to stem considerable investments. According to a PwC survey (PwC 2015), the impact of digital technology in banking is observed in the form of

- considerable investment by banks on R&D in using digital technology toward web and mobile;
- large investments on social, mobile, analytics and cloud (SMAC) technologies; and
- study of customer behavior through analytics.

The investment into social, mobile, and Internet technologies can be viewed as a mimetic behavior banks face during transformation. Banking institutions now face the challenge to capitalize these investments. Therefore, banking institutions need to understand their customer behavior (Lin 2015; Virk and Pahuja 2012). To understand customer behavior, Big Data analytics seemed to have become an imperative in banking institutions (Fuschi and Tvaronavičienė 2014). However, the value of Big Data analytics should carefully be evaluated (Banerjee et al. 2013). As customer preferences are not fully understood and probably still changing, this phase can be viewed as a truly transformational one.

Despite of all confidence that the banking and capital markets organizations have while adopting technology-oriented measures to transform the banking, they also recognize the upcoming challenges, in particular from a systems perspective (Venkatesh and Ghosh 2013). Digital business models drive banking institutions into the usage of big data technology to tap large customer data. In conjunction, banking institutions need to worry about ensuring greater compliance as well as improving fraud and risk management capabilities (PwC 2015). The process of transformation usually follows different approaches like upgrading of the existing systems of banking, reengineering for new features, involving the third-party vendor, or replacing the old system or at times continuing with the existing systems given the constraint of investments and risk involved (Aggarwal 2006; Pillai and Jacob 2015). This process generated systems being faster and more economical (Dapp 2015). Systems upgrade has actually been a decisive factor toward the competitiveness of banks in the changing landscape of banking: Technology-enabled digital finance has supported banking by eliminating delays, complexity, physical presence, inaccessibility, costly propositions, need for cash and documentation (PwC 2015). Therefore, the spread of digital finance has resulted in the increase of transparency, reach and convenience to the customers. Moreover, there is a further scope of creating better infrastructure, rich data insights, credit profiles, interoperability, interconnected services, and real-time systems (PwC 2015).

Summarizing the changes in customer preferences, competitive landscape, large investments, and the severe changes in business processes in banking institutions, a multitude of indicators point to a transformational nature of changes.

High Pressure Due to Low Profitability

Interest rates are at all-time-lows in Europe as well as in the USA, and spreads are therefore limited. Therefore, profits from fixed-income securities are meager, and profits from trading and investment banking suffer from highly volatile markets. Consequently, consulting firm EY reports that the ROE of the 2000 largest banks dropped from 17 percent in the years 2005–2007 to only 9 percent in the period from 2011 to 2013 (EY 2015). We clearly view this as a sign of continued performance reduction which has been identified above as a promotor for transformational change. One potential answer to this trend may be a further consolidation of the industry by Mergers & Acquisition (M&A). However, following the financial crisis, consolidation among international banks has found to have increased, but not to an alarming extent (Mersch 2015). One of the main hurdles might be the huge investments into digital infrastructure, which has increased dramatically in recent times, for example, due to increased data requirements to meet regulatory requirements as well as customer relationship management systems. In case two banking institutions would merge, these investments can be classified as sunk costs if they are not compatible with one another. Having to cope with new systems can generate a liability of newness, which is described above as one of the major risks of transformational changes.

Lower Customer Loyalty and Risks of Innovation Adoption in Retail Banking

Transformation of the banking sector has become an inevitable approach to combat global challenges. Like never before, established banks seem to have a major problem in maintaining customer loyalty and thus in retaining customers with loyalty of their customers. In 2014, 50 percent of all retail customers have opened or closed accounts, indicating that clients' willingness to switch banks has increased (EY 2015). At the same time, customers have become more demanding, for example concerning the availability of banking services and the channels through which it is provided. Accordingly, there is an observed shift toward multi-channel banking and banks are thus expected to provide varied products to their customers via a number of channels. Banks have devised various innovative access channels for consumers such as door-step banking, self-service channels, mobile banking, in-store stealth branches, and virtual wallet. The promising growth of mobile banking in the last few years and expectations of a further surge in mobile banking growth in the next decade provide banks with an additional opportunity to explore innovative

services. However, the question remains, which factors are important for the adoption of mobile banking? Not surprisingly, trust has been found to be one of the major prerequisites in the adoption of mobile banking (Lotfizadeh and Ghorbani 2015). Furthermore, research has demonstrated that, among others, mimetic force is a good predictor for the adoption of innovations (Dash et al. 2014). Banks also try to provide service centric products to the customer instead of silo products. This fact again fits into research findings where compatibility is found to influence the adoption of innovations (Dash et al. 2014).

In addition, the mimetic pressure mentioned above can be viewed as an institutional rationale for transformational changes. A further indicator for transformational changes is the necessity for huge investment in technology on upgrading the banking systems. The cloud-based solutions have thus enabled the banks to bring in more of flexibility in processes, real-time systems and is deemed to result in cost reduction, which is likewise a rationale for transformational changes.

Increased Regulation

Currently, interest rates are at all-time-lows in Europe as well as in the USA, indicating that banks have easy access to money supply. Especially in Europe, the European Central Bank (ECB) has recently relaxed the access to money even further. Consequently, one might state that the constraints of money supply have lessened.

However, the restrictions on granting loans to companies have tightened due to further regulation. Moreover, financial investors, like insurance companies, dare to seek out profitable investments themselves, without the help of banks as financial intermediaries. For example, the market for commercial mortgage-backed securities has regained attractiveness and helps insurance companies to earn their promised rates to their beneficiaries (Borchersen-Keto 2014; Möglich and Raebel 2014).

The regulatory framework like Basel III has tightened considerably. Therefore, banks are now required to reserve more equity for most of their investments, increasing both financial and bureaucracy costs. These initiatives have also influenced regulatory and compliance related activities under IFRS (KPMG 2013). According to a survey from KPMG, 72 percent of the respondents identified regulatory and legislative pressures as the most significant barrier to growth, while 77 percent said political and regulatory uncertainty posed the biggest threat to their bank's business model (KPMG 2013). Considering that such a high number of respondents feel that the

whole business model is affected, this is clearly a reason for transformational changes. According to the institutional perspective, this is caused by normative pressure from adapted industry standards.

New Competitive Threats by Non-Financial Firms

One major driving force toward transformation mentioned above is the increase in global banking competition. As a result of the ever-evolving roles of banking, there is a need to provide services which are faster and relatively cost-effective like so-called Fintechs do. Banks have also become commoditized in the sense that Fintechs compete fiercely with commercial banks, for example, concerning payment services (Dapp 2014). In recent times, retail banks have experienced huge competition from technology firms such as Google and Amazon rather than new traditional banking entrants and foreseeably, their impact on the transformation of the banking industry will be even larger (Bouvier 2015; Clozel 2015; The Economist Intelligence Unit 2015).

Changing customer habits along with the competition posed by these technologies, companies have forced banks to re-evaluate their priorities. In response to technology companies such as Apple, Amazon, PayPal, and Google at the doorstep of financial services industry, banks now prioritize their digital strategy (The Economist Intelligence Unit 2015). For banks, this requires reorientation through innovative business models supported by technology. However, banks are advised not to try to imitate Fintech business models, but to shift toward customer focused services and relationship building (Marinč 2015).

As the competitive landscape is clearly affected by competitors of a new kind, another one of the aforementioned reasons for transformational change is fulfilled.

Proposed Routes of Transformational Changes in Banking

Proposed Changes in Banking in Europe and in Germany in Particular

To tackle the proposed changes for any major bank in Europe, two things are essential: (i) to regain financial strength and (ii) to have a strategy to guide development. To master the first prerequisite, banks are currently engaged in recapitalizing their post-crisis balance sheets. Several non-performing segments

are sold off or shifted to state-guaranteed bad banks. Net interest margins are expected to remain low, which limits profitability. However, shareholders will focus on profitability and revenue growth (EY 2015). To recoup profitability, more than ever before size is likely to matter. The size advantage would propose further consolidation of the banking sector in Europe. Currently, concentration measures show that the concentration among banks in Europe remains low (ECB 2014). Consolidation would promise cost reduction especially in information technology costs and corporate overheads (Mersch 2015). Considering the costs of a proprietary IT system with which many banks operate cost reductions may be realistic. Furthermore, in literature, there is evidence that larger banks have lower overhead costs (Kovner et al. 2014) However, interestingly, additional research suggests that replacing the top management of the acquired bank negatively impacts acquisition performance (Zollo and Singh 2004).

However, also mid-sized banks have recently been able to raise capital from the markets. For example, although hard-hurt from the crisis, Germany's Commerzbank raised 1.4 billion Euros in equity in April 2015 from the markets, and, thus, has been able to reduce state participation to an estimated 15 percent. One of the reasons why investors provided money might simply be the lack of profitable alternatives. However, a second reason might have been the proposed strategy which focused on retail banking and asset management but not on trading and investment banking like the Deutsche Bank has attempted. A consolidation, for example, among German banks is prone to keeping the traditional business model instead of seizing the opportunities offered by new technologies and implementing enhanced customer services.

The benefits of new technology are equivocally highlighted by banking strategy consultants (Accenture 2013; Khanna 2014) and new products enhancing customer service are deemed to be largely driven by technology. Concerning future development, the banking industry should be ready to apply lessons from other industries such as the telecoms industry. Similarly to banking, the telecoms industry has been regulated for a long time. After deregulation, incumbents had to deal with switching their business models from wireline to wireless and Internet-based business models. Some of their services like standard voice calls or Internet access have now become commodities, while others like news services, live streaming, or location-based services are seen as value adding by customers. In banking, the processing of payment transactions has become a commodity, while M-commerce services are still deemed to be value adding as they improve customer experience. Major consulting companies forecasted that digital innovations are key to retaining and winning new customers (Accenture 2015; Vater et al. 2015). Accenture proposes a bank with enhanced digital channels, for example, that

follows customers to social media channels (Accenture 2012). However, we are reluctant to assume that this is a dominant strategy for all customers. Still, worry against fraud in digital banking is high (ACI Universal Payments 2014), and therefore might well impede such activities.

It is to note that almost everybody in Europe already has access to banking services. Therefore, the market is quite saturated. Banks need to differentiate from one another to draw customers away from competitors. Such predatory competition is deemed to be costly and revenue growth is hard to achieve. Therefore, we expect major European banks to watch out for selected strategic M&A opportunities worldwide. Some strategy consultants proposed that banks should merge with telecom companies to gain a competitive advantage in digital innovations (Rosingsh et al. 2001; Dapp 2014; Lonie and Wagener 2013). For banks however, revenue growth might be more easily achieved by internationalization strategies, particularly considering that in Asia's booming nations such as China or India, banking services are open to and of increasing importance to a wider range of society.

According to a PwC survey, one of the top three challenges for European banks is restoring trust (PwC 2014). Several scandals like the recent LIBOR scandal shaking up Deutsche Bank have led customers to lose confidence in the fair dealing of their trusted bank of choice (PwC 2014). Arguably, this can be one explanation for the increased willingness to switch banks. In accordance, EY advised retail banks to simplify their revenue structures and to make them fully transparent to their clients. Retail clients want to understand for what reasons they are paying fees and how to avoid them (EY 2014).

Furthermore, regulation is already a big issue in Europe's banking industry, but is deemed to be one of the top three challenges in Europe (PwC 2014). As regulation aspiration is still growing, European banks need to invest resources to stay on track. However, Europe's regulatory authorities do not only pose additional requirements on existing banks (e.g. through Basel III), but also keep an eye on new entrants. For example, crowd investing platforms that have yet to be regulated, peer-to-peer lenders as well as direct marketers have provoked the need for regulation. Fuelled by the insolvency of the German wind power operator PROKON, which has directly marketed mezzanine capital securities to private clients, authorities have been alarmed to protect customers. PROKON has largely marketed mezzanine capital instruments to private customers who apparently underestimated the risk of PROKON's business model. After having been surprised by the company's insolvency, some private investors claimed to have been misled and under-informed by the company's information material supporting their investment choice. Although law suits are still ongoing, it has led authorities

to think about further regulations of the so-called gray capital market. Although regulatory institutions have underlined the benefits of increased competition paralleling banking to the telecoms industry (Accenture 2013), they seem to have understood the perils of relaxed customer protection (Mersch 2015).

Proposed Changes in Banking in India

The Indian banking industry has evolved and transformed itself “from a socialist licensed raj business to a liberalized, modernized & technology oriented white elephant of India” (Gaubha 2012, p. 85). The banking and financial sector in India can be broadly categorized under commercial banks, co-operative banks, rural banks and microfinance financial institutions (MFIs), nonbanking financial companies (NBFCs), housing finance companies, financial institutions, mutual funds, and the insurance sector (Chakrabarty 2009). In India, public sector banks hold 70 percent of the assets owned by commercial banks (Chakrabarty 2009). Recommendations of the two Narasimham Committees have played a pivotal role in the transformation of Indian banking (Chakrabarty 2013). Private sector banks and foreign banks gained entry after the Banking Sector Reform in 1991. The entry of foreign banks has also increased the level of competition which is posing a great challenge for the banks. Reserve Bank of India (RBI) has been a strong leader and regulator toward the transformation of Indian Banking. According to the Federation of Indian Chambers for Commerce & Industry (FICCI), RBI has overtaken China, Brazil, Russia, and the UK in regulatory systems and has been on par with the USA, Japan, Singapore, and Hong Kong (FICCI 2010).

Among large banks, **HDFC Bank has won** the prestigious best bank award in 2014 for the second time in a row (BusinessToday 2015). But banking in India like anywhere else is undergoing various challenges due to slowdown and high levels of loan defaults and issues of money laundering. The banks are also going through certain challenges in the form of a deteriorating asset quality and a very high rate of distressed assets to the extent of up to 11 percent (Mundra 2015; Adhikari 2013). Many banks have even more concerns: the frequently low capital base and, thus, low capital adequacy ratio, makes it difficult for various banks to meet Basel III norms (Mundra 2015).

The approach toward bringing in transformation depends upon the size of the bank and kind of systems prevalent in the bank. Mostly the approach differs for a mid-size bank in comparison to smaller bank. Mid-sized banks usually prefer customized solutions required by the bank while smaller banks prefer outsourcing to hosted or cloud-based service providers. YES bank

remains the best mid-sized bank in 2014 (BusinessToday 2015) and one of the most successful in reacting to the current challenges (Wright 2015). YES bank is one of the most upcoming innovative banks which has made its presence felt strongly during the last few years. According to Abhishek A. Bhagat, Senior President and leader of the Innovation & Knowledge Banking initiatives at YES BANK, states that “YES Bank has always been at the forefront when it comes to leveraging the latest technologies to provide products and services to its customers” (Bhagat n.d.). “YES bank has the advantage of being first mover in various technology related initiatives single PIN access across all electronic channels, large scale use of technology for delivering superior services and products to the customers, money monitor, mobile payments, two-factor authentication, mobile banking and RFID in branches” (YES Bank n.d.). “As competition intensifies, the existing banks will have to think of innovative strategies to retain customers” (Adhikari 2013, n.p.). There is no better way to put it; this is an era of intense competition for the banks from all around. Thus, if banks are looking to retain their customers, there is no other way out but to innovate in providing the right offers and ensure a strong capital base to be able to meet regulatory requirements.

RBI has also implemented strict regulations regarding Know Your Customer (KYC) norms (Chakrabarty 2009). These norms are to be followed by the banks opening new accounts and gradually to be updated. They are meant for gathering information about the identity and address of the customer so as to ensure that the services rendered by the banks are not misused.

Another aspect which needs attention is that there is still a huge market which is untapped. Despite having the largest number of savers in the world, a significant number of people are still unbanked. There are challenges to be addressed like financial inclusion, effectively deregulating the interest rates on the saving deposits, weak industrial growth, transition to IFRS, proper implementation of Basel III norms, and so on.

To address the issue of financial inclusion, the banks have made the account opening process simpler and compulsorily to open 25 percent of a bank's branches in rural areas with a minimum of 40 percent credit to be disbursed to the priority sector.

In another development, a working group was constituted to introduce a holding company structure for major financial conglomerates. The Central Bank has also initiated the process for adopting International Financial Reporting System (IFRS) so as to facilitate the comparison of banks functioning in different countries. The major challenges in this area concern infrastructure upgrades, IT services, and human resource issues.

RBI discusses various challenges that the Indian banking sector is facing such as asset quality, capital adequacy of banks, human resource issues including the proposed vacuum at the middle and senior level, prolonged leadership vacuums at the top and high attrition rates, giving rise to resource gaps (Mundra 2015). Further, after the approval of licenses to the new and upcoming banks this problem will surface at a larger scale.

Despite the various challenges being faced, the banking sector in India has been a witness to several encouraging developments. These include the extensive usage of social media both for branding and improving customer services, engaging more women in various departments and tailor-made products for the unbanked population of India.

Given the diverse viewpoints Indian banking does need serious transformation with the help of innovative measures to emerge as a successful system. The success of banks will highly depend upon the way capability of the organizations is upgraded and adapted in this challenging and changing market situation. Value creating M&A transactions may also provide an advantage for the banks. There is an utmost requirement of continuously innovating to design and implement new models targeting untapped markets. Increase in investment in IT would aid banks in improving the services offered to their customers. Investment in R&D and enhancing customer services will actually pave the future for Indian banks.

The banks can also explore the avenues of retail advances for home and personal loans. Banks need to reflect upon both fixed cost and cost per transaction so that these can be minimized. The focus needs to revolve around the initiatives taken with the involvement of people, process and technology. Diverse avenues in terms of generating income, requires a good amount of thought process. The asset quality is another area which needs to match with Basel III norms.

These are challenging times for the banks and the banks have to identify opportunities from the challenging environment. The challenges like competition among the banks and large number of accounts being opened under the Prime Minister's Jan Dhan Yojana scheme, a national mission for financial inclusion, can be perceived as a new set of opportunities for the banks. This way banks can contribute in the economic growth of the country.

How Proposed Changes in Europe and India May Link

As discussed above, European banks strive for profitable revenue growth opportunities. In Asia, specifically in India, growth opportunities are prevalent both in retail banking as well as concerning capital market opportunities.

The recent status of foreign banks in India is quite encouraging, given the fact that during March 2013 there were 43 foreign banks from 26 countries functioning as branches as well as 46 banks from 22 countries with representative offices. The route for non-banking financial companies (NBFC) is also emerging as another trend for entry. The foreign banks are largely engaged in foreign currency lending to the Indian financial institutions and corporates. Most of the foreign banks have limited their scope to deposits and investment products (Kashyap and Kumar 2013). Thus, private sector banking is another area which can be focused.

In retail banking, India has just launched an initiative to increase the number of bank accounts holders dramatically. This initiative has turned out as a great success. Jan-DhanYojana was announced by the Prime Minister of India on August 15, 2015. ICICI, India's largest private sector bank, alone opened 100,000 accounts that day. The bank claimed that "it has been working on a comprehensive financial inclusion plan over the past four years" (Wharton 2015). Further, ICICI sees its strength in their network covering approximately 15,600 villages and have brought more than 18.5 million unbanked people into the banking fold (ICICI 2014) "We aim to open 2.5 million accounts under the yojana, taking the total number of accounts under our financial inclusion program to more than 20 million." The CEO of ICICI claimed in 2014 (ICICI 2014). As of September 8, 2015 just 580,000 accounts have been successfully opened at major banks in India (Wharton 2015). Further, Indian retail banking is already largely mobile. Many banks offer integrated value-added services concerning leisure or healthcare services or even tax advisory (Federal Bank 2015; South Indian Bank 2015). The focus of Indian Banking on financial inclusion clearly sets the mandate that to be successful banks will have to come up with sound strategic moves so as to extend financial outreach. The banks can also enter into the area of their core competencies and offer specialized services through differential licensing regime. The Indian economy is approaching increases in urbanization, non-urban centers covered through financial inclusion, and preferences toward cash less economy. Thus, cash management is emerging as another area of strength for the banks. Priority toward local corporations and small and medium enterprises (SMEs) will be advantageous in spreading risk for the banks.

Further, PwC's bankers' survey on the future of equity capital markets reveals that participants view the development of the Chinese and Indian equity markets as most attractive. Participants of the study expect that by 2025 India will have the second-most equity capital markets issuers, after China (PwC 2011). In terms of capital raised, India is expected to be in the third position, behind only China and the USA. Therefore, in terms of growth potential, India is very attractive. Further, as Indian regulation tends to converge with the European example, for example, adopting Basel regulations,

and so on, it can be expected that both European and Indian banks will become interested in one another. European banks will be interested in the relationship because of the growth opportunities, while Indian partners might be interested in the European expertise in capital markets and asset management know-how. However, European partners might profit from the Indian perspective of asset management, too, as India was largely unaffected by the crisis. Therefore, we expect large European incumbent banks to try to establish a footprint on these future markets. Moreover, we currently observe that some global players like ING are already active in the consolidation of the Indian banking sector. For example, ING bought Kotak Mahindra Bank in 2014. According to the recently released Wholly Owned Subsidiaries Guidelines, foreign banks can now open new branches, list on Indian exchanges and enter into M&A with private sector banks, subject to the overall investment limit of 74 percent (Gopakumar 2013). However, the success of these banks would also be assessed in accordance with regulatory approval. Financial inclusion is one of the imperatives for Indian banking institutions. The commitment for this would also be expected from the foreign banks.

These policy changes are evolving the landscape of banking in India. Seventy-five new bank branches have been granted to foreign banks and 13 banks have been provided the licenses by the central bank (Kashyap and Kumar 2013). Deutsche Bank, one of the leading German Banks, established its first branch in India in 1980. The bank currently has its branches in 16 cities and employs 9800 staff. With a customer base of 500,000 it is a major integrated financial service provider to Indian corporates, institutions, and the individual clients (Deutsche Bank n.d.).

Also the debt capital market is developing at a rapid pace in India. This will translate into the increasing scope of trade finance and external commercial borrowings. ICICI Bank, India's largest private sector bank announced its association with Alibaba.com for the launch of the Trade Facilitation Center, a single window facility to provide easier trade finance to SMEs in India.

Partnering with some Indian retail bank has another advantage for German banks concerning bank lending services. The risk structure of credits is very different from European ones. On average, credit engagements are rather low, showing a microfinance structure. Microfinance is deemed as a growing asset class, in particular because its risk structure is capable of lowering portfolio risk altogether since its correlation with other assets is low. Investing into this kind of asset base would stabilize portfolio returns, ultimately helping to restore customer confidence. This fact is also attractive for traditional banks, which may lead them into either organic development into this field or M&A activity. Further, from a social point of view, microcredits are deemed important for the development of a country. In Europe, there is a growing demand for socially responsible investments which can be satisfied by investment opportunities. Therefore, we propose that M&A activity involving microfinance

institutions is about to start. Just recently, we saw a transaction in Pakistan where Habib Bank invests into First Microfinance Bank (M&A Market 2015). However, the majority of transactions may be postponed for some time due to the unavailability of targets, but in particular in India the relaxed wholly owned subsidiaries guidelines would open up opportunities for foreign banks.

Currently, India is among the largest and most mature markets for business process outsourcing (BPO) (Deloitte 2014). In particular, the banking BPO market size is expected to rise significantly in the near future (Everest Group 2015) as there will be a significant cost pressure due to low interest rate margins. India is expected to gain disproportionately from this increase as there are already banking industry experts available. Not only in terms of cost efficient outsourcing, but for servicing wealthy private as well as institutional clients, currently banks hire talented professionals. In particular, foreign private banks are trying to seize their opportunities on the Indian market. Just recently, major foreign private banks have announced to increase their headcount in India again, as the growing Indian economy boosts opportunities for private banks (Chatterjee 2015). Further, according to EY, by 2030 there will be 3.1 million additional jobs in the financial service industry in India (EY 2015). Therefore, in the war for talent India is going to obtain a leading position.

On the other side of the linkage, the status of Indian banks in Germany is quite notable. Some of the leading Indian banks are prominently functioning in offering their services in Germany. These include the State Bank of India and ICICI bank. According to the FrankfurtRheinMain website (FrankfurtRheinMain n.d.), ICICI Bank, India's largest private sector bank, entered the German market in 2008. It is functioning as a direct bank offering call and term money accounts for retail customers. The bank offers simple and safe savings products at attractive interest rates. The bank has been successful in attracting deposits amounting to 500 million US dollars. The bank also deals with corporate clients having close business connections between Germany and India. These may be the Indian companies, which operate a subsidiary in Germany, or German corporations looking to do business in India. The product portfolio offered by the bank includes trade, M&A, and the financing of start-ups. However, concerning retail banking, Indian banks in Germany are hardly noticed outside the Indian community in Germany.

Summary

The global banking industry is going through major transformation. The presence of new entrants, radical changes in technology, demographic and attitudinal changes among consumers are forcing banks to re-think existing models. The German Banking industry is sailing stormy waters. Major banks

such as Deutsche Bank and Commerzbank are facing negative news on a recurring basis. In contrast to the demise of privately owned banks, interestingly, cooperative banking is currently undergoing a revival, just like the well-known Grameen Bank established by Nobel laureate Muhammad Yunus.

On the other side of the coin, India is expected to become the fourth largest economy during the coming decades. There are encouraging trends being observed in the Indian economy in the form of increasing purchasing power, growth of the middle class, major scope for retail lending services along with an increasing trend toward the use of debit and credit cards.

There are favorable policy changes occurring in the Indian banking landscape in the form of deregulation of interest rates, new banking licenses, liberal norms for the entry of foreign banks, encouragement provided to foreign banks through permission for stand-alone separate entities registered in India. There is availability of more lendable resources and universal banking as a concept is gaining acceptance. M&A of banks with other financial institutions like non-banking financial companies, direct financial institutions, and so on, are aiding the banks in diversifying products and services. Financial inclusion initiatives and increased use of technology are going to reshape the Indian banking environment, which is a very encouraging move toward attracting foreign players. Also the fact that India will have a large young consumer base with an average age of 29 by the end of 2020 provides a great opportunity for global players through judicious use of technology. But the questions that are being raised in the global discussion ask—Will the future consumers really need the banks? How would the mergers and acquisitions affect the banks at different levels? What would be the role of non-banking players? How would the banks justify their existence in the crowded markets?

The industry would be driven significantly by the customer's choices and intense competition along with the effective management of human capital, regulatory framework, and use of technology in attaining competitive advantage.

Bibliography

- Accenture. (2012). *Banking 2016: Accelerating growth and optimizing costs in distribution and marketing*. Retrieved June 1, 2015, from <https://www.accenture.com/lv-en/insight-banking-2016-next-generation-banking-summary.aspx>
- Accenture. (2013). *Banking 2020: Capturing emerging opportunities*. Retrieved June 1, 2015, from <https://www.accenture.com/hk-en/insight-capturing-emerging-opportunities-banking-summary>

- Accenture. (2015). *The everyday bank: A new vision for the digital age*. Retrieved December 17, 2015, from https://www.accenture.com/t20150714T065456_w_us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Strategy_6/Accenture-The-Everyday-Bank-A-New-Vision-for-the-Digital-Age.pdf#zoom=50
- ACI Universal Payments. (2014). *Fighting online fraud: An industry perspective*. Retrieved July 15, 2015, from <http://www.aciworldwide.com/-/media/files/collateral/fighting-online-fraud-an-industry-perspective-volume-3-us-5227-1213.pdf>
- Adhikari, A. (2013, December 8). *India's best banks 2013*. BusinessToday. Retrieved July 1, 2015 from <http://businesstoday.intoday.in/story/hdfc-bank-aditya-purion-rural-banking-scope-future/1/200612.html>
- Aggarwal, N. (2006). *Roadmap to successful core banking system replacement: Critical success factors and best practices*. Retrieved July 20, 2015 from http://www.research-andmarkets.com/reports/1056130/roadmap_to_successful_core_banking_system.pdf
- Banerjee, A., Bandyopadhyay, T., & Acharya, P. (2013). Data analytics: Hyped up aspirations or true potential? *Vikalpa: The Journal for Decision Makers*, 38(4), 1–11.
- Bhagat, A. (n.d.). *Membership: Member showcase*. Retrieved July 15, 2015, from <http://www.nasscom.in/abhishek-bhagat-yes-bank>
- Borchersen-Keto, S. (2014). *CMBS market boosted by positive fundamentals as 2014 comes to close*. Retrieved July 27, 2015, from <http://www.reit.com/news/articles/cmbs-market-boosted-positive-fundamentals-2014-comes-close>
- Bouvier, P. (2015). Banking is Fintech, like it or not. *American banker*. 11/2/2015, 180 (169).
- BusinessToday. (2015). *India's best banks*. Retrieved July 22, 2015 from <http://businesstoday.intoday.in/story/best-indian-banks-2014-listing-kpmg-study-hdfc-ucos-yes-bank/1/213958.html>
- Chakrabarty, K. C. (2009). *Banking and finance in India – Developments, issues and prospects*. Retrieved July 1, 2015 from <http://www.bis.org/review/r090902e.pdf>
- Chakrabarty, K. C. (2013). *Transformation of DFIs into commercial banks – the case of the IDBI and the role of employee unions*. Retrieved July 1, 2015 from <http://www.bis.org/review/r131002f.htm>
- Chatterjee, S. (2015). *Foreign private banks plan India headcount boost in revival of growth push*. Retrieved July 27, 2015 from <http://www.reuters.com/article/2015/02/16/india-banks-wealth-idUSL4N0VK27J20150216>
- Clozel, L. (2015). Nonbanks, tech firms poised to steal banks' business. *American Banker*. 10/2/2015. 180 (F338)
- Crowston, K., & Myers, M. (2004). Information technology and the transformation of industries: Three research perspectives. *Journal of Strategic Information Systems*, 13, 5–28.

- Dapp, T. F. (2014). Deutsche Bank Research (Ed.): Fintech—Die digitale (R)evolution im Finanzsektor: Algorithmenbasiertes Banking mit Human Touch, Frankfurt, September 23, 2014.
- Dapp, T. F. (2015). Deutsche Bank Research (Ed.): Fintech reloaded – Traditional banks as digital ecosystems: With proven walled garden strategies into the future, Frankfurt, June, 9, 2015
- Dash, M., Bhusan, P., & Samal, S. (2014). Determinants of customers' adoption of mobile banking: An empirical study by integrating diffusion of innovation with attitude. *Journal of Internet Banking and Commerce*, 19(3), 1–21.
- Deloitte. (2014). *Deloitte's 2014 global outsourcing and insourcing survey*. Retrieved July 29, 2015 from <http://www2.deloitte.com/content/dam/Deloitte/us/Documents/strategy/us-2014-global-outsourcing-insourcing-survey-report-123114.pdf>
- Deutsche Bank. (n.d.). *Deutsche Bank in India*. Retrieved July 19, 2015 from <https://www.db.com/india/>
- DiMaggio, P., & Powell, W. W. (1983). The iron cage revisited: Collective rationality and institutional isomorphism in organizational fields. *American Sociological Review*, 48(2), 147–160.
- ECB. (2014). *Banking structures report*. Retrieved June 1, 2015, from <http://www.ecb.europa.eu/pub/pdf/other/bankingstructuresreport201410.en.pdf>
- Everest Group. (2015). *Banking BPO annual report 2015 – Heavy on technology, low on people – Future of banking BPO*. Retrieved June 1, 2015, from <https://research.everestgrp.com/Product/EGR-2015-11-R-1466/Banking-BPO-Annual-Report-2015-Heavy-on-Technology-Low-on-Peo>
- EY. (2014). *Global consumer banking survey 2014: Winning through customer experience*. Retrieved June 1, 2015, from <http://www.ey.com/GL/en/Industries/Financial-Services/Banking---Capital-Markets/Global-consumer-banking-survey-2014>
- EY. (2015). *Transforming banking for the next generation*. Retrieved June 1, 2015, from <http://www.ey.com/GL/en/Industries/Financial-Services/Banking---Capital-Markets/EY-transforming-banking-global-banking-outlook-2015>
- Federal Bank. (2015). *Value added services*. Retrieved June 1, 2015, from <http://www.federalbank.co.in/value-added-services>
- FICCI. (2010). *Indian banking system: The current state & road ahead*. Retrieved July 1, 2015 from http://www.ficci.com/Sedocument/20043/FICCI_Annual_Survey_on_Indian_Banking.pdf
- FrankfurtRheinMain. (n.d.). *In Germany since 2008 Indian ICICI Bank*. Retrieved July 20, 2015, from <http://www.frm-united.com/en/press/best-practices/best-practice-icici-bank.html>
- Fuschi, D., & Tvaronavičienė, M. (2014). Sustainable development, big data and supervisory control: Service quality in banking sector. *Journal of Security & Sustainability Issues*, 3(3), 5–14.
- Gaub, R. (2012). The Indian banking industry: Evolution, transformation & the road ahead? *Pacific Business Review International*, 5, 85–97.

- Gopakumar, G. (2013). *RBI releases guidelines for foreign bank subsidiarisation*. Retrieved July 4, 2015 from http://www.moneycontrol.com/news/cnbc-tv18-comments/rbi-releases-guidelines-for-foreign-bank-subsidiarisation_984315.html
- Hannan, M. T., & Freeman, J. (1984). Structural inertia and organizational change. *American Sociological Review*, 49, 149–164.
- ICICI. (2014). *ICICI Bank participates in Pradhan Mantri Jan Dhan Yojana*. Retrieved July 14, 2015 from <http://www.icicibank.com/aboutus/article.page?identifier=news-icici-bank-participates-in-pradhan-mantri-jan-dhan-yojana-20142808125622348>
- Kashyap, M., Kumar, S. (2013). *Foreign banks in India: At an inflection*. Retrieved June 23, 2015 from <http://www.pwc.in/assets/pdfs/publications/2013/foreign-banks-in-india.pdf>
- Khanna, S. (2014). *The bank of the future*. Retrieved June 1, 2015, from http://www.mckinsey.com/insights/financial_services/the_bank_of_the_future
- Kovner, A., Vickery, J., & Zhou, L. (2014). Do big banks have lower operating costs? *Economic Policy Review*, 20, 1–27.
- KPMG. (2013). *2013 banking industry outlook survey: Regulatory change spans the enterprise*. Retrieved July 10, 2015 from <http://www.kpmg.com/US/en/topics/Documents/banking-outlook-survey-2013a.pdf>
- KPMG, FICCI. (2007). *India and Germany: Two great countries engaging to take economic relations to a new level*. Retrieved June 28, 2015 from http://www.going-global-edu.in/all-pdfs/India_Germany_kpmg1.pdf
- Lin, C.-W. (2015). User purpose analysis for mobile banking service. *Journal of Testing & Evaluation*, 43(3), 702–710.
- Lonie, S., & Wagener, I. (2013). Transformational banking from transformational relationships: Case study of a bank and mobile network operator partnership. *Journal of Payments Strategy & Systems*, 6(4), 333–344.
- Lotfizadeh, F., & Ghorbani, A. (2015). A multi-dimensional model of acceptance of mobile banking. *International Journal of Management, Accounting and Economics*, 2(5), 414–427.
- M&A Market. (2015). *Habib Bank Limited looking to acquire “significant shareholding” in First Microfinance Bank Limited*. Retrieved July 29, 2015 from <http://mamarket.blogspot.de/2015/04/habib-bank-limited-looking-to-acquire.html#gsc.tab=0>
- Marinč, M. (2015). The future of banking: The role of information technology. *Bančni vestnik: BANKING SECTOR AT THE CROSSROADS: CHALLENGES FOR THE FUTURE*. Forthcoming.
- Mersch, Y. (2015). *The future of banking – A central banker’s view*. Retrieved June 1, 2015, from <https://www.ecb.europa.eu/press/key/date/2015/html/sp150310.en.html>
- Möglich, A.-K., Raebel, R. (2014). *Kreditfonds – ein Marktüberblick*. Retrieved July 27, 2015, from <http://www.hedgework.de/617.html>

- Mundra, S. (2015). *Indian banking sector: Emerging challenges and way forward*. Retrieved June 26, 2015, from https://www.rbi.org.in/Scripts/BS_SpeechesView.aspx?Id=955
- Pillai, R. S., Jacob, M. (2015). *Core banking transformation: 2012 and beyond*. Retrieved July 23, 2015 from <http://www.infosys.com/finacle/solutions/thought-papers/Documents/core-banking-transformation-2012-and-beyond.PDF>
- PwC. (2011). *Capital markets in 2025: The future of equity capital markets*. Retrieved June 1, 2015, from <http://www.pwc.com/capitalmarkets2025>
- PwC. (2014). *Retail banking 2020: Evolution or revolution?* Retrieved June 1, 2015, from <http://www.pwc.com/gx/en/banking-capital-markets/banking-2020/>
- PwC. (2015). *Logging into digital banking: Creating access, transforming lives*. Retrieved June 22, 2015 from https://www.pwc.in/en_IN/in/assets/pdfs/publications/2015/logging-into-digital-banking.pdf
- Rindova, V. P., & Kotha, S. (2001). Continuous “morphing”: Competing through dynamic capabilities, form, and function. *Academy of Management Journal*, 44(6), 1263–1280.
- Romanelli, E., & Tushman, M. L. (1994). Organizational transformation as punctuated equilibrium: An empirical test. *Academy of Management Journal*, 37(5), 1141–1166.
- Ros Singh, W., Seale, A., & Osborn, D. (2001). *Why banks and telecoms must merge to surge*. Retrieved June 1, 2015, from <http://www.strategy-business.com/article/17163?gko=4cda6>
- Ruhr-Universität Bochum. (2014). *Wozu braucht man (noch) Banken?* Retrieved July 12, 2015 from <http://aktuell.ruhr-uni-bochum.de/pm2014/pm00059.html.de>
- South Indian Bank. (2015). *Value added services*. Retrieved June 1, 2015, from <http://www.southindianbank.com/content/viewContentLvl2.aspx?linkIdLvl2=16&linkId=16&sec=1>
- The Economist Intelligence Unit. (2015). *Future factors: The 3 Rs of retail banking: Regulate; revise; re-envisage*. Retrieved July 20, 2015, from <http://www.economist-insights.com/financial-services/analysis/future-factors-2015>
- Tushman, M. L., & Romanelli, E. (1985). Organizational evolution: Interactions between external and emergent processes and strategic choice. *Research in Organizational Behavior*, 8, 171–222.
- Vater, D., Cho, Y. & Sidebottom, P. (2015). *The digital challenge to retail banks*. Retrieved December 17, 2015 from http://www.bain.com/Images/BAIN_BRIEF_Digital_challenge.pdf
- Venkatesh, S. G., Ghosh, A. (2013). *Top 10 challenges banks face when implementing core banking transformation*. Retrieved July 4, 2015 from <http://www.infosys.com/finacle/solutions/thought-papers/Documents/Top10-%20Challenges.pdf>
- Virk, S., & Pahuja, A. (2012). An empirical analysis of factors affecting the adoption of e-banking services. *Journal of Commerce & Accounting Research*, 1(2), 38–45.
- Wharton. (2015). *Financial inclusion in India: Moving beyond bank accounts*. Retrieved July 8, 2015 from <http://knowledge.wharton.upenn.edu/article/financial-inclusion-india-aims-move-beyond-bank-accounts/>

- Wischnevsky, J., & Damanpour, F. (2006). Organizational transformation and performance: An examination of three perspectives. *Journal of Managerial Issues*, *XVIII*, 104–128.
- World Bank. (2015). *World Bank group support to transformational engagements*. Concept Note. Retrieved in March 2015 from <http://documents.worldbank.org/curated/en/2015/03/24307303/concept-note-world-bank-group-support-transformational-engagements-ieg-category-ii-learning-product>
- Wright, G. (2015). The transformers. *Global Finance*, *29*(8), 29–38.
- YES Bank. (n.d.). *YES BANK's technology edge*. Retrieved July 16, 2015, from <https://www.yesbank.in/about-us/technology-edge.html>
- Zollo, M., & Singh, H. (2004). Deliberate learning in corporate acquisitions: Post-acquisition strategies and integration capability in US bank mergers. *Strategic Management Journal*, *25*, 1233–1256.

Part 3

Achieving Customer Centricity

8

The Changing Face of Customer Centricity

Rajesh Gaurav and G Shainesh

Ideas in Brief This chapter assesses the impact of macro environmental factors, including deregulation, increased competition, technological changes and changing consumer needs on the evolving nature of customer centricity and the need for firms to embrace it. Developed through a review of literature and study of industry examples and trends, this chapter traces how business focus has shifted from production to customer, and identifies ways in which businesses can enhance customer centricity by leveraging new technologies. Customer centricity is fast emerging as a norm across industries, and firms are adopting customer centricity to enhance competitiveness. This chapter lays a strong emphasis on embracing customer centricity, based on fundamental reasons as well as industry examples.

Keywords Balanced centricity • Customer centricity • Customer service • Product and service customization • Social media

R. Gaurav (✉)
IIM Bangalore, Bangalore, India
e-mail: rajeshgaurav@gmail.com

G. Shainesh
Marketing, IIM Bangalore, Bangalore, India

Introduction

Rapid changes in the business environment are opening up a plethora of opportunities while increasing competition for firms. Lower entry barriers across markets are resulting in stronger competition and more choice for consumers. In an environment characterized by rapid changes, incumbents are forced to transform to stay relevant and succeed. While there are multiple aspects that the transformation needs to take care of, this chapter focusses on the transformations in customer centricity and its impact on businesses.

Customer centricity emphasizes placing the customer at the heart of the organization and then designing all processes and activities around the customer. Understanding customers' needs and satisfying them better than competitors are the key aspects of customer centricity. Customer centricity requires marketers to assess each customer on an individual basis. Then they decide whether to serve the customer directly or through a third party and finally decide how the offering should be customized or standardized. The objective is to maximize both the efficiency (doing things right) and the effectiveness (doing right things) simultaneously at a customer level (Sheth et al. 2000).

The concept of customer centricity has been around for more than six decades. Drucker (1954) had emphasized the centrality of the customer in determining the firm's offerings and eventual success. However, customer centricity has been gaining popularity in the last few years. As competition increases exponentially in several markets, due to low entry barriers in the digital age, customers have more options and many have turned fickle. Firms that enjoy their customers' loyalty have an edge that can lead to sustainable advantage. As customer retention turns into a high-priority objective, businesses will also enjoy improved customer stickiness.

This chapter traces the evolution of customer centricity over time as the focus of businesses shifted from being product centric to being customer centric. We illustrate this evolution with the help of new customer-centric approaches that businesses are taking and share our perspectives on the future. Finally, we recommend steps needed to move toward customer centricity and highlight a few challenges associated with this journey.

Evolution of Customer Centricity

Many businesses spend more of their time and efforts on their products as compared to the markets during their initial stages of evolution. This results in product-centric firms that would focus on reducing the cost of production through standardization while aiming for economies of scale by manufacturing large

numbers of standard products to gain market share. The main marketing activities of such firms involve promoting, pricing and distributing products for the mass markets. The entry of new players, attracted by a rapidly growing market, forces the players to seek different market segments to target their differentiated offerings, thus leading to product variety. The firms, now organized around market segments, result in market segment-centric marketing (Sheth et al. 2000).

Subsequent developments in the marketplace, including shifts in consumer preferences, emergence of new technologies, dissatisfaction with marketing productivity, and so on, have driven firms to adopt customer-centric marketing and processes in place of product- and market segment-centric marketing (as shown in Fig. 8.1). During the last decade, changes in technology have enabled unprecedented interaction between businesses and customers. These interactions enable managers to have a more holistic view of their customers. Managers are today inundated with data related to every aspect of their customers, including purchases, usage, perceptions, preferences and opinions. Using insights from their investments in building customer relationship and analytics, they can customize their marketing and/or their offering. Technology also enables multiple opportunities for customer-facing employees to serve customers as they have a lot more relevant information about their customers. Businesses can now choose to customize the marketing to a specific customer. Such customization, that was earlier limited to business markets (B2B) or small businesses, is spreading to the consumer markets (B2C).

Change in technology has also helped unorganized sectors to become organized, and also more customer centric. Take for example the healthcare service providers in India. While the large hospitals and chains are well organized, a large share of healthcare service is provided by small, independent clinics. These clinics always lacked the wherewithal to provide good service experience

Firm's Orientation

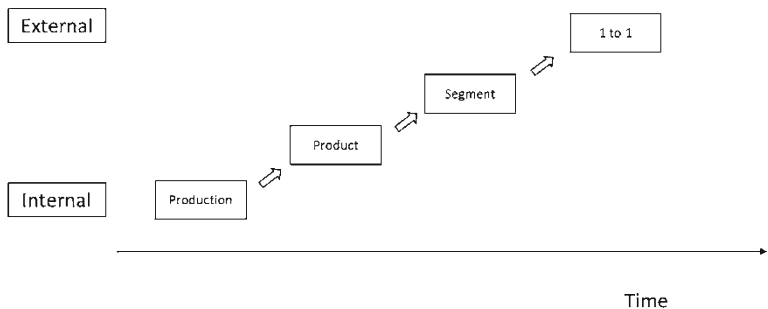


Fig. 8.1 Evolution of customer centricity

to patients. Appointments were either non-existent or done manually. Sick patients had to sometime wait for long before meeting with a doctor. Tech start-ups, such as Practo, are trying to transform this space. Once a doctor/clinic signs up with Practo, the appointments are handled by Practo's system. Patients can choose among various doctors by specialty, geography, and so on, and book an appointment with complete visibility of schedule. Such smartphone-based digital technology is enabling even small businesses to become customer centric. Larger businesses have no excuse not to improve on customer centricity.

Evolution of the Marketing Mix: Marketing mix has been a core concept of marketing for a long time. The marketing mix as per the initial definition included product, place, price and promotion. This was highly relevant for products, but an update was necessary for it to be relevant for the service industry. Thus, "4P"s became "7P"s with the inclusion of people, processes and physical evidence. Customer centricity can be achieved only if attention is paid to all these elements of services marketing mix. Figure 8.2 depicts how the "7P"s are evolving as banks are turning more customer centric.

Earlier, banks used to operate only through their branches. A customer, in order to operate his/her account, had to visit the bank's branch in person. The bank's working hours were fixed and its layout as well as processes for carrying out transactions were largely driven by the convenience of the bank's

7 P's	Early days of banking	Banking now
Product	Same type of account for everyone	Different types of account based on customer needs
Place	Few branches, fixed timings Necessary to visit the branch	ATMs everywhere, 24 hour online Most transactions do not require a visit to branch
Price	Uniform fees and charges	Different charges depending on various factors
Promotion	Advertising - Mass advertisements	Advertising - Personal Selling, Social Media Individual customer targeted cross-selling/upselling
People	Emphasis only on hard skills	Emphasis on both hard and soft skills
Processes	Processes made as per Bank requirements	Customer centric processes e.g. scan/deposit a check at home
Physical Evidence	Branches, Checkbooks, physical statements	Mostly electronic form.

Fig. 8.2 Evolution of a bank's marketing mix

employees and operational needs rather than the convenience and comfort of the customer. The result of such internal focus was a gross neglect of the preferences, likes and dislikes of customers. Customers' service experience was not very good, but they did not have too much choice as most banks would provide a similar experience. The root cause of all this was the point of view of the bank, namely looking at the transactions more from their point of view (efficiency, ease, etc.) and designing the system around such operational needs. Hence, the customer would end up getting a raw deal. Customer-centric processes try to change this outlook. When banks decided to adopt a more customer-centric approach, they also looked at technology to help them out. The result was setting up of ATMs at various locations in a city covering not just the business areas but also the residential areas. ATMs and call centers have brought banking at the fingertips of the customers. They offer easier access because of the location advantage and customers can use them at any time of the day or night as per their convenience. The transactions are also carried out much faster. The adoption of home banking, internet banking and mobile banking has enhanced customer centricity. As a result of all these changes, banking is no longer a dreaded chore for customers. The transition at banks illustrates the potential for adopting similar approaches in other businesses.

Product/Service Customization

Customization is one such approach to improve customer centricity. The level of customization can range from zero (standardized) to fully customized (unique for each customer). While complete customization is not easy and sometimes not even desirable for all customers, attempts can be made to increase the level of customization. Modularization is an option to enable customers to pick and choose as per their preference. Customization is relatively simpler for digital services, while it can be fairly complicated for most physical services. A firm could also choose to customize its offerings only for high-value customers if customizing for all customers is unviable.

A few illustrative examples of service customization include:

- Crafting a handpicked vacation package instead of fixed pre-decided packages.
- A mobile service provider's plans, for example, Airtel's "MyPlan" which permits a customer to choose individual limits for voice calling, text and data services for a recharge amount, depending on her needs.

- Relationship managers of wealth management services for high-net-worth individuals know their customers by name and their preferences. Customers expect recognition in such cases, and firms have to be extremely careful in utilizing the deep knowledge about their customers.

Customer Engagement

Apart from customization, another way to increase customer centricity is to engage with customers as much as possible. Some firms have gone on to co-create the product/service along with the customer. In co-creation, the customer is an active participant in the new product design/development. Co-creation requires firms to use techniques such as co-creation workshops, contests or crowdsourcing. Other innovation management practices include offering innovation toolkits to consumers (Thomke and Hippel 2002) or innovation contests to attract consumer activity (Jeppesen and Lakhani 2010). Consumers are a valuable potential source of innovation. As lead users develop their own new products and services by leveraging information and communications technology and often freely share their innovations with others, they create user-innovation communities and a rich intellectual commons (von Hippel 2005; von Hippel et al. 2010). Smart managers will need to create systems and processes to track emerging trends in user community groups and co-opt such design elements into their new product development efforts. Even if co-creation is difficult, managers must explore multiple ways to engage with customers from pre-purchase to consumption. The evolving technology permits this kind of engagement with customers.

Engaging the customer can start even when the customer is just researching about a product (see Fig. 8.3). For example, a user puts out a tweet asking for comparison between three brands of budget SUV. If a brand gets back promptly, a positive impression is created that the company is very responsive and is listening to customers. Similarly, during consumption and ongoing support, active interactions with customers will help keep the customer engaged. Positive experiences in these stages enable repeat orders and word-of-mouth advertisement.

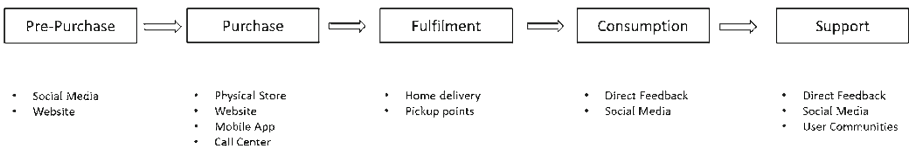


Fig. 8.3 Possible avenues for engagement in the purchase cycle

Most customers prefer a mix of online and personal contact with businesses. For the customer, it is one firm they are interacting with, and they want a seamless experience whether they approach through online presence or personal contact. Hence, it becomes imperative for the businesses to integrate all channels seamlessly. A well-integrated channel presence will help deliver a positive customer experience and strengthen customer bonds.

Customer Engagement on Social Media

Social media has enabled unprecedented access to information. Businesses can connect to current and potential customers directly and interact with them. Customer-to-customer sharing of reviews and feedback has created a set of more informed and demanding customers. Customers expect customized and fast response. The times of nine-to-five customer service are long gone, and customers do not have any patience to wait. Earlier, customer would send an email and wait for the standard response time of a few business days. Even if the customer was not satisfied with the service, no one else came to know. In the age of Twitter and Facebook though, response is immediately expected and also visible to the whole world.

As social media has gained so much prominence, enterprises have felt the necessity to be present there. This helps them engage customers directly by adding more channels available to them. Social media is also a place to get a pulse on the customer sentiments which customers may not reveal directly to the firm. Hence, more and more firms are increasing their presence on social media.

However, just having a presence on social media is not enough, in fact could be detrimental if not accompanied with a social media strategy. Often, firms only plan for the “Likes” and “Follows” when entering social media but get a nasty surprise when a negative feedback spreads all over. When a firm responds to a negative comment, it helps improve the customers’ relationship with the firm. However, since the response is publicly visible, expectations of other customers go up. Responding to complaints can sometimes result in even more complaints. If the team is not equipped to handle the volume of feedback and in the ways to appease customers, the overall satisfaction might go down (Ma et al. 2015).

Moreover, as it is the same brand that is behind multiple touch points, the customer expects a seamless experience across multiple media platforms. Paradoxically, this multiplicity of channels creates a new set of challenges for businesses while improving convenience for customers. Thus, integrating all touch points to enable a seamless customer experience becomes a priority.

With the advent of customer relationship management (CRM) and analytics, the firm's goal was to build a stronger relationship with desired customer. Now the customer expect their preferences to be remembered, and doesn't want to give out the same information repeatedly. Customer expects to be treated as an individual. Having a CRM is a hygiene factor now. However, unless all departments share data with each other, CRM will not be effective. To achieve customer centricity, much more is needed than just having a CRM solution.

There is one more source of peer pressure to adopt customer centricity, and that is not even from the same industry. When a customer experiences a more personalized and customer-centric service from a bank or a hotel, she expects the same from a hospital and a retail chain. Such enhanced expectations create a lot of pressure for everyone to adopt customer centricity.

Future of Customer Centricity

Companies across domains, including products and services industry or business-to-business (B2B) and business-to-consumer (B2C), exemplify customer centricity (Fig. 8.4). They share a common passion for keeping customer as their central focus. Following are some examples.

Caterpillar: Caterpillar is globally reputed for its outstanding products. But the company is not satisfied with just delivering quality products when the customer asks for it. Using advanced data analytics, Caterpillar can anticipate when a target customer would be looking for industrial equipment, and customize messages and events for those customers. Caterpillar combines

	B2B	B2C
Products	Caterpillar	Apple
Services	IBM	Ritz-Carlton

Fig. 8.4 Some examples of companies embracing customer centricity

various data sources, including social media, product usage, purchase history and so on, and analyzes the data to look for customers' buying patterns and purchase cycles. It tries to understand if potential customers currently use Caterpillar's product or competitors' and makes its pitch based on product usage. Caterpillar also places strong emphasis on focussing on marketing efforts whose returns can be measured (Altier 2012).

IBM: Using a new "design thinking" approach to application development, IBM has engaged directly with users with the ultimate aim of making the user's life better. Design thinking is a product development technique that puts user's needs as the starting point. Apart from hiring thousands of designers, IBM trains its managers on design thinking so that they put customer needs first (Lohr 2015).

Apple: Apple has always aimed to delight its customers with its innovations, both in the products and in customer service. It is well known that Apple products are designed with usability and user-centric design as prime priorities (Gibbons 2013). Apple has extended its customer-centric focus to its service also. "Genius Bar" is an example of one such innovation. For any hardware or software issues, customers can make a reservation and talk to one of the experts ("Genius") in the stores (Apple Inc. n.d.). These experts can handle most customer issues immediately and explain the service details, resulting in a satisfied customer.

Ritz-Carlton: The hotel chain is held as an example of excellent customer service and keeping customer at the center of all processes. The company goes to great lengths to ensure that customer needs are taken care of. To ensure that any customer issues are handled to the immediate satisfaction of the customer, the company has given each staff member \$2000 of discretion per guest to be used to solve any customer complaint (Solomon 2013).

Implementing Customer Centricity

As organizations undertake fundamental changes in the way they interact with customers and conduct transactions, their efforts are driven by the rapidly evolving customer expectations. The adoption of customer-centric marketing presents an ideal opportunity for organizations to integrate activities around the customer. The emphasis is on full integration of all customer-facing functions by better aligning the activities of a firm around customer value-adding processes. Customer-centric organizations integrate not only the sales, marketing and customer service functions but also the non-marketing functions through the use of information technology. For example, current front-end

sales force automation systems allow sales to be tightly integrated with the back-end production. Marketing metrics and performance incentives are oriented toward the share of a customer, customer processes, customer equity and CRM as compared to the traditional market share metric alone. The aim is to present a single face to the customer across all touch points and solve her problems.

Customer centricity has wide and deep implications for the organization. Functionally structured organizations experience challenges to be customer centric. Thus, the top management and marketing team’s objectives for higher customer centricity are moderated by the lack of support from other organizational functions. The entire organization has to appear as a single entity to a customer and everyone in the organization has to strongly believe that they cannot succeed without serving customers well. So the customer-centric organization might find it necessary to redesign processes and re-organize itself around customer.

An enterprise needs to systematically implement customer centricity, as presented in Fig. 8.5. A detailed assessment of how the firm delivers value to its customers is needed. A fresh look at the customers’ needs and the current processes will reveal gaps which need to be filled with changed and new processes. The new means of delivery will need to be tested and made sure that it is delivering value as intended.

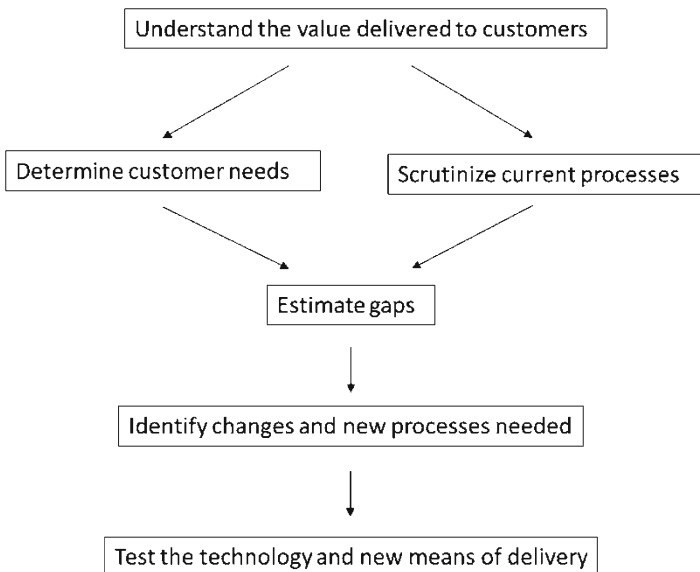


Fig. 8.5 Steps toward customer centricity

Customer Centricity Versus Balanced Centricity

An alternate perspective is that true customer centricity can never be achieved. Instead, interests of all stakeholders need to be secured. “By separating suppliers and customers we deprive them of context and interdependency; co-creation of service is a necessity. We therefore have to move away from one-party centricity—either supplier-centric or customer-centric—to two-party centricity which simultaneously zooms in on both suppliers and customers” (Gummesson 2008, p. 16). Gummesson introduced the concept of balanced centricity—all stakeholders have the right to satisfaction of needs and wants. Indeed, if being truly customer centric disrupts the entire organization, it may not be possible to be 100 % customer centric. There will be a need to balance the interests of all stakeholders. However, more likely than not, the current balance may be highly tilted toward the firm or the product, and there will be a strong need to move toward customer centricity. So even if the goal is not 100 % customer centricity, there is a need to improve upon it.

Challenges with Implementing Customer Centricity

The decision to move toward customer centricity has to be powered by the firm’s leadership, and not by the customer-facing functions like marketing. It is important because the decisions taken by one department may have consequences on the customer experiences in unanticipated ways. For example, consider the example of a problem faced by customers in a hotel that was traced to a seemingly unrelated decision made by another department (Ford et al. 2001). The customers were complaining that breakfasts arrive late and cold to the room. Detailed investigation found that the cause was unavailability of elevators needed by the room service people when delivering breakfasts. The problem was ultimately traced to a management decision about how many bedsheets each floor was allowed to stock for the housekeepers. As the decision left a few floors with less sheets than required, the housekeepers started using elevators to hunt for extra sheets to finish cleaning the rooms on their floors. Here we see how one manager’s decision to save costs by stocking fewer sheets had unintended consequence of customer’s bad experience with breakfasts.

To avoid such problems, it is important to look at the entire customer experience and act as one single organization.

Conclusion

The concept of customer centricity has been around for many decades. However, it has gained prominence in recent times. Macro environmental factors, including technological evolutions and liberalization, have lowered the entry barriers and increased competition in most markets. Customers now expect and demand that firms should cater to their convenience and not the firm's. Technology has made customer centricity not only necessary but even accessible to most firms. We saw with the example of a start-up (Practo) how even small independent clinics are able to achieve unprecedented levels of customer centricity. This raises expectations even more for larger firms.

There are multiple ways to achieve customer centricity. We saw how with the focus shifting from production to the customer, industries such as banking have shifted the focus from their own efficiency to the customer's convenience. Product/service customization, increasing customer engagement, use of social media and so on can all aid toward embracing customer centricity.

Achieving customer centricity is not easy though. It needs focussed effort, and there are many challenges on the way. In many cases, going completely customer centric may not be possible or even required, but increasing customer centricity while balancing other stakeholder's needs could be a better path.

Bibliography

- Altier, T. (2012, June). Retrieved from <http://www.marketingprofs.com/opinions/2012/23601/understand-your-customers-better-four-tips-from-caterpillar>
- Apple Inc. (n.d.). Retrieved from Apple Website: <http://www.apple.com/retail/geniusbar/>
- Drucker, P. F. (1954). *The practice of management: A study of the most important function in America society*. New York: Harper & Brothers Publishers.
- Ford, R. C., Heaton, C. P., & Brown, S. W. (2001). Delivering excellent services: LESSONS FROM THE BEST FIRMS. *California Management Review*, 44(1), 39–56.
- Gribbons, W. (2013, January 29). Retrieved from UX Magazine: <https://uxmag.com/articles/the-four-waves-of-user-centered-design>
- Gummesson, E. (2008). Extending the service-dominant logic: From customer centricity to balanced centricity. *Academy of Marketing Science Journal*, 36(1), 15–17. doi:<http://dx.doi.org/10.1007/s11747-007-0065-x>
- Jeppesen, L. B., & Lakhani, K. R. (2010). Marginality and problem-solving effectiveness in broadcast search. *Organization Science*, 21(5), 1016–1033.

- Lohr, S. (2015, November 15). *IBM's design-centered strategy to set free the squares*. Retrieved from New York Times: http://www.nytimes.com/2015/11/15/business/ibms-design-centered-strategy-to-set-free-the-squares.html?_r=0
- Ma, L., Sun, B., & Kekre, S. (2015, May). The squeaky wheel gets the grease—An empirical analysis of customer voice and firm intervention on Twitter. *Marketing Science*, 34(5), 627–645. Retrieved from <http://dx.doi.org/10.1287/mksc.2015.0912>
- Sheth, J. N., Sisodia, R. S., & Sharma, A. (2000). The antecedents and consequences of customer-centric marketing. *Journal of the Academy of Marketing Science*, 28(1), 55–66. doi:10.1177/0092070300281006.
- Solomon, M. (2013, September 18). Retrieved from Forbes: <http://www.forbes.com/sites/micahsolomon/2013/09/18/empowered-employees-vs-brand-standards-the-customer-experience-needs-both/#32edc7d5768f>
- Thomke, S., & Hippel, E. v. (2002, April). Customers as innovators: A new way to create value. *Harvard Business Review*, 80(4), 74–81.
- Von Hippel, E. A. (2005). *Democratizing innovation*. Cambridge, MA: The MIT Press.
- Von Hippel, Eric A. and de Jong, Jeroen P.J. and Flowers, Steven, (2010) Comparing business and household sector innovation in consumer products: Findings from a representative study in the UK September. Available at <http://dx.doi.org/10.2139/ssrn.1683503>

9

Rethinking Client Centricity to Reinvent Business Models

Shailesh Chopra and Premkumar Rajendran

Ideas in Brief Client centricity is frequently spoken and written about, but not often experienced. As a customer, do you feel organizations can serve you better? Do you find it increasingly necessary to complain in order to get better service? If you believe that the behaviors of organizations toward clients need to change fundamentally, then you are not alone. This chapter sheds light on what client centricity really is. Organizations frequently get it wrong, and assume what they believe is true. The authors highlight the urgency to discuss client centricity, the necessity for organizations to be client centric, and the challenges in unleashing its potential. Rethinking client centricity is essential to reinvent business models. Client centricity is delusive. In a state of delusion, even the best of strategies combined with genuine efforts may yield negative results. An effective approach is to provoke readers to think, unlearn, and re-learn. The authors facilitate readers to become aware of the delusion and help by providing examples to re-learn by building on fundamentals. While organizations believe they are client centric, only very few customers feel so. This chapter provokes the thinking of an organizational change agent, and is

S. Chopra (✉)

Deutsche Bank, Singapore, Singapore

e-mail: shailesh.chopra@db.com

P. Rajendran (✉)

Deutsche Bank, Singapore, Singapore

e-mail: rajendran.premkumar@db.com

recommended reading for anyone involved in organizational transformation. When the transformation toward client centricity gains momentum across industries, it would lead to societal changes. Focusing on client centricity will trigger an organization to continuously reinvent itself. The authors attempt to present client centricity in a simple way with personal and industry examples.

Keywords Business model • Client centricity • Client experience • Delusion • Unlearning

Introduction

The words *client centricity* are frequently encountered, but not often experienced. Client centricity is highly talked about by organizations and a buzzword in many industrial and service sectors, but hardly experienced by clients. Since organizations operate in an increasingly cost-conscious and risk-averse world, it appears that client centricity is seen only in words and is lost when organizations translate their vision into action. Clients are claimed to be the reason why organizations exist. However, we often see, read, and experience callous attitudes of manufacturers, sellers, and service providers:

- Manufacturers recall cars only after lives are lost or endangered.
- Television, telecom, and internet service providers do not seem to understand what customers really want.
- Transportation companies from taxis to airlines maximize revenues and profits with scant regard for passenger convenience.
- The life span of products we use every day have shortened more than we could ignore.

Organizations are more interested in short-term profit margins than in client centricity that would lead to long-term sustainable growth. These day-to-day experiences influence us strongly as clients, to read the small print before we sign on the dotted line to buy any product or service. While organizations may tout *Customer is King*, we, as clients, should better know the principle of *caveat emptor*: The buyer alone is responsible for checking the quality and suitability of goods before making a purchase.

In today's cost-conscious and risk-averse world, does the client really come first, or is the client only incidental? Are clients not always expected to know more than what they are told before signing up for any product or service? The hindrances to achieve client centricity are seen both within and outside organizations. Organizations do not find it easy to institutionalize client centricity when sales teams endeavor to maximize their commissions or bonuses,

and infrastructure teams labor to minimize their costs. Close competition, necessity to comply with regulations and standards, product focus, and organizational culture and structure take away the organization's focus from client centricity.

Customers around the world are increasingly uncomfortable with banks and the banking sector (Auerbach et al. 2012). The customers do not fully comprehend the contractual terms and conditions, are shocked by hidden costs, and frustrated with slow and inadequate responses to their complaints. Demonstrations around the world accuse the industry of greed and corruption. Movements such as Occupy Wall Street convey their message loudly and clearly (Micah 2015). These signal the need for business models that consistently put the customer at the heart of all activities.

In the transportation sector, Hong Kong's metro train operator MTR is regarded as a world leader in efficiency, safety, reliability, and convenience (MTR 2014). In its approach to corporate responsibility, MTR commits to ensure services of value to customers by improving and upgrading their services and products continuously to meet customer needs (MTR). While MTR boasts in its annual reports that 99.9 percent of passenger journeys are on time, scores of train delays in 2013 made the then CEO Jay Walder to admit MTR's sourcing of materials and quality assurance were its weakest points (Lee 2014). MTR's webpage (MTR) showcases glitzy trains, but peak hour travel in Hong Kong could get very crowded. Hong Kong's Legislative Council Secretariat in its Research Brief is concerned with the crowdedness in train compartments during peak hours (Legislative Council Secretariat 2014, January). While in New York and Berlin, four standees per square meter is defined as crowded, in Singapore and Beijing, five standees are considered to be crowded, and the report highlights that Hong Kong does not even have any specific indicator for measuring crowdedness of train compartments.

The prevalence of such delusion and disconnect between what organizations believe they offer clients, and what they practice, makes it obvious that client centricity needs fundamental rethinking.

Why Is Client Centricity a Mirage?

Allen et al. (2005) report in a Bain & Company study that while 80 percent of organizations believed they delivered a superior experience to their customers, only 8 percent of customers felt so. Around the world, customers are increasingly feeling discomfort. From buying soap at a supermarket to buying a luxury car to banking, customers do not experience client centricity. The global financial crisis has changed the economic landscape, organizations which were too focused on

shareholders got exposed and became bankrupt, stricter regulations and imposing of hefty fines caught organizations by surprise, and technology disruption has further fueled fierce competition. All such changes leave organizations with no choice but to adapt to a fast-paced transformation journey. Organizations have become inward looking with passive client centricity. To make things worse, customer behaviors are also changing rapidly. Online forums and customer portals serve as a loud mouthpiece for customers, and help to spread news quickly and widely. For example, when the Malaysian airliner MH370 went missing, it attracted four million tweets in the first two weeks after it went missing (Doty 2014). When iPhone 6 Plus was launched, it appeared to bend when placed in the pockets of tight pants; while Apple was reluctant to acknowledge the flaw, Unbox Therapy posted a video titled *iPhone 6 Plus Bend Test* in September 2014 that went viral with more than 67 million views (Squarespace 2014).

The American Customer Satisfaction Index dropped in the final quarter of 2014 in all brick-and-mortar retail categories: supermarkets, department and discount stores, specialty retail stores, health and personal care stores, and gasoline stations (American Customer Satisfaction Index 2015). Walmart had the lowest level of customer satisfaction since 2007 while Home Depot tumbled to near the category's bottom.

The Customer Satisfaction Index of Singapore (Institute of Service Excellence at Singapore Management University 2015) shows a declining trend in sectors such as tourism and food and beverage (see Table 9.1).

The declining customer satisfaction is seen elsewhere in the world as well, and poses a big challenge and an urgent need for organizations to address.

Taking a step back, it is important to understand the forces behind organizational transformation. Change has been the only constant, and organizations need to handle this carefully. The macro-environmental forces that affect organizations are studied using the PESTEL framework (Johnson et al. 2008), where the acronym PESTEL stands for Political, Economic, Social, Technological, Environmental, and Legal. Political forces are the influences by governments on organizations. Economic forces refer to macro-economic factors such as exchange rates, growth rates, business cycles, and fuel prices. Social factors are cultural changes and demographics. Technological influ-

Table 9.1 Singapore's customer satisfaction index for tourism and food and beverage

Sectors	2007 score	2008 score	2009 score	2010 score	2011 score	2012 score	2013 score	2014 score
Tourism	71.0	68.6	67.1	69.3	73.5	70.0	74.5	69.1
Food and beverage	67.7	65.4	65.0	65.1	67.5	67.7	70.3	65.8

ences refer to innovations, inventions, discoveries, and advances in areas such as science and technology. Environmental forces are related to “green” issues, such as pollution and global warming. Legal influences are legislative constraints and changes. These macro-environmental forces compel organizations to transform. Client-centric organizations continue to be attractive for clients to do business with and are successful in their transformation journey, but history is filled with examples of organizations that have not survived, or have barely survived but denting the client experience they offer.

A few most noticeable organizational failures are listed below (Chopra and Banerjee 2013):

- Lehman Brothers, an organization with 158 years of history and assets over US\$ 600 billion, collapsed in 2008.
- General Motors, known for its Mark of Excellence, filed for bankruptcy in 2009. In spite of being the world’s leading automotive company, it struggled to survive.
- Washington Mutual, a company with assets over US\$ 300 billion, was promptly delisted from the New York Stock Exchange when it filed for bankruptcy.
- Nokia, the leading company in selling mobile handset, is barely in business.
- Kodak suffered a blow due to its incapability to handle technology disruption.

These examples raise the question: Can organizations ever attain client centricity to avoid such disasters? Merriam Webster’s dictionary defines mirage as something, such as a pool of water in the middle of a desert, that is seen and appears to be real but that is not actually there. It is something that you hope for or want but that is not possible or real. A mirage in its extended sense applies to a dream, hope, or aim. When organizations convert their strategy into action, client centricity becomes a mirage on account of three things:

1. Belief bias,
2. Inattentive blindness, and
3. Forgetting the client.

Belief bias is the tendency to judge the strength of arguments based on how feasible the conclusion is rather than how strongly the arguments support that conclusion.

Organizations aspire to be client centric (in their mission and vision), claim to be client centric (in their annual reports, websites, advertisements, and

promotions), and end up believing they are client centric. Any evidence to the contrary is simply brushed aside, and organizations continue in their belief bias. Truth and belief overlap only to a limited extent, and belief encompasses the untruth. The Venn diagram in Fig. 9.1 shows this visually.

ICICI Bank advertises “A unique 3-in-1 Online Trading Account” and invites potential clients to “Open an account for free” (ICICI Bank). While the website is friendly and makes everything appear easy, a prospective client would realize only later that the printed application form is 35 pages long and requires a signature in about 15 places. A few of the terms and conditions governing the trading account are in a font size as small as 8. Do we not know intuitively that a smaller font size indicates terms not in our favor? After reading and nearly completing the form, we are none the wiser about:

- When will the account be opened?
- Whether, when and how many times the bank would call to verify details?
- When, how, how much, and at what frequency will fees be charged (the advertisement said only the account opening is free)?
- How can transactions be initiated after the account is opened?
- What details would be available in the trading statements, and how should we decode them?
- What is the escalation process?

The bank’s response to client enquiries includes the text “Please be assured of best in class service. Our organization is highly committed to serve customers and we put customers first in every aspect of our business.” ICICI Bank does go the extra mile and offers to send an employee of their *Know Your Client* team to visit prospective clients and help with the documentation.

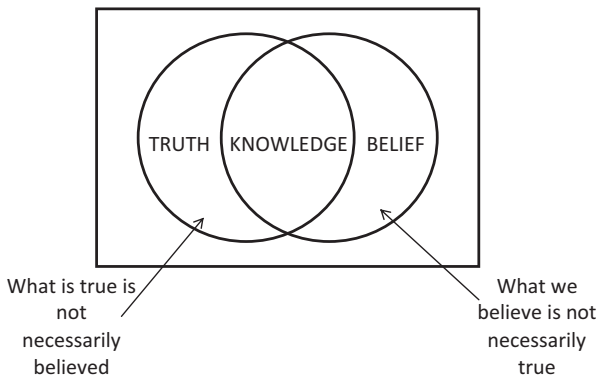


Fig. 9.1 Truth distinguished from belief

However, the organization's obsession with documentation leaves the feeling that the exercise is more to protect itself than to serve clients.

Considering the stringent regulations that govern documentation requirements in the banking industry, it will not be surprising to see other banks in the same regulatory jurisdiction exhibit a similar behavior. Banks, and for that matter, organizations in other industries, need to rethink their approach to client centricity, while they comply with regulatory requirements, manage other PESTEL factors, and compete in the marketplace.

It takes deliberate human action to avoid the pitfalls of belief bias. Warren Buffet, for example, has demonstrated his ability to make decisions without being influenced by subconscious biases. In the 2013 Berkshire Hathaway annual shareholder meeting, Warren Buffet invited Doug Kass, the famous short seller, to play the role of the *credentialed bear* in an effort to dissuade the 55,000 strong crowd from owning the Berkshire Hathaway stock (Buffett 2014). Warren Buffet explains human behavior during run off bull markets or extended periods of stock market stagnation by quoting Charles Darwin: "Charles Darwin used to say that whenever he ran into something that contradicted a conclusion he cherished, he was obliged to write the new finding down within 30 minutes. Otherwise his mind would work to reject the discordant information, much as the body rejects transplants. Man's natural inclination is to cling to his beliefs, particularly if they are reinforced by recent experience" (Dooley 2013). Organizations, too, believe they are client centric until they are woken up from this delusion by, say, a loss in business, class action suits, or a regulatory penalty. The truth always exists, but organizations are blinded by their beliefs. They continue to justify their efforts in providing a positive client experience, while being blind to the continued absence or shortage of client centricity.

Inattentional blindness is a term used in psychology, and is also known as perceptual blindness. It is not associated with any defects or deficits in vision, but is a psychological lack of attention. Inattentional blindness occurs when a person does not recognize something that occurs in plain sight, while being focused on another. It occurs in spite of the change being prominent (U.S. Department of Transportation 2013) and is a highly predictable and robust phenomenon (Mack and Rock 1998).

In the Invisible Gorilla Experiment, Simons and Chabris invite unsuspecting viewers to count the number of times a ball is passed between players wearing a white shirt (Simons and Chabris 2010). While the ball is being passed, a person in a black gorilla suit walks past. The experiment showed that, of the people who did not have any prior knowledge about the experiment, about half the number missed seeing the gorilla. Those who had knowl-

edge of the experiment managed to see the gorilla, but missed out on other conspicuous things that happened on stage (Simons 2010).

The CFI Group surveys customer satisfaction in their use of contact centers and publishes the Contact Centre Satisfaction Index each year (CFI Group). The 2014 survey shows that people still prefer *the human touch*. Keeping aside the seven-year low score of 69 for 2013, the score of 72 in 2014 is still the lowest since 2008.

Client centricity is often a mirage because organizations believe they are client centric, but clients do not experience it. In this state of delusion, even the best of strategies combined with genuine efforts may yield negative results. Axis Bank has customer centricity at the top of its five core values (Axis Bank 2015) and states its vision of excelling in customer delivery. Translation of such a vision into consistent client experience goes awry at times due to inattentive blindness.

Organizations attempt to structure their services based on client segmentation. One way of segmenting clients is by the profitability they yield to the organizations. Clients who yield better profitability have access to better and more exclusive services. Based on the fluctuation of the profitability and any revision in segment thresholds, clients may be re-segmented periodically. Less profit-yielding clients may find themselves not being able to avail certain services or paying more for them. When organizations do not pay attention to appropriate communication to clients, or equip their client support teams adequately to respond to client enquiries, they might see clients walking away. When organizations are too focused on profits, they miss seeing the gorilla. In the banking industry, re-segmenting *premier* clients as *regular* clients could result in increased interest rates on loans, annual fee for credit cards, and fees for services. Without appropriate client communication and training of support staff, there could be a flood of calls from clients and the call center muddled in its responses.

Clients may face negative experience multiple times when different departments of a bank are not in sync. For instance, when clients are not notified of a downgrade in their status, they would be shocked to realize the annual fee for their credit cards is no longer waived by their bank. They might reach out to the call center request for waiver of the fee, and the call center may not respond appropriately, triggering multiple loops of discussion and escalation, increasingly frustrating the client. Clients may eventually request for termination of the credit cards. They would be further shocked when they receive calls from another department in the bank reminding them of overdue credit card annual fee and corresponding interest. These negative client experiences point to a multiplicity of systems within a bank and lack of coordination among their teams. Clients may further reduce the business they have with the bank, or even exit their relationship. While the bank might have segmented clients believing it could offer better services to exclusive clients, it could lose more

than what it bargained for. When clients exit banking relationships due to such negative experiences, it is hard to explain what the bank was focused on, and why could no one in the bank see the gorilla walking in.

Organizations have business objectives to meet, and commercial organizations need to be profitable in order to survive. When an organization prioritizes its business objectives over that of its clients, it is not client centric. Organizations tend to look inward and do not always consider clients, their expectations, and best interests when they respond to competition and PESTEL forces. The response is based on their strengths and weaknesses, which are in turn based on the resources they have at their disposal, the skills they possess, and the competences they can use. These drive the selection of the strategic choices for the organization which are then put into action. The clients tend to be forgotten.

Strategic Choices for Organizational Transformation

Organizations undergoing transformation typically consider the below strategic choices. Each of these choices has the potential to lead an organization into a state of delusion, making it to believe that client centricity is being achieved or not being compromised:

- Cost Reduction (process improvement, outsourcing/offshoring, staff-layoff);
- Product Focus; and
- Change in Organizational Structure and Culture.

Cost reduction has become the mantra for top management in a stagnating economy. There is nothing wrong about it given the fact that price is driven by cost and profit. Thanks to competition and innovation, prices decline squeezing the profit margin, with seemingly the only way to protect profit is to focus on cost. Although clients benefit by lower prices, this does not constitute client centricity in its true sense. Organizations prioritize cost reduction initiatives based on projected returns on investment, and implement them in the quickest possible time frame in order to gain the maximum cost benefit. When clients are not considered in the cost reduction initiatives, these initiatives adversely affect client experience due to poorer quality of products and services. Cost reduction is achieved by process improvement, offshoring, outsourcing, and staff-layoff.

Process efficiency becomes the key driver in process improvement initiatives. At the turn of the twentieth century, Frederick Taylor revolutionized the

workplace with his ideas on work organization, task decomposition, and job measurement. Since the 1990s, information technology and business process redesign are transforming organizations to the degree that Taylorism once did (Davenport and Short 1990). When process improvements are seen only as a means to reduce costs to the organization, clients become secondary and client centricity is lost. With increasing pressures to reduce costs quickly, organizations do not have the patience to wait for long periods of time for process improvement initiatives to deliver tangible cost reduction, and they jump into the offshoring or outsourcing bandwagon. Offshoring and outsourcing enable organizations to benefit from labor cost arbitrage across geographical or organizational boundaries. Against the benefits of in-housing, outsourcing offers the potential for reduced labor costs, efficiency through specialization, and reduced agency costs, and each of these benefits is potentially enhanced by offshoring rather than domestic outsourcing (Cronin et al. 2004). Except for regulatory requirements such as client data protection (in countries and industries where these are applicable), the processes of offshoring and outsourcing tend to have even less of a consideration for clients, whereas the impact on clients could be higher and more direct in comparison to process improvement initiatives. Processes that may be seamless within an organization may get split between two organizations or two locations on account of outsourcing or offshoring, adversely affecting client experience. Staff redundancy and layoffs may be triggered by process improvements, offshoring, and outsourcing. Variations to job cuts exist. Reduced number of work hours with proportionately reduced pay, and requiring staff to avail involuntary unpaid leave, also result in the same effect—reduced costs. In a stagnating global economy, hundreds of thousands of jobs are cut every year, thus making staff-layoff a very prominent cost reduction strategy.

Where do the clients get lost amid these cost reduction initiatives? Figure 9.2 shows a graph of increasing delusion of achieving client centricity with the progression of cost reduction initiatives. Process improvements, offshoring or outsourcing, and layoffs have an increasing potential for cost reduction in a given time frame. Correspondingly, they have a higher impact on clients and client centricity.

Organizations enter a state of delusion when they believe their cost reduction efforts will have a positive impact on client experiences, whereas in reality, they have a negative impact. If clients considered cost to be the most important factor in their buying decisions, then probably the company selling the cheapest cars would top the sales chart. For the clients, while cost does matter, it is only in the context of the overall package or experience. Organizations that excessively focus on cost lose out on client centricity.

Organizations choose cost reduction more often than revenue generation. A convenient method to demonstrate this is to do a search of the terms *cost*

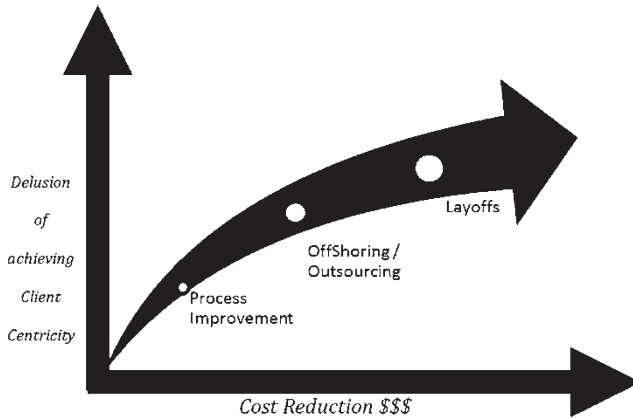


Fig. 9.2 Delusion of achieving client centricity by cost reduction

reduction and *revenue generation* using an internet search engine. We have seen 30–40 million hits for *cost reduction* and about half the number for *revenue generation*!

A product-centric organization believes that a superior product is the way to achieve client satisfaction. But an obsession with products makes client focus passive. One may argue that products are always developed by taking client feedback into consideration. Organizations use focused groups, client workshops, surveys, and panels to capture client feedback. This feedback from clients is used by organizations to develop new products or to enhance existing products. Why then are product-centric organizations not client centric? Where is the breakdown in achieving client centricity? The breakdown happens in the way a product-centric organization decodes or interprets the client feedback and uses this information to convert the organization's strategy into action. In an attempt to differentiate its products and avoid them being viewed as commodities, a product-centric organization builds myriad *new* features. Its marketing is focused on its products' features. These organizations consider *customization* to be *customer focus*. A product-centric organization is organized by products. Metrics such as profitability and market share are tracked for each product, and recognition and rewards are for product development and innovation. The product teams dominate in a product-centric organization, and their capabilities lead to the final shape, size, and functionality of their products. They endeavor to create the best product, and this fosters a product culture. A product-centric organization may hear the voice of the customer, but may not act on it the same way as a client-centric organization.

Levi Strauss & Co. is a product-centric organization. With US\$ 4.75 billion net revenue and US\$ 106 million profit in 2014, Levi Strauss is one of

the largest apparel companies and a global leader in jeans wear. Its products are sold in approximately 50,000 retail locations in more than 110 countries (Levi Strauss & Co.). However, Levi Strauss has seen better times. The 2009 annual report (Levi Strauss & Co.) states “Our net sales have declined from a peak of US\$ 7.1 billion in 1996 to US\$ 4.1 billion in 2003, with no growth through 2009.” Net sales have continued to stagnate below US\$ 5 billion as of 2014, and net profit has declined significantly since its recent high of US\$ 460 million in 2007. With increasing competitive and macro-environment pressures on the organization, Levi Strauss churned out a wide selection of jeans for its clients. Its jeans series that started with the 501 series now goes on till 59X. A sample list of its jeans by style and fit:

- 501[®] Original
- 501[®] Shrink-to-Fit
- 505[®] Straight
- 510[™] Super Skinny
- 511[™] Skinny
- 514[™] Slim Straight
- 517[®] Slim Boot Cut
- 520[™] Taper
- 527[™] Boot Cut
- 550[™] Relaxed Fit
- 559[™] Relaxed Straight
- 560[™] Comfort Fit
- 569[®] Loose Straight
- 59X Low Series

Each of the styles and fits has myriad color options. There are special additional variations introduced from time to time. The consumer has no dearth of choices when buying from a product-centric organization. The multiplicity of choices exists in soaps, tissue paper, toothpaste, toothpick, and many other products irrespective of the price range. Decision making is increasingly difficult when presented with too many product variants, and such availability of an overwhelming number of choices should not be confused with client centricity.

When faced with a necessity to transform, organizations attempt to change their structure and culture. This is easier said than done, and often negatively impacts client centricity. As part of transformation initiatives, organizations change from a centralized model to a decentralized model and vice versa. This gives a perception of constant change and does not add to client centricity.

In either model, organizations are set up in a hierarchy of departments and divisions (see Fig. 9.3), each of which identifies other departments and divisions as internal customers. While the dependency of one on the other cannot be ignored, this recognition of internal customers creates a silo mentality and obfuscates the one real end-customer to the organization.

Silo mentality is deep-rooted in larger organizations. Silos are created within organizations to develop expertise in specific areas and encourage accountability and responsibility. However, when silos begin to operate with different objectives and priorities, the end-customer suffers. Organizational transformation initiatives end up breaking down silos and creating new ones. When different silos present conflicting messages, the client sees the organization as disjointed. A common example is of banks where departments that manage credit cards are different from those that manage other banking products. Clients experience differences in the way the silos deal with them.

Policies on hiring, rewards, and recognition do not always include client centricity as a factor. An organization may include client centricity in its mission or vision statement, or in its list of corporate values, but the job description for staff may not consider this at all. Rewards and recognition aligned to delivery of individual silos result in collaboration across silos in the best of times, and inter-silo rivalry in the worst of times. The silo mentality leads to policies that are not end-client centric. A Forrester study shows silos result in customer dissatisfaction 60 percent of times (Leggett 2014). A survey on internal collaboration by American Management Association reveals that 83 percent of executives agree that silos exist, and 97 percent believe that it has a negative effect (American Management Association 2002).

When dealing with larger organizations, it is common to see clients repeatedly communicate the same issue to different departments. A client inquiring about an incorrect invoice may first need to explain to the call center executive, then to the billing department, and probably again to the collections department. If the client is frustrated and decides to end the business relationship, he or she may be directed to another department to initiate account closure. Similarly, a client with a billing enquiry may need to call a different number if there is a need to request for new services. Smaller organizations tend to rank higher in customer satisfaction. For instance, Ace Hardware, smaller than its competitor Lowes, sells similar products priced slightly higher, and still ranks higher in client satisfaction in the JD Power Home Improvement Retailer Satisfaction Study (J.D. Power 2015). Ace Hardware has ranked the highest in client satisfaction with home improvement retailers for the ninth consecutive year. Larger organizations tend to expand without integrating the new pieces into existing ones, thus creating more silos. An organization hav-

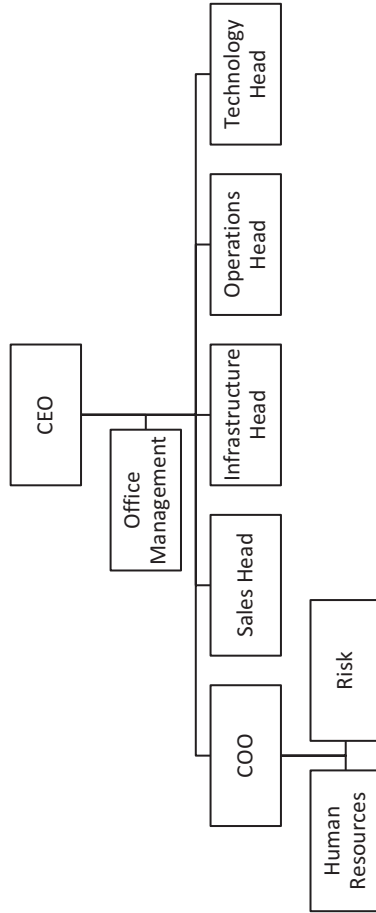


Fig. 9.3 Silo mentality promoted by organizational structure and hierarchy

ing a brick-and-mortar retail network may set up a web portal for online ordering, without integrating the two channels. Customer experience would differ across the channels, potentially leading to dissatisfaction.

Why Is Client Centricity Important?

Without clients, organizations will not exist. Clients are essential to the survival and success of any organization, and enable organizations to achieve their business objectives. Organizations depend on clients, and to many organizations' regret, not the other way round. Retaining clients and increasing market share depend on an organization's ability to deliver a positive client experience consistently, and its ability to adapt its products and services to changing client needs and values, consistent with its mission statement, brand image, values, and beliefs. In other words, client centricity drives an organization's survival and growth.

Competition for profits extends beyond established industry rivals (Porter 1979, 2008). The competitive industry forces also include customers, suppliers, potential entrants, and substitute products. The intensity of the forces differs from industry to industry. Amid these competitive forces, repeat customers help to provide certainty for the business and yield a higher profit margin on account of the lower costs of selling to existing clients. These competitive and macro-environmental PESTEL forces compel organizations to transform. Client-centric organizations continue to be attractive for clients to do business with and are successful in their transformation journey.

Encyclopedia Britannica enjoyed more than two centuries of prosperity. It had 100 full-time editors and more than 4000 contributors, including 110 Nobel Prize winners and 5 American presidents (Wikipedia – Encyclopaedia Britannica). The 11th edition in 1910/11 with 28 volumes (plus an index volume) was a high point of scholarship and writing with more articles than before, but shorter and simpler, and for the first time, it sold a million copies. Its 15th edition in 2010, spanning 32 volumes and 32,640 pages, was the last printed edition, with digital content and distribution continuing after that.

Encyclopedia Britannica had lost sight of clients who embraced electronic information sources such as Microsoft's Encarta and the online Wikipedia. Printed reference books were overwhelmed by the internet and its global spread of resources. Wikipedia rapidly moved toward replacing the authority of experts with the wisdom of the crowds. Wikipedia has a number of topics which would not have been considered worthy of an entry in Encyclopedia Britannica. A more client-centric characteristic would have prevented

Encyclopedia Britannica from going so close to going out of business. While writing this chapter, we as authors have referred to Wikipedia to obtain details about Encyclopedia Britannica!

In today's world of uncertainty and instability, client centrality is not only important but also urgent. As organizations transform, they need to retain clients and safeguard their business. The client centrality of organizations plays a key role in their continued existence.

What Really Is Client Centrality?

Client service, experience, loyalty, delight, and customer-friendly are many common words which intend to point in the direction of the client but do not necessarily mean client centrality.

Clients know client centrality when they experience it, and they know it when they don't!

Client centrality is not about an organization providing a convenient way by which a client having a problem can approach the organization, and the organization solving the problem in a friendly manner. If the problem is on account of the organizations, usually the clients are pacified with freebies. A complimentary upgrade of a hotel room when there is a leaking tap, free pizza if delivery is delayed, discount on a food bill when a client is not happy with a restaurant, and so on, are not examples of client centrality.

One of our interview partners explains this with his experience at a car service center where he had arrived at the appointed time to drop off his car for service. "I had to join a long queue of cars waiting to hand over my car for service. While waiting, a friendly customer care executive approached me and invited me to make use of the customer lounge which was well stocked with food and beverage. This made me feel important as a customer. The executive also explained that since it would take four hours to service the car, the service center offers a complimentary service of returning the car to his address, to which I agreed. This was a great overall experience. However, is this client centrality? Sadly, it is not."

It requires a paradigm shift to understand client centrality and for organizations to rebuild themselves. In the above example, the fundamental requirement is to service the car. The problems faced by the clients are the compulsion to visit the service center, high waiting time, and the inevitable cost of the service. The cost to the client tends to go higher because the lounge where the clients are invited to relax is also used by the service center to up-sell their products and services. Even when clients have a pre-booked appointment and

the time required for a regular car service is less than an hour, they end up with six to eight hours of the car's unavailability during the day of servicing. Thus the end-to-end process has nearly 90 percent of non-value adding time. Instead of solving this fundamental problem, the service center attempts to offer perceived conveniences such as the use of a lounge and return of the car at a desired location. The overstaffed customer care department, the plush lounge, and the *free* car drop off add to the cost. There is no such thing as a free lunch and ultimately the clients have to pay. The service center management thinks they have gone the extra mile in offering client conveniences, but the clients do not necessarily feel it, especially when they know these conveniences add up to the costs they bear. The organization is covering up the problem instead of addressing it. It is in a state of delusion.

The term *client centricity* is about a decade old, and has been used as a fashionable phrase by organizations in different industries. The Oxford dictionary defines *centric* as "in or at the center." By extrapolation, client centricity is the way of interacting, engaging, or doing business that has the client as the focus. Client-centric organizations believe the reason for their existence is to serve their clients and to keep their clients' experience positive. Client centricity, in its simplest form, means making the client's life easy and convenient. It is a mind-set. It starts with organizations establishing a culture of putting the clients first. They shift their focus from products and processes toward their employees so that the employees start thinking like their customers. The organization's technology and processes are then used to amplify the organization's purpose so that it creates and maximizes the value to the clients who seek to use its products and services. A client-centric organization is designed to deliver a positive experience to clients even before a client purchases a product or service, and during the process of purchasing and throughout the lifetime of using it. Organizations that aspire to be client centric build their strategies keeping their clients at the center and ensure that a positive experience is delivered in all situations. These organizations make it easy for clients to learn about them, buy from them, and to get support from them. Repetitive positive experiences keep clients loyal and the clients often become ambassadors of the organization and its products and services.

Client centricity is much more than a simple understanding of clients' needs, likes, and attitudes—these are primarily pieces of information that trigger an organization to change. It requires a fundamental change in the thinking, the mission, vision, and goals of the organization from the highest level down to the development and delivery of products and services at the lowest level.

Is Client Centricity Attainable?

Client centricity is attainable when organizations keep clients at the center of their decisions every step of the way, and are built to focus on value-adding steps instead of covering up fundamental problems. Transformation initiatives of organizations are usually fast paced and customer focus becomes passive. The following set of questions helps organizations to stay focused on client centricity during their transformation initiatives. Every “yes” answer indicates a potential negative impact to client centricity, and should trigger a rethinking by the organization:

- Cost Reduction
 - Is the cost reduction initiative due to market pressure?
 - Will it decrease responsiveness or value to the client?
 - Is this an attempt to reduce accounting cost (i.e., not an initiative to reduce cost of poor quality)?
 - Is the organization focused on automating manual steps only to save costs and reduce its risks?
- Product Focus
 - Is the product’s market share a key success measure in the organization (contrast this with measures of client retention or loyalty)?
 - Does the organization stretch its resources for customization and product proliferation, and yet the clients are not happy?
- Organizational Structure and Culture
 - Does the profitability of the department (or silo) take precedence over the profitability from a client segment?
 - Is the organization’s focus divided between internal clients and external clients?
 - Are processes continuously made more efficient, yet clients still complain (Chopra and Banerjee 2013)?
 - Is the organization more focused on transactional efficiency than on client experience?

Customer-centric companies can create a positive experience no matter how difficult the customers are. But unfortunately, the industry is filled with examples where companies are more product focused than customer focused, leading to their downfall. Nokia, BlackBerry, and Kodak are some of the big names.

Apple started off as a product-centric company. It has made innovative products ever since its inception. But only when Steve Jobs came back to lead Apple, it became the most valued company. The shift from product centricity to client centricity became the top priority. Apple started to provide innovative solutions to clients rather than just innovative products. The Apple Store has topped the Fortune listing of the most profitable US retailers (Wahba 2015). The annual sales per square foot of the Apple Store in 2014 was US\$ 4798.82, the highest of any US retailer. The Apple Store boasts more than 20,000 visitors a week on average and is consistently appreciated for its customer service. The Genius Bars in Apple's retail stores are well known to the lengths to which Apple goes to improve client experience. Apple was quick in accepting that products are bound to have problems, be it due to manufacturing or the way they are used. A product focus alone would not take the organization to be the most valued company. Apple started to give equal importance to post-sales support as part of the overall customer experience it was offering. The Genius Bar is the heart and soul of the retail stores where trained and certified professionals help customers with any type of problem or query on Apple products.

Dan McGinn shares his feeling of comfort knowing that a Genius Bar is nearby when he had problems with his newly purchased iPhone (McGinn 2011). He eventually did not use the Genius Bar, but he had the certainty of getting a Genius to fix the problem, if necessary. Apple's One to One support program (Apple) is another example. This program was created with one purpose: to build a customer for life. It is based on the knowledge that the more a customer understands and appreciates a product, the more likely he or she would make a deeper emotional connection with that product, and to return or to recommend the product/service to a friend. Under the One to One program, Apple technicians help set up a customer's computer and create a tailored curriculum to suit the customer's goals, learning style, and experience level. The customer has the flexibility to work on whatever project he or she wants, with a trainer available to answer questions. One to One allows customers up to 52 hours of personal training for US\$ 99. For many of Apple's clients, this is of amazing value, while for Apple, it is an investment into its current customers. When a client obtains a quick solution, it drives client loyalty and word-of-mouth publicity for Apple. However, Apple, like many other organizations, finds it challenging to consistently exhibit client centricity. The example of Apple's reaction to the bending of iPhone 6 Plus in customer pockets was mentioned earlier in this article.

Many surveys in the USA publish lists of the top client-centric organizations. The Talkdesk blog provides links to a few of these lists (Talkdesk 2015). Only a few organizations appear in more than one list, indicating that client centricity

is still a moving target for organizations. Amazon is one of the companies that appears in multiple top 10 lists. It has been successful in achieving its mission *to be Earth's most customer-centric company* (Amazon 2013). This achievement is the result of deliberate action by its CEO Jeffrey P. Bezos, known to leave an empty chair at conferences, informing attendees that they should consider that seat occupied by their customer, “the most important person in the room” (Anders 2012). Each year, he and thousands of Amazon managers attend two days of call center training, learning humility and empathy for the customer (Ciotti 2014). Amazon appoints *Customer Experience Bar Raisers* to maintain excellent standards, develops products based on customer desires rather than their development team's opinion, and routinely tests customer reactions to different features or site designs (Talkdesk 2015).

Conclusion

Organizations are in a state of delusion with regard to their client centricity. Organizations innovate and take great efforts to serve customers better. This makes organizations to believe they are client centric, but more and more customers feel otherwise, thus leading to the delusion. In reality, organizations of today face immense competitive pressures and changing macro-environment forces. Although client centricity is included in the mission or vision statements and in core values of organizations, it remains a mirage for many organizations due to belief bias, inattentional blindness, and forgetting the client while converting organizational strategy into action. Cost reduction, product focus, and change in organizational structure and culture are the actions that organizations take during transformation. Each of these could result in a negative impact to client centricity. In order to reduce costs quickly, organizations embark upon offshoring, outsourcing, and layoff, ignoring client centricity.

Client loyalty and retention are more important than ever before. Increased competition misleads organizations toward customization or product proliferation. *Me too* strategy leads to commoditization of products and eventually to price wars. Organizations have to transcend from products to customer solutions. Lastly, organization structure and culture promotes silo thinking with an active focus on internal customers and a passive focus on the end-customer. Organizational policies are more geared toward silo mentality: Employees are rewarded when they meet their silo targets and process focus is limited to divisional boundaries.

It is essential to end the organizational delusion of client centricity. This delusion threatens the survival of organizations irrespective of their sizes. Organizations could attain client centricity and reinvent business models by a fundamental rethinking of their strategic choices and motivations. A paradigm shift in thinking is required to focus on value over cost, customer solution over products, and end-customers over internal silos. Companies such as Amazon and Apple exhibit high levels of client centricity, inventing and reinventing their business models repeatedly. The sheer success achieved by these and other client-centric companies is testament to the power and attainability of client centricity.

Disclaimer The views expressed are those of the authors and not of their employer.

Bibliography

- Allen, J., Reichheld, F. F., Hamilton, B., & Markey, R. (2005, October 5). *Insights*. Retrieved February 18, 2015, from Bain & Company: <http://www.bain.com/publications/articles/closing-the-delivery-gap-newsletter.aspx>
- Amazon. (2013). *Company facts*. Retrieved September 15, 2015, from <http://phx.corporate-ir.net/phoenix.zhtml?c=176060&p=irol-factSheet>
- American Customer Satisfaction Index. (2015, February 18). *Retail customer satisfaction drops despite improvement for online shopping*. Retrieved May 17, 2015, from American Customer Satisfaction Index: <https://www.theacsi.org/news-and-resources/press-releases/press-2015/press-release-retail-2014>
- American Management Association. (2002). *Survey on internal collaboration*. Retrieved May 17, 2015, from <http://www.amanet.org/training/articles/2002-Survey-on-Internal-Collaboration-36.aspx>
- Anders, G. (2012, April 23). *Inside Amazon's idea machine: How Bezos decodes customers*. Retrieved September 15, 2015, from Forbes: <http://www.forbes.com/sites/georgeanders/2012/04/04/inside-amazon/>
- Apple. (n.d.). *One to One support program*. Retrieved May 16, 2015, from <http://www.apple.com/retail/learn/one-to-one/>
- Auerbach, P., Argimon, R. F., Hieronimus, F., Roland, C., & Teschke, B. (2012, April). *Banking on customer centricity. Transforming banks into customer-centric organizations*. Retrieved February 18, 2015, from McKinsey & Company, Inc: <http://www.mckinsey.com>
- Axis Bank. (2015). *Axis Bank – vision and values*. Retrieved July 14, 2015, from <http://www.axisbank.com/media-center/vision-and-values.aspx>

- Buffett, W. (2014, November 21). *Why Doug Kass is short Berkshire Hathaway*. Retrieved February 18, 2015, from <http://www.warrenbuffett.com/why-doug-kass-is-short-berkshire-hathaway/>
- CFI Group. (n.d.). *Contact center satisfaction index (CCSI) 2014*. Retrieved September 07, 2015, from http://www.cfigroup.com/downloads/CFI_contact-center-satisfaction-index_CCSI_2014.pdf
- Chopra, S., & Banerjee, J. (2013). *Delusion in organisational excellence*. India: McGraw Hill.
- Ciotti, G. (2014, May 28). *Lessons in customer service from the world's most beloved companies*. Retrieved September 15, 2015, from Entrepreneur: <http://www.entrepreneur.com/article/234116>
- Cronin, B., Catchpole, L., & Hall, D. (2004, February). Outsourcing and offshoring. *CESifo Forum*, 17–21.
- Davenport, T. H., & Short, J. E. (1990, July 15). The new industrial engineering: Information technology and business process redesign. *MIT Sloan Management Review*.
- Dooley, R. (2013, May 07). *How Warren Buffett avoids getting trapped by confirmation bias*. Retrieved February 18, 2015, from Forbes: <http://www.forbes.com/sites/rogerdooley/2013/05/07/buffett-confirmation-bias/>
- Doty, C. (2014, March 21). *The ink tank*. Retrieved February 18, 2015, from Beutler Ink: <http://www.beutlerink.com/blog/thin-air-internet-responds-malaysia-air-flight-370/>
- ICICI Bank. (n.d.). *A unique 3-in-1 online trading account*. Retrieved July 14, 2015, from <http://www.icicibank.com/online-services/three-in-one-account/main.page>
- Institute of Service Excellence at Singapore Management University. (2015, June 19). *Scores comparison of customer satisfaction index of Singapore*. Retrieved July 11, 2015, from Singapore Management University: <http://ises.smu.edu.sg/csigs/scores-rankings/scores-comparison-csisg>
- J.D. Power. (2015, June 03). *Home improvement retailer satisfaction study*. Retrieved July 11, 2015, from <http://www.jdpower.com/press-releases/2015-home-improvement-retailer-satisfaction-study>
- Johnson, G., Scholes, K., & Whittington, R. (2008). *Exploring corporate strategy* (8th ed.). Essex: Pearson Education Limited.
- Lee, A. (2014, March 01). MTR vows to improve quality after long train delays. *South China Morning Post*.
- Leggett, K. (2014, February 06). *Navigate the future of customer service in 2014*. Retrieved February 15, 2015, from Forrester: http://www.aspect.com/global-aspects/aspect_com/documents/na/navigate_the_future_of_customer-service_in_2014.pdf
- Legislative Council Secretariat. (2014, January). *Measures to ease crowdedness of train compartments in overseas cities*. Research Brief, Hong Kong.
- Levi Strauss & Co. (n.d.-a). *Annual reports*. Retrieved July 11, 2015, from <http://levistrauss.com/investors/annual-reports/>

- Levi Strauss & Co. (n.d.-b). *Company fact sheet*. Retrieved July 11, 2015, from http://levistrauss.com/wp-content/uploads/2015/04/2015_CompanyFactSheet_F.pdf
- Mack, A., & Rock, I. (1998). *Inattentional blindness*. London: A Bradford Book/The MIT Press.
- McGinn, D. (2011, April 18). *Welcome to creating a customer-centered organization*. Retrieved February 14, 2015, from Harvard Business Review: <https://hbr.org/2011/04/welcome-to-creating-a-customer>
- Micah, W. M. (2015). *Occupy wall street*. Retrieved September 15, 2015, from <http://occupywallst.org/>
- MTR. (2014). *Annual report*. Hong Kong: MTR.
- MTR. (n.d.-a). Retrieved May 17, 2015, from <http://www.mtr.com.hk/en/customer/tourist/index.php>
- MTR. (n.d.-b). Retrieved February 14, 2015, from MTR Corporate Responsibility: http://www.mtr.com.hk/en/corporate/sustainability/our_approach.html
- Porter, M. E. (1979). How competitive forces shape strategy. *Harvard Business Review*. Boston: Harvard Business School Press.
- Porter, M. E. (2008). *The five competitive forces that shape strategy, Harvard business review*. Boston: Harvard Business School Press.
- Simons, D. J. (2010, April 28). *The monkey business illusion*. Retrieved June 12, 2015, from YouTube: https://www.youtube.com/watch?v=IGQmdoK_ZfY
- Simons, D. J., & Chabris, C. (2010, March 10). *Selective attention test*. Retrieved June 12, 2015, from YouTube: <https://www.youtube.com/watch?hl=en-GB&gl=SG&v=vJG698U2Mvo>
- Squarespace. (2014, September 23). *iPhone 6 plus bend test*. Retrieved September 06, 2015, from YouTube: <https://www.youtube.com/watch?v=znK652H6yQM>
- Talkdesk. (2015, January 13). *Top 10 customer-centric companies of 2014*. Retrieved September 15, 2015, from <http://blog.talkdesk.com/top-10-customer-centric-companies-of-2014>
- U.S. Department of Transportation. (2013). *A literature review of inattentional and change blindness in transportation*. Createspace, USA Independent Publishing Platform.
- Wahba, P. (2015, March 13). *Apple extends lead in U.S. top 10 retailers by sales per square foot*. Retrieved May 17, 2015, from Fortune: <http://fortune.com/2015/03/13/apples-holiday-top-10-retailers-iphone/>
- Wikipedia – Encyclopaedia Britannica. (n.d.). Retrieved May 16, 2015, from https://en.wikipedia.org/wiki/Encyclop%C3%A6dia_Britannica

10

Transforming Product Line Selection Strategy

Subrat Sarangi

Ideas in Brief Product line selection has been a complex problem for marketers. From consumer product group companies to airlines industry, marketers have had to make decisions considering a range of market- and firm-specific factors leading to product line profitability or market share or revenue. While a large product mix in terms of breadth (number of product lines offered), length (vertical differentiation in the line through features), and depth (horizontal differentiation, i.e. color, flavor, pack size) offers the firm various advantages, they may not be sustainable in the long run. Hence, marketers need to have a robust decision model in a dynamic business environment characterized by uncertainty and lack of information while making product line selection decisions. This chapter examines the interplay of multiple conflicting decision objectives and bounded rationality of the decision maker. It recommends a methodology for marketers to arrive at a satisficing product line selection strategy, which is both satisfying and sufficing the constraints and desired objectives. From a theoretical perspective, the proposed model considers a set of intra-firm, inter-firm, and multi-market competition variables. Given the marketer's bounded rationality and hence the inability to define the goals of the decision objectives precisely, there is a need for firms to transform product line selection strategy for sustained profitability. The methodology suggested

S. Sarangi (✉)

KIIT University School of Management, Bhubaneswar, India

e-mail: subrat@ksom.ac.in

© The Editor(s) (if applicable) and The Author(s) 2017

H. Ellermann et al. (eds.), *The Palgrave Handbook of Managing Continuous Business Transformation*, DOI 10.1057/978-1-137-60228-2_10

213

in this chapter is multi-objective mixed-integer fuzzy-goal programming. The proposed methodology is a significant departure and transforms the traditional product line selection decision models. However, empirical validation of the model is beyond the scope of this chapter.

Keywords Fuzzy-goal programming • Inter-firm versus intra-firm • Multi-market competition • Multi-objective decision model • Product line selection

Introduction

Line and brand extensions are an integral part of a product, brand, or a category manager's annual marketing plan. Firms resort to extensions through small variations in size, color, flavor, re-packaging, or increase in pack size to either defend their markets or expand to new segments or address changing customer needs within the same segment. New product introductions at a generic level that are completely new for the customers are far too less with few examples cited as Apple's iPhone and iPad, Sony's Walkman, social media sites like Facebook and Twitter, Tata Motor's Nano, and Pfizer's Viagra. This is corroborated in the findings from Information Resource Inc.'s 2004 Pacesetters study that between the period 1995 and 2004, product line extensions increased to 94 % from an annual average of 87 % in 1995. These figures when compared with new product launches, dropping to 6 % in 2004 from a previous decade average of 13 %, indicate a clear trend in terms of product strategy adopted by marketers. Be it Coca-Cola's fairly successful Diet Coke or less successful Vanilla and Cherry Coke, Pepsi's sugar-free cola Pepsi Max targeted at men, Videocon's Wi-Fi-enabled air conditioners, Syska LED bulbs toward energy-efficient lighting, or withdrawal of extensions, that is, Le Sancy soap by Unilever or Gold Spot and Double Seven by Coca-Cola India, and very recently Aliva range of baked crackers by PepsiCo India, they all reiterate that product diversification and pruning have always been a vital element in the firms' go-to market strategy. This has propelled researchers Bruce G.S. Hardie and Leonard M. Lodish (1999) to say: "In many markets, the development of product-line extensions is a competitive reality. As product categories evolve, a company must continuously adapt its product line."

While a wider product portfolio helps the firm to address multiple demand segments, offer competitive presence across segments to incumbent vendors,

greater choice to channel, and increased shelf presence at point of sale, there are several demerits that firms need to assess while making line expansion or pruning decisions. Factors evaluated by marketers before expanding a line include cannibalization of current share, addition of new customers, dilution of brand equity (in the case of a brand extension), benefits from scale economies in manufacturing, distribution, sales and advertising, and expected competitors reactions in multiple market contacts. Similarly, when firms have to decide on withdrawal of an extension, the decision variables include impact on loyal customer base and switch to competitor's products, loss in efficiency due to scale, and expected competitors reactions due to withdrawal of product. The decision variables listed above do not represent the exhaustive criteria considered by firms, or discussed in extant literature on product line decision-making, but nevertheless expose the complexity in the decision-making process. These decision variables may be categorized as intra-firm, inter-firm, and inter-market with multiple contact points where the focal firm competes. This study focuses on analyzing product line decisions at an intra-firm, inter-firm, and inter-market competition context. Further, the study highlights the nuances of multi-market theory of competition and mutual forbearance wherein firms with multiple market contacts act with the interplay of resource endowments and market (dis)similarities. The study bridges the gap in extant literature by providing a multi-objective decision model considering a set of decision variables representing the three broad categories discussed above. The objectives are simultaneously evaluated to provide a decision framework to the marketer while deciding on the product line strategy. The study contributes to the scant empirical research base on product line decision-making (Jayachandran et al. 1999; McPhaul et al. 2010; Wooseong et al. 2010) by integrating a set of firm and competition variables simultaneously in a multi-objective decision-making environment which is critical for the firm given the market dynamics and information availability. The methodology of the study is an integrative approach based on the extant literature in marketing, strategy, and decision sciences on product line decision-making followed by model development on a dairy company operating in multiple domestic markets in eastern India.

The scope of the study includes different forms of product line selection decisions, that is, proliferation through re-introduction of discontinued products and pruning. It is to be noted that new product/brand launches within a line have been kept out of scope of this study. Further, testing of the model has also been kept out of scope of the study. It is mainly to maintain simplicity in illustration of the formulated model for the readers and exposing them to the shift in mind-set desired for academia and industry practitioners to revisit product line selection decisions on a more frequent basis rather than

on an annual or biennial basis. The study reinforces that marketers need to be more frequent while evaluating product line decisions and the proposed model can serve as the basis to arrive at a satisficing solution. Model testing and new product launch decisions however remain as a subject for future research for the author. The term *product* in this chapter is used interchangeably for services and hence service-line-extension-related decision-making is also within the scope. As far as development of the model is concerned, a select set of decision variables have been considered based on ease of variabilization, implications for the study, and ease of data collection specific to the industry in focus (i.e. dairy industry). The ensuing sections detail the research gap followed by development of the model, assumptions, limitations, and concluding remarks.

Review of Literature

The section begins with an understanding of some basic definitions and concepts on product line. A firm's product mix or portfolio is the entire range of product categories offered by the company. For example, Procter & Gamble's (P&G) range includes categories such as skin care, hair care, oral care, health care, house care, food, and so on, under various brands, namely Oral B, Whisper, Tide, Vicks, Ariel, Gillette, and Duracell, to name a few. Within the product mix of P&G, the group of closely related products which may or may not be under the same brand name represent the product lines (Ferrell and Hartline 2011). For example, laundry detergent with brands like Ariel and Tide represents a product line that is vertically differentiated as detergent for fabric care, detergent for stain removal, detergent for white and colored clothes. These tiers within the product architecture reflect the length of the line, and further each vertically differentiated line, that is, detergent for white and colored clothes, may be horizontally differentiated with variants in terms of flavors like lemon or sandalwood. The final tier in the product architecture indicates the product line depth. The horizontally differentiated products in the line are variants which exhibit slight difference from the common type or norm (ElMaraghy et al. 2013). Thus by offering a larger variety or assortment of products, the firm is able to address various user segments, usage scenarios, constraints, social values, and others.

Product line decisions are not just restricted to expansion of lines through new product introductions or re-launch of a discontinued product as can be seen in the case of Colgate with 14 extensions in toothpaste product line in India or Horlicks from GlaxoSmithKline (GSK) with 4 extensions and several

flavors within each extension. Marketers many a times face the situation of pruning the product line by withdrawing products as the case of P&G discontinuing one fourth of its range to gain competitive advantage (Narisetti 1997). Extant literature (Moorthy 1984; Benson 1990; Quelch and Kenny 1994; Putsis 1997; Hoch et al. 1999; Huffman and Kahn 1998; Cristol and Sealey 2000; Morgan et al. (2001); Tang and Yin 2010; Deng et al. 2014) substantiates a whole range of benefits that prompt firms to go for line extensions (i.e. addressing larger customer base; utilization of excess capacity; leveraging existing infrastructure in distribution, sales, and marketing; and blocking competition) and also disadvantages that lead to pruning of lines (i.e. dilution of brand; consumer confusion; cannibalization of existing market share; and losses due to increase in advertising, sales, manufacturing, engineering, inventory, and distribution overheads). The list of benefits and disadvantages listed above is not exhaustive and is subsequently discussed under three broad classifications of intra-firm, inter-firm, and inter-market factors determining product line selection decisions.

Product line selection decisions vary depending on the nature of decision. The decision-making process is simpler for existing products since they have historical data and information on various cost and sales parameters, while for a new product launch, it is all the more challenging. However, the decision for selection of a product is fundamentally driven by two factors, namely the net impact on the product line profit and the risk associated with the line (Montgomery and Urban 1969). Whether the decision variables are linked to intra-firm or inter-firm or multi-market competition, the performance of the line is judged through product line profit and risk. Product line research establishes this conjecture through the findings of Baumol and Ide (1961), Holdren (1960), Zufryden (1977), Green and Krieger (1985), Fruchter et al. (2006), Chen and Hausman (2000), and Schon (2010). The findings have established that cost linkages in terms of scale economies or diseconomies in joint production, procurement, distribution, sales, and promotion impact the overall profit, while impact on demand due to complementarities or substitution effect or action and competitive action and reaction of firms in a multi-market context leads to risk interdependencies. Further, consumer surplus, market share, and revenue have been interchangeably used as measures of product line performance while evaluating product line selection decisions.

Intra-firm

Intra-firm decision variables for a marketer are associated with internal resource endowments of the firm and the synergies which the firm enjoys through prun-

ing or expansion of lines. Intra-firm product line decision-making has been extensively researched in marketing science and decision sciences (Dobson and Kalish 1988, 1993; Kohli and Sukumar 1990; Kekre and Srinivasan 1990; Nair et al. 1995; Villas-Boas 1998, 2004; Van Ryzin and Mahajan 1999; Kim and Chhajed 2000; Desai et al. 2001; Morgan et al. 2001; Day and Venkataramanan 2006; Heese and Swaminathan 2006). Review of extant literature indicates one of the earliest intra-firm new product selection decision model was based on a payoff matrix developed on short-term and long-term profitability computations factoring probability estimates of commercial sales and cost parameters, in addition to several intangible factors, namely product marketability, durability, productive ability, and market growth potential (O'Meara 1961). While marketability was a test of synergy with the existing product lines, distribution channel, assortment to offer, and complementarities with existing product sales, durability was linked with demand patterns, market coverage, and design exclusivity of the product in question. The framework tested the internal synergies of the firm in terms of physical assets, production and technology skills, raw material leverage under the dimension productive ability, while growth potential tested the demand gap and competitive positioning in the market. Subsequent development of marketing decision models, that is, demand, cost, profit, and uncertainty models factored demand drivers (i.e. stage in product life cycle, price, advertising spend, distribution and sales effort, degree of competition, and interaction with existing products), cost drivers (i.e. plant size, technology level and desired change in technology, cost synergies, and plant utilization), profit drivers (i.e. people, financial and manufacturing resource availability, government regulations), and decision drivers (i.e. uncertainty on decision-making, market risk, and estimation risk) (Urban 1967, 1968, 1969, 1975; Kotler 1965; Montgomery and Urban 1969). The measures for the factors varied from spend value to a mix of sub-dimensions; that is, for advertising, it was copy effectiveness, media efficiency, and spend rate; for promotion, it was promotion time pattern and promotion intensity; for price, it was inflation and competitor reaction to price-related adjustments; for sales effort, it was salesman effort, coverage efficiency, and message quality; and certain other factors like packaging look and feel (Little 1975). While most of the factors discussed above pertain to operational success of products whether launched as a line or a brand extension, firms do need to evaluate the controllable factors, that is, available marketing resources and skills to assess the customer needs and buying behavior, market intelligence on competitors, and product superiority in terms of quality and technology (Song and Parry 1994, 1997; Calantone et al. 1996) while reviewing product portfolio.

Empirical research on product line selection on intra-firm factors is far too scarce and covers specific industries, namely consumer product groups, consumer durables, and technology products. The factors may be broadly categorized under two heads: firm specific and market specific represented in Fig. 10.1. Firm-specific factors include category market share, age of firm, age of product technology for firm, firm size, marketing competency of firm, demand for the firms existing product lines, degree of complementarity and substitutability of existing products, product development costs, manufacturing and packaging overheads, and relative pricing (Lancaster 1990; Ratchford 1990; Stavins 1995; Bayus and Putsis 1999; Putsis and Bayus 2001; Bordley 2003). Broader product lines are proven to be associated with higher design costs (Bayus and Putsis 1999), inventory costs (Lubben 1988) and direct costs (Abegglen and Stalk 1985), increased lead time in manufacturing and assembly (Anderson 1995; MacDuffie et al. 1996), and resource scarcity (Teece 1982). Further, line extensions with assortments providing between-attribute trade-offs to customers as against within-attribute trade-offs lead to over-choice and hence confusion among customers, resulting in reduced market share and overall reduction in line profitability (Gourville and Soman 2005). From a pricing perspective, consumer response to product line breadth extensions have been found to be positive as compared to depth and hence firms have the tendency to price the different flavors within a line equally, restricting overall line margins (Draganska and Jain 2006). Some of the brand and extension characteristics testing the synergies with existing brand portfolio are brand characteristics in terms of brand strength, symbolic value, and order of launch;

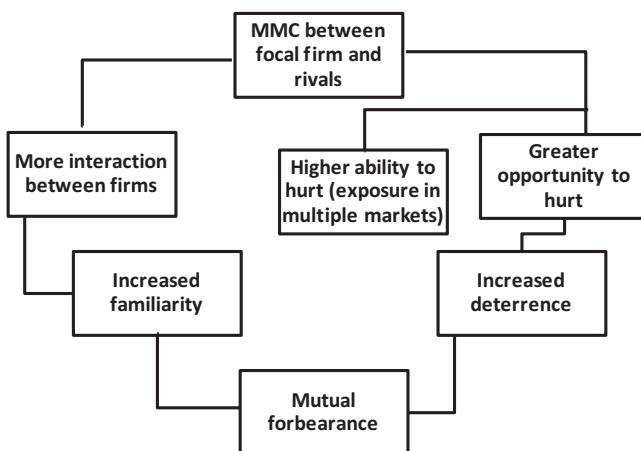


Fig. 10.1 Multi-market competition leading to mutual forbearance

sequence of launch; and support for the extension in terms of advertising and promotion spend, sales, and distribution effort (Urban et al. 1987; Aaker and Keller 1990; Reddy et al. 1994). Decisions related to product pruning is directly related to withdrawal costs and hence extensions with a high brand strength deter exit of such products since losses from product sales are less than the overall cost of withdrawal (Thomas 1996). Market-specific factors are discussed in this section subsequently since they have a linkage with inter-firm and multi-market competition (MMC).

The detailed review of past research on intra-firm factors influencing product selection decisions from early 1960s to recent times ignores the interplay of inter-firm and multi-market contact for the focal firm. It may also be noted that the findings from extant literature quoted above have been based on intra-firm factors modeled on decision objectives of profit, market share, return on investment, and consumer surplus.

Inter-firm

Inter-firm rivalry pertains to two firm-specific rivalry and individual conduct of firms, where rivalry is the action/response dyad (Chen 1996). An action is defined as an initiation of a move by the firm through a line extension in an existing market or launch of existing product in a new geography (Chen and MacMillan 1992; Chen and Hambrick 1995). Response is a counter-move by the firm responding to rival firm's action to defend or improve market position. Market or industry structure impacts inter-firm rivalry (Baum and Kom 1994; Caves 1984; Hannan and Freeman 1989; Jacobson 1992). Chen (1996) has analyzed inter-firm rivalry and competition based on three aspects, namely market commonality, resource similarity, and competitive asymmetry. Market commonality is defined in extant literature as *the degree of presence that a competitor manifests in the markets it overlaps with the focal firm*. Resource similarity is defined in extant literature as *the extent to which a given competitor possesses strategic endowments comparable, in terms of both type and amount, to those of the focal firm*.

Resource similarity is drawn from the theory on resource-based view of firm, wherein the firm is a bundle of tangible and intangible resources and capabilities (Penrose 1959; Wernerfelt 1984). These resources are heterogeneously existent among firms and the firms are idiosyncratic in their behavior and the management routines (Barney 1991; Peteraf 1993). Competitive asymmetry treats every inter-firm rivalry in terms of resource similarity and market commonality as unique and directional and not symmetric based

on Tversky's (1977) seminal work on asymmetry. Competitive behavior of a firm is determined by the firm's awareness, motivation, and capability (Dutton and Jackson 1987; Kiesler and Sproull 1982; Lant et al. 1992; Schelling 1960), which in turn depends on the constructs market commonality and resource similarity (Chen 1996). However, competition in most cases does not get restricted to inter-firm rivalry and has interplay with several competitors in multiple markets, discussed subsequently. Further, product line decisions cannot just be taken in a dyadic action/response context between the firms neglecting the intra-firm linkages. While the focal firm reacts with withdrawal of a select product variant in a line (ignoring others) as a response to price cut by the competitor, this decision cannot be taken in isolation without considering other intra-firm factors, namely channel margins, manufacturing synergies, and cost. This chapter focuses on a multi-objective decision model in product line selection considering the various aspects simultaneously.

Multi-market Competition

As a phenomenon, MMC has been a strategic issue impacting firms due to globalization, emergence of transnational companies, and product diversification. Firms having presence in multiple geographic markets (whether domestic or international) face MMC. For this study, a geographic market has been considered as the smallest unit where the manager has the decision-making authority on the strategic variables, namely price, promotions, and push sales (Jayachandran et al. 1999). A product market is a set of goods and services which meet the same need and is produced using a similar technology and used by similar set of consumers (Abell 1980). The combination of the geographic and product markets constitutes a geographic-product market and the market domain of the firm is a set of geographic-product markets it operates in. Multi-market contact is measured by the average number of markets the focal firm competes with all the competitors in a given market, excluding the focal market (Karnani and Wernerfelt 1985; Boeker et al. 1994; Gimeno and Woo 1996; Jayachandran et al. 1999; Woosong et al. 2010). As a result, mutual interdependence between competing firms increases leading to mutual forbearance and impact on competitive intensity between the competing firms. Mutual forbearance leads to familiarity (Baum and Korn 1999) between the competing firms leading to tacit coordination and reducing the competitive intensity, or leads to deterrence (Bernheim and Whinston 1990). Since degree of familiarity on the resource endowments of the com-

peting firms is a function of market intelligence, lack of resources leads to incomplete information and judgmental decisions. Similarly, in the case of deterrence, ability and opportunity to hurt (Jayachandran et al. 1999) for a firm would be determined by the payoff from the action/reaction determined in a suboptimal decision environment. The relationship between the focal firm and the rivals competing in multiple markets leading to mutual forbearance is depicted in Fig. 10.2. Review of extant literature provides a detailed listing of studies carried out on MMC and impact on firm performance with single objective function, that is, price and yield (Gimeno and Woo 1996; Evans and Kessides 1994; Jans and Rosenbaum 1996; Parker and Röller 1997; Wooseong et al. 2010) and market entry and exit (Fuentelsaz and Gómez 2006; Baum and Korn 1999; Gimeno 1999). However in the context of MMC, product line selection decisions need to be made factoring not just price or product launch/withdrawal decision, but the interplay of other decision objectives, namely advertising spend, channel profitability, and inventory minimization, to name a few. The decision needs to be based on the intra-firm, inter-firm, and multi-market dynamics governing the focal firm. It may be illustrated that a firm competing in several geographic markets dealing in dairy products, that is, packaged milk, packaged curd, ice cream and butter of different pack sizes, and variants, may decide to maximize

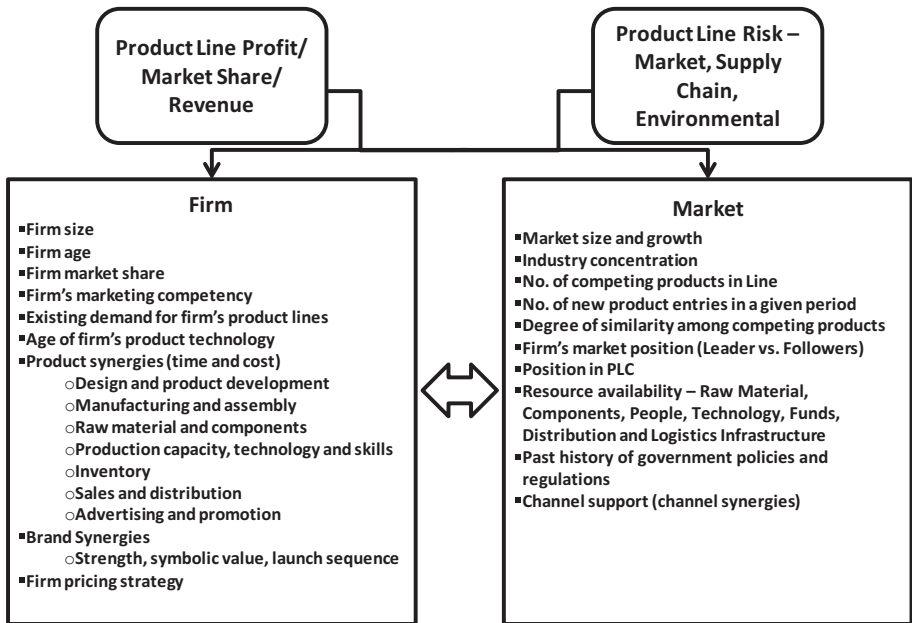


Fig. 10.2 Factors impacting product line selection decisions

channel margin and promotion spend and minimize logistics cost under the pressure of price cut/incentives by its competitors in the multi-market context while making decisions on pruning/proliferation of product line, ignoring revenue (price) and volume during the festive season. The simultaneous consideration of multiple objectives in an inter-firm, intra-firm, and MMC context with firm constraints on promotion budget, logistics budget, and channel dis-satisfaction may thus lead to temporary withdrawal of flavored butter and 0.5-liter packaged milk variant and greater focus on ice cream and packaged curd. An illustrative example has been used to explain two different situations (festive season sale and end of season sale) in the model building section.

Having discussed MMC and inter-firm rivalry, it is worthwhile mentioning that there is considerable amount of research focused on market-specific factors influencing product line selection decisions. Though these studies have not specifically discussed the mutual forbearance and its impact on competitive intensity, the conclusions are similar (Axaroglou 2008; Sorenson 2000; Shankar 2006; Mainkar et al. 2006). The market-led factors discussed in extant literature include size of the market, market growth, number of new product entries in the category, industry concentration, number of competing products in the line, relative position of firm in the category, and barriers to entry (Schmalensee 1978; Connors 1981; Carpenter 1987; Ratchford 1990; Gresov et al. 1993; Stavins 1995; Bayus and Putsis 1999; Putsis and Bayus 2001; Bordley 2003). Axaroglou (2008) has made a holistic study of external factors based on a cross-industry study of more than 150 firms over a ten-year period and proposes that high market demand and low industry concentration lead to greater line extensions. The study of competitive behavior in industrial markets (Ramaswamy et al. 1994) suggests high retaliatory behavior in high concentration markets with significant effect of degree of standardized products offered. The firms may retaliate by product proliferation/pruning in such a market context, while tend to continue status quo with a cooperative behavior when market growth is high, which can be considered an implication of mutual forbearance. Seminal work on product market strategy by Sorenson (2000) categorizes marketers as R-strategists and K-strategists following a less focused wider portfolio and a highly focused lean portfolio, respectively. His findings reveal that initially product proliferation increases firm viability and with the increase in the number of offerings, firms need to follow a culling/pruning strategy. However, in uncertain market conditions characterized by high volatility, firms need to avoid culling and adopt a wait-and-watch approach. Product line strategies adopted by firms are asymmetric, depending on the market position, that is, leader versus follower (Shankar 2006). It has been empirically proven that market leaders that are large in size are more likely to adopt hybrid and complex strategies on product line prolif-

eration when they have a history of product line proliferation actions and attract a price premium with no definite market leadership on any particular marketing variable. However, a market follower's product line strategy is simple with price-related actions and proliferation strategies linked with lines where they enjoy leadership. Further, market leaders in contrast to the followers are characterized by greater reaction elasticity as compared to competitor anticipation elasticity that determines the product line actions (Shankar 2006). For new entrants in a market competing against incumbent players, the theory of legitimation and competition determines the strategy of product proliferation (Hannan and Carroll 1992; Hannan and Freeman 1989). There is an inverted U-shaped relationship between the product proliferation by new entrants and number of organizations in the industry (referred to as population density). When the density is low, lack of resources deters product proliferation and vice versa (Mainkar et al. 2006).

The discussion so far on MMC and market-specific factors indicates various aspects of competition and firm behavior in product line selection decision. But to the best of knowledge, there has not been a single study that simultaneously considers multiple objectives spanning inter-firm, intra-firm, and MMC.

Model Objectives and Solution Method

Early literature on product line design and optimization shows inclination of researchers to model on consumer preferences with the objective of maximizing firm profit or revenue or market share with multidimensional scaling (MDS) and conjoint analysis as the preferred techniques. The studies were based on consumer surveys relating brand preference to choice on various attributes to arrive at the position to be occupied with the proposed design in the joint space that mapped the existing products and the ideal point of the consumer relating preference to choice (Carroll 1972; Srinivasan and Shocker 1973; Shocker and Srinivasan 1974, 1977; Urban 1975; Green and Wind 1973; Green et al. 1981). Advancement in modeling methods enabled multi-attribute optimal product design solutions based on deterministic and probabilistic algorithms and heuristics addressing the sellers' and the buyers' problem with decision variables, that is, price (Dobson and Kalish 1988, 1993), design (Kohli and Sukumar 1990; Nair et al. 1995), and manufacturing (Morgan et al. 2001; Day and Venkataraman 2006). While cannibalization of existing product offerings had been a subject of research in terms of customer preferences, competition in terms of substitutable products in product line positioning

and pricing was introduced by Nichols (2000). As a deviation from Dobson and Kalish model (1988) which had introduced a passive competitor with zero utility and thus nullified monopoly situation of a seller, Nichols (2000) assigned a fixed utility to the competing product and used a meta-heuristics approach which was a hybrid of enumerative and random-based procedure. Tang and Yin (2010) in their paper have developed a model factoring costs, capacity, and competition as design constraints to arrive at the optimal price, quantity for a select product line using a heuristics approach. As far as product line design optimization models are concerned, while first choice models maximizing consumer surplus are common (Zufryden 1977, 1979, 1982; Green and Krieger 1985; Fruchter et al. 2006), attraction choice models for product line selection maximizing sellers' profit function (Chen and Hausman 2000; Schon 2010) have seen some recent developments. As a deviation, models developed on variables, that is, price, design, manufacturing, competition, and capacity constraints, component commonality mitigating line production costs (Kim and Chajjed 2000), manufacturing setup cost synergies through design (Desai et al. 2001; Heese and Swaminathan 2006), inventory management (Kekre and Srinivasan 1990; Van Ryzin and Mahajan 1999), distribution channel profit (Villas-Boas 1998), and advertising communication (Villas-Boas 2004) provide a broad perspective of factors considered while designing and selecting product lines. High design complexity and greater overlap with competitor offerings are established empirically to have a positive relation with product failure (Dowell 2006). Netessine and Taylor (2007) have expanded on Moorthy's (1984) model based on monopolist seller offering a select set of products applying the concept of pooling, by interacting availability of production technologies and information on consumer preferences on product line decision-making. Ramdas and Sawhney (2001) have combined the revenue and cost interactions at a product and component level, respectively, due to cannibalization for assembled product manufacturers and have recommended a margin optimization model. In one of the most recent papers on product line extensions (Mu et al. 2013), the authors have extended the Ramdas and Sawhney's (2001) model by taking a budget constrain (i.e. labor cost, component development cost, product development cost) and cardinality constrain (e.g. number of line extensions from a given set) using an efficient heuristic to arrive at a near optimal solution. Deng et al. (2014) have based their design optimization model on integration with suppliers and supplier selection. Addressing the complexities involved in optimal design and positioning of products for suitable customer segments, Michalek et al. (2011) recommend an analytic target cascading method where different functions of engineering and product development maintain their func-

tional expertise and provide near optimal design solution. Natural analogies (e.g. social organisms, genetic evolution) have been instrumental in developing near optimal algorithms through usage of particle swarm optimization in product line design (Tsafarakis et al. 2011).

Based on the exhaustive review of extant literature, it may be concluded that the focal firm is faced simultaneously with intra-firm, inter-firm, and multi-market contact decision variables while making product line selection (pruning/proliferation) decisions. While considerable research has been carried out, the marketers' dilemma still remains unaddressed since the decision-making is suboptimal. This study acknowledges that managers have to deal with multiple objectives with varying degree of focus across the time horizon with incomplete information as payoffs, and outcomes of all the possible alternative solutions are not known (Simon 1955). As the marketer is driven by multiple conflicting objectives in an uncertain decision environment characterized by bounded rationality, it becomes difficult to define precise goals for the different objective functions, leading to imprecise fuzzy goals (Zimmermann 1978; Yager and Basson 1975). This chapter proposes a multi-objective and multi-criteria product line selection decision model factoring simultaneously intra-firm, inter-firm, and MMC, recommending interactive mixed-integer linear fuzzy-goal programming technique. Interactive mixed-integer linear fuzzy-goal programming as a solution technique enhances adaptability of the model to real-world scenarios by providing the flexibility desired by marketers based on the prevailing business context. The proposed technique also provides the marketer flexibility to revisit product line selection decisions on a more frequent basis (as demonstrated in the model subsequently). The proposed method enables the marketer to meet the decision criteria of the designed system (i.e. sufficing solution) and the permissible error limits (i.e. satisfying solution).

The subsequent sections of this chapter include development of model followed by limitations of the study and conclusion.

Model Building

Decision models in management science started with single objective optimization problems. However, with increasing complexity in the decision environment, multi-objective optimization problems were increasingly adopted, and it was first proposed by Kuhn, Tucker, and Koopmans in 1951 (Cohon 2013) as multi-objective programming (MOP). Since then extensive research has happened in this field, though the application is very limited to marketing

discipline and more prevalent in operations and decision sciences. Most decision scenarios have managers to evaluate the alternatives based on multiple decision criteria varying in preferences, ratings, and conflicting in their goals. The multi-criteria decision-making (MCDM) problems are further classified into multi-attribute decision-making (MADM) and multi-objective decision-making (MODM) (Hwang and Yoon 1981). While MADM is applied with limited number of predetermined alternatives and preference ratings, MODM is used to achieve the optimal or aspired goals by considering the interactions of the constraints (Tzeng and Huang 2014). Most MCDM problems are fuzzy problems (Zadeh 1965; Bellman and Zadeh 1970) with conflicting goals, attributes, and alternatives factored simultaneously.

A typical product line selection decision is a complex decision facing the marketer in a dynamic environment with multiple objectives and possible alternatives conflicting in nature. While it is clear that such a problem cannot be deterministic in nature given the uncertainty, it is also not stochastic since the decision criteria cannot be defined as probabilities (Wagner 1970). This is mainly due to subjective uncertainty arising from linguistic variables wherein a marketer may not be in a position to determine the aspirational value of profit or advertising spend or inventory in a precise manner due to bounded rationality. This study approaches the problem as a fuzzy multi-objective decision-making (FMODM) problem. The approach also provides the marketer to plan product mix in a more dynamic manner in a given time horizon.

Model Design

The model under study is a product line selection problem for a firm with a portfolio of products under offer in multiple geographic markets. The focal firm is in contact with multiple focal market competitors, leading to mutual forbearance. The model also factors select inter- and intra-firm variables relevant to the focal firm. The study is illustrated on a dairy industry based in eastern India where the focal firm offerings include packaged milk, packaged curd, and ice cream. As stated in the beginning, the scope of the model does not include new product launches. Hence, the decision scope of the model is restricted to withdrawal/continuation and re-launch of a product which had been discontinued in the past, on existing variants in an intra-firm, inter-firm, and MMC decision environment.

The focal firm has z product categories (breadth) with a number of brands and c number of variants (product architecture of focal firm presented in

Fig. 10.1). The focal firm competes in k markets with B_{kt} being the number of competing firms at time t . As represented in the figure, packaged milk is vertically differentiated in terms of double toned and single toned offered in two pack sizes of 0.5 liter and 1.0 liter. Similarly, for ice cream, the vertical differentiation is family pack (1 liter) and cups (100 grams) offered in four flavors (horizontal differentiation). In the entire product mix, some variants may have been offered at time $t - 1$, while some others may have been discontinued by the focal firm due to myriad reasons, namely lower profit margins, increase in raw material cost, reduction in sales due to competitor actions in multiple market contact points, restricted budgets for advertising and sales overheads, or stage in product life cycle (Wind and Claycamp 1976). In this situation when the marketer at time t evaluates the product line strategy for continuation/re-launch/pruning, there are multiple variables that need to be considered which are discussed below (Fig. 10.3).

The above product architecture for the focal firm may be explained generically as a firm offering “ z ” number product categories represented as, $j_1, j_2, j_3, \dots, j_z$. Further, there may be “ a ” number of brands for category “ j_1 ” represented as, $j_{11}, j_{12}, j_{13}, j_{14}, \dots, j_{1b}, \dots, j_{1a}$. The portfolio may also include “ c ” number of variants for a brand “ m ” represented as, $m_1, m_2, m_3, m_4, m_5, \dots, m_c$. The marketer has to make a decision with the given complex product architecture to decide which of those variants to continue, which ones to discontinue, and which of those to re-launch that have been discontinued in the past. It is to be noted that the decision of product re-evaluation and continuation is also a critical decision variable encountered by the marketer.

Variable Definition

PROFIT (P)	Focal firm profit
REVENUE (RE)	Focal firm revenue
SALES OVERHEADS (S)	Total sales overheads for focal firm
COST (C)	Total cost of goods sold for focal firm
ADVERTISING (A)	Total advertising spend for focal firm
DISTRIBUTION (D)	Total distribution overheads for focal firm
CHANNEL MARGIN (CM)	Total channel margin for focal firm
DYAD MULTI-MARKET (MMC_{opt})	Dyad -in -market measure for firm o with competitor p in market k and time t
FIRM MULTI-MARKET (MMC_{okt})	Firm-in-market measure for firm o in market k and time t
MARKET SHARE (MS_j)	Market share for product category j
PLC _{j}	Stage in product lifecycle for product category j (PLC _{j})

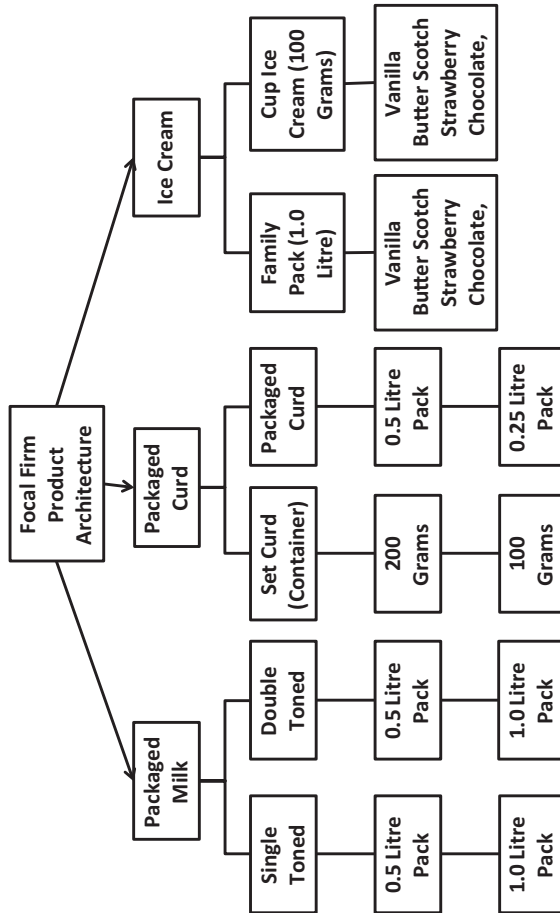


Fig. 10.3 Product architecture of focal firm

Variables such as P_{jmi} , R_{jmi} , C_{jmi} , A_{jmi} , D_{jmi} and CM_{jmi} are based on historical time series data of the focal firm varying by product j , brand m , and variant i . Stage in product life cycle varies by product category j , and is measured as growth, stable or decline, depending on historical time series data for the category. For computational purposes, they may be treated as categorical variables assigned by weights, that is, ice cream as a category in growth phase and may be assigned a weight of 0.5, followed by packaged milk at 0.3 (stable) and packaged curd at 0.2 (decline) (Polli and Cook 1969; Wind and Claycamp 1976). Similarly, MS_j may also be treated in a similar fashion. For MMC, MMC_{okt} firm-in-market level measure suggested by Wooseong et al. (2010) may be adopted. It measures overall MMC of the firm for all its focal market competitors. The measure is developed from the overall MMC between two firms in all markets (MMC at dyad level). Hence, for a focal firm o competing in k markets with B_{kt} being the number of competing firms at time t , firm o 's MMC with competitor p in market k and time t is:

$$\begin{aligned}
 MMC_{opkt} &= O_{okt} \cdot O_{pkt} \sum_{l \neq k}^K \{ \text{FirmShare}_{olt} \cdot \text{MarketShare}_{plt} \} \\
 &= O_{okt} \cdot O_{pkt} \sum_{l \neq k}^K \{ \text{Sales}_{olt} / \text{Sales}_{ot} \} \{ \text{Sales}_{plt} / \text{Sales}_{lt} \}
 \end{aligned}$$

The firm-in-market level measure, MMC_{okt} , may be represented as

$$MMC_{okt} = \frac{\sum_{l \neq k}^{B_{kt}} MMC_{opkt}}{B_{kt} - 1}$$

The MMC computation does not include the focal market to avoid muddled causality (Gimeno and Jeong 2001). The computation of MMC measure is based on historical time series data on an aggregate level of the firm and its focal market competitors for the set of competing products. Having defined the variables above, two scenarios are discussed that a marketer would face in a real-life situation across the time horizon. Both the scenarios differ in business context, defining the model constraints and conflicting nature of decision objectives. The choice of the scenarios, that is, festive season sale and end-of-season sale, enable the model to factor greater complexity in terms of conflicting decision objectives for the marketer and nature of constraints to be modeled.

Scenario 1: Festive Season Sale

The business environment is characterized by demand spurt due to upcoming festivals across the markets the firm operates in. Historically, firms register a

15–20 % increase in sales against the previous quarters during the festive season for dairy products. The competitive activity also intensifies as every competing firm tends to maximize gains (revenue/margin/market share) during the period. There is a spurt in advertising spend and incentivization by most focal market competitors. Against this backdrop, the focal firm in study is facing the following constraints that are a legacy of their previous quarters' performance.

- i. The focal firm is 50 % short of their overall revenue target to be achieved till time $t - 1$.
- ii. The focal firm has exhausted 90 % of the sanctioned budget on advertising and promotion and has only 10 % unused at time t .
- iii. Competitor action is expected to intensify.
- iv. Products like ice cream, both cup and family packs, are growth products (registering more than 8 % growth quarter-on-quarter for last 18 months). While packaged milk is stable with a quarter-on-quarter growth of 4–6 %, and packaged curd in decline stage with a less than 3 % growth.
- v. Market share position of the focal firm across all its focal markets is maximum for packaged milk at 18 %, followed by packaged curd at 10 %, and ice cream at 7 %.
- vi. As a special sanction to boost festive season sales, there is a grant of additional budget on sales overheads through deployment of contractual workforce for the focal firm.

The various conflicting objective functions for the MODM in the above scenario for the focal firm are formulated below.

- i. *Objective 1*—Maximize RE: Total Revenue (*in dollars*)
- ii. *Objective 2*—Maximize S: Total Sales Overheads (*in dollars*)
- iii. *Objective 3*—Maximize CM: Total Channel Margin (*in dollars*)
- iv. *Objective 4*—Minimize A: Total Advertising Spend (*in dollars*)
- v. *Objective 5*—Minimize P: Total Firm Profit (*in dollars*)

There are five objective functions to be considered simultaneously by the marketer of which first three are maximization functions and the remaining two are minimization functions based on the prevailing business context. In this scenario, given bounded rationality of the marketer, it is not possible to define the aspirational values of the different objective functions and hence there has to be a departure from the traditional decision models of product line selection to fuzzy mixed-integer interactive method (FMODM) where the interim goals are assigned and iteratively the satisficing solution is determined. For example, while the marketer has to maximize the revenues, there cannot be a significant dip in firm profit, and hence, there is an element of

fuzziness that exists in the goal. Similarly, channel margins need to be focused upon since the firm has limited advertising budget and focal market competitors are expected to intensify promotional activity, it has to be at the cost of firm profit, but to what extent has to be determined in an interactive fuzzy decision environment. It is to be noted, these decisions need to be taken in an MMC context with different product categories contributing to spend, market share, and revenue structure differently and positioned at different stages in the PLC.

Scenario 2: End-of-Season Sale

The business environment in end-of-season sale is characterized by the focal firm catching up with the various organizational targets planned. Further, there is also an expected shortage in the resource endowments available with the firm given the end of season. Against this backdrop, the focal firm in study is facing the following constraints that are a legacy of their previous quarters' performance.

- i. The focal firm is 10 % short of their overall profit target to be achieved till time $t - 1$.
- ii. The focal firm is 20 % short of their overall revenue target to be achieved till time $t - 1$.
- iii. The focal firm has exhausted entirely the sanctioned budget on advertising and promotion for the year.
- iv. Growth rates and relative market shares by products remain the same as in scenario 1.

The various conflicting objective functions for the MODM are formulated below.

- i. *Objective 1*—Maximize RE: Total Revenue (*in dollars*)
- ii. *Objective 2*—Maximize P: Total Firm Profit (*in dollars*)
- iii. *Objective 3*—Maximize S: Total Sales Overheads (*in dollars*)
- iv. *Objective 4*—Minimize CM: Total Channel Margin (*in dollars*)
- v. *Objective 5*—Minimize A: Total Advertising Spend (*in dollars*)

In scenario 2, there are again three maximization functions and two minimization functions with firm profit to be maximized and channel margin to be minimized. In a dynamic market environment and changing business needs, the focal firm has to alter the decision criteria where there is limited

resources to gather complete information. More so in the context of emerging economies where the focal firm is operating, the predictability is reduced and hence there is a need to transform product line selection decision methods. For example in the above scenario, the marketer has to trade-off between the degree of maximization of firm profit and revenue as both are below targeted levels and the focal firm is at the end of season. Similarly, while channel satisfaction has been addressed to some extent by maximizing channel margin in scenario 1, there is a need to draw resources and invest on other dominating priorities.

Based on the above two scenarios, the model is formulated as a mixed-integer linear fuzzy-goal programming problem with the following notation.

μ_{jmi}	Price for product category j , brand m , and variant i (\$/unit)
α_{jmi}	Cost for product category j , brand m , and variant i (\$/unit)
β_{jmi}	Profit margin for product category j , brand m , and variant i (\$/unit)
Q^*_{jmi}	Quantity sold for product category j , brand m , and variant i (no. of units)
γ_{jmi}	Sales overhead for product category j , brand m , and variant i (\$/unit)
σ_{jmi}	Advertising spend for product category j , brand m , and variant i (\$/unit)
δ_{jmi}	Distribution overhead for product category j , brand m , and variant i (\$/unit)
η_{jmi}	Channel margin for product category j , brand m , and variant i (\$/unit)
λ_j	Market share for product category j (assigned weight based on market share category)
ζ_j	Stage in PLC for product category j (assigned weight based on PLC stage category)
θ_{opkt}	Dyad-in-market measure for firm o with competitor p in market k and time t

The model formulation for z product categories, a brands, and c variants for scenario 1 is as follows:

$$\max RE = \theta_{opkt} \cdot \sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \mu_{zac} \cdot Q^*_{zac} \cdot \lambda_j \cdot \zeta_j X_{jmi} \tag{10.1}$$

$$\max S = \theta_{opkt} \cdot \sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \gamma_{zac} \cdot Q^*_{zac} \cdot \lambda_j \cdot \zeta_j X_{jmi} \tag{10.2}$$

$$\max CM = \theta_{opkt} \cdot \sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \eta_{zac} \cdot Q^*_{zac} \cdot \lambda_j \cdot \zeta_j X_{jmi} \tag{10.3}$$

$$\min A = \theta_{opkt} \cdot \sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \sigma_{zac} \cdot Q^*_{zac} \cdot \lambda_j \cdot \zeta_j X_{jmi} \tag{10.4}$$

$$\min P = \theta_{opkt} \cdot \sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \beta_{zac} \cdot Q^*_{zac} \cdot \lambda_j \cdot \zeta_j X_{jmi} \tag{10.5}$$

X_{jmi} is the variant i for brand m and product j ; λ_j is the assigned weight for product category j based on market share; and ζ_j is the assigned weight for product category j based on stage in PLC.

S.T.

$$\sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \mu_{zac} \cdot Q_{zac}^* \cdot X_{jmi} \geq V, \text{ where } VTR \text{ and is the minimum target revenue for focal firm} \tag{10.6}$$

$$\sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \sigma_{zac} \cdot Q_{zac}^* \cdot X_{jmi} \leq 0.1Q, \text{ where } QTR \text{ and is the maximum advertising budget for the focal firm} \tag{10.7}$$

$$\sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \alpha_{zac} \cdot Q_{zac}^* \cdot X_{jmi} \leq T, \text{ where } TTR \text{ and is the maximum cost of goods sold budget for the focal firm} \tag{10.8}$$

$$\sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \beta_{zac} \cdot Q_{zac}^* \cdot X_{jmi} \geq F, \text{ where } FTR \text{ and is the minimum target profit margin for focal firm} \tag{10.9}$$

$$\sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \gamma_{zac} \cdot Q_{zac}^* \cdot X_{jmi} \leq SO, \text{ where } SOTR \text{ and is the maximum sales overhead for focal firm} \tag{10.10}$$

$$\sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \delta_{zac} \cdot Q_{zac}^* \cdot X_{jmi} \leq DO, \text{ where } DOTR \text{ and is the maximum distribution overhead for focal firm} \tag{10.11}$$

$$\sum_{z=1}^Z \sum_{a=1}^A \sum_{c=1}^C \eta_{zac} \cdot Q_{zac}^* \cdot X_{jmi} \leq CMG, \text{ where } CMGTR \text{ and is the maximum permissible channel margin budget for focal firm} \tag{10.12}$$

$$Q_{jmi}^* = \text{Market Share } X_{jmi}. \text{ Total Sales in Category } j, \text{ brand } m \text{ and variant } i \tag{10.13}$$

$$X_{jmi} = \begin{cases} 1, & \text{if product is continued orre launched} \\ 0, & \text{if product is withdrawan or discontinued} \end{cases} \tag{10.14}$$

$$\mu_{jmi}, \alpha_{jmi}, \beta_{jmi}, \gamma_{jmi}, \sigma_{jmi}, \delta_{jmi}, \eta_{jmi}, \lambda_j, \zeta_j \text{ and } \theta_{opkt} \text{ TR} \quad (10.15)$$

Equations 10.1, 10.2, 10.3, 10.4 and 10.5 model the various objective functions depicting festive season sales. Equations 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12, 10.13, 10.14, and 10.15 define the variable properties and boundary constraints for the model in terms of minimum revenue target, firm profit margin and maximum permissible advertising, channel margin, cost of goods sold, distribution and sales, or re-launch at time t .

Fuzzy Mixed-Integer Goal Programming Model

Given the vagueness and uncertainty in the marketers mind regarding the target goals for the different objective functions, the problem is formulated as a fuzzy mixed-integer goal programming (f-MIGP) problem. A typical formulation of f-MIGP is given below.

Determine x_i where $i = 1, 2, 3, \dots, n$
 to satisfy $Z_k(x_i) = Z_k$, where $k = 1, 2, 3, \dots, K$
 $g_l(x_i) \leq a_l$, where $l = 1, 2, 3, \dots, L$
 $h_p(x_i) = b_p$, where $p = 1, 2, 3, \dots, P$
 $c_d(x_i) \geq d_r$, where $d = 1, 2, 3, \dots, D$
 $x_i \geq 0$ and integer,

where

$Z_k(x_i)$ is the k th goal constraint,

$g_l(x_i)$ is the l th inequality constraint,

$h_p(x_i)$ is the p th equality constraint,

a_l is the available resource of inequality constraint l ,

b_p is the available resource of equality constraint p ,

c_r is the available resource of inequality constraint d .

Symbol “ \cong ” stands for fuzziness of the goal which explains the linguistic aspirational values of the marketer. For example, the marketer is unsure about the goal for firm profit maximization and channel margin minimization in scenario 1. The problem would lie in how much to increase firm profit sacrificing channel margin and the satisficing solution would be in the vicinity of the aspirational goal Z_k within defined tolerance limits. The variables a_l , c_r and b_p are the available resources or constraints of inequality and equality constraints, such as advertising budget, sales overheads, and minimum levels of channel margin.

Once the formulation of the model is complete as in the above scenario, optimization modeling software, namely LINGO 15.0, Tora may be used to solve the model using mixed-integer fuzzy-goal programming solution method. As illustrated in the model above, marketers can adopt similar decision models pertaining to product line decisions depending on the environment and business context.

Assumptions and Limitations

The scope of the study is limited only to product line decisions pertaining to continuation/withdrawal or re-launch and does not include new product launch decisions. The selection of the variables in such studies is driven by data availability and industry characteristics and hence does not include all possible decision constraints and alternatives. Since the proposed solution method is fuzzy multi-objective linear goal programming, the non-linear interactions are ignored. Besides the selection of the objective functions in both, the decision scenarios may be based on a more scientific approach, that is, analytic hierarchic process (AHP). The desired data for testing the model is specific to product category by brand and variant for the different variables, namely cost, profit, sales overheads, channel margin, advertising spend, and distribution overhead. There are certain assumptions to be made for the apportionment of these budgets for a variant and hence computational accuracy is reduced. Further, the author also submits that the adoption of the model for product line decisions is limited to usage by informed and experienced employees exposed to the methodology proposed.

The readers may note that while the study exposes the readers to a radically different approach in product line selection strategy by way of model design and formulation, the author has purposefully kept the model testing and validation out of scope given the focus of the handbook. But the methodology proposed in this chapter for product line decision-making is a significant shift from ad hoc methods adopted by marketers till this date. The proposed solution is transformational and warrants further study to establish the theory in the existing body of literature on product line decision-making. It forms a part of future research for the author.

Conclusion

Product line decision literature has evolved significantly over the past five decades since drawing initial interest in early 1960s. The body of knowledge on this subject has drawn attention of academicians from different domains, namely marketing, strategy, operations research, and decision sciences. Various techniques have been studied by researchers such as MDS, conjoint analysis, deterministic and probabilistic models, and, of late, hybrid optimization methods. The decision models have been developed on a range of intra-firm and inter-firm variables that have been extensively discussed in the study. But the gap is still glaring since none of the studies to the best of my knowledge have factored the practical problems faced by the marketer due to limited resources and incomplete information. Hence, adoption of traditional methods in decisions related to product continuation/withdrawal and re-launch is inappropriate. This study acknowledges bounded rationality of the marketer and suggests fuzzy-goal programming approach to arrive at a satisficing solution. Second, the study transforms the traditional decision methods by proposing a model considering multiple objective functions considered simultaneously, factoring the interplay of intra-firm, inter-firm, and MMC context. To summarize, the contribution of this study is far reaching in terms of both theoretical and methodological contribution in product line selection research. From a theoretical perspective, the model developed in the study considers a set of intra-firm variables (e.g. cost of goods sold, advertising spend, distribution overheads), inter-firm variables (market share), and MMC simultaneously. From a methodological perspective, the study factors the limitations of the marketer in terms of information availability while taking decisions and hence the role of linguistic goals in assigning the aspirational values for the objective functions. The study therefore transforms product line selection decision methods to a more practical approach that is representative of the dynamic business environment of today.

Bibliography

- Aaker, D. A., & Keller, K. L. (1990). Consumer evaluations of brand extensions. *Journal of Marketing*, 54(1), 27–41.
- Abegglen, J. C., & Stalk, G. (1985). *KAISHA, the Japanese corporation*. New York: Basic Books.
- Abell, D. F. (1980). *Defining the business: The starting point of strategic planning*. Englewood Cliffs: Prentice Hall.

- Anderson, S. J. (1995). Measuring the impact of product mix heterogeneity on manufacturing overhead cost. *Accounting Review*, 70, 363–387.
- Axaroglou, K. (2008). Product line extensions: Causes and effects. *Managerial and Decision Economics*, 29(1), 9–21.
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99–120.
- Baum, J. A., & Korn, H. J. (1994). The Community Ecology of Large Canadian Companies, 1984–1991. *Canadian Journal of Administrative Sciences/Revue Canadienne des Sciences de l'Administration*, 11(4), 277–294.
- Baum, J. A. C., & Korn, H. J. (1999). Dynamics of dyadic competitive interactions. *Strategic Management Journal*, 20(3), 251–278.
- Baumol, W. J., & Ide, E. A. (1961). Variety in retailing. In F. M. Bass et al. (Eds.), *Mathematical models and methods in marketing* (pp. 121–138). Homewood: R.D. Irwin.
- Bayus, B. L., & Putsis, W. P. (1999). Product proliferation: An empirical analysis of product line determinants and market outcomes. *Marketing Science*, 18, 137–153.
- Bellman, R. E., & Zadeh, L. A. (1970). Decision-making in a fuzzy environment. *Management Science*, 17(4), B-141.
- Benson, B. (1990). Increasing product variety and rising prices. *Review of Industrial Organization*, 5(1), 31–52.
- Bernheim, B. D., & Whinston, M. D. (1990). Multimarket contact and collusive behavior. *The RAND Journal of Economics*, 21, 1–26.
- Boeker, W., Goodstein, J., Stephan, J., & Murmann, P. (1994). The dynamics of market entry: The role of multipoint competition. Working paper, Graduate School of Business, Columbia University.
- Bordley, R. (2003). Determining the appropriate depth and breadth of a firm's product portfolio. *Journal of Marketing Research*, 40(1), 39–53.
- Calantone, R. J., Schmidt, J. B., & Song, M. X. (1996). Controllable factors of new product success: A cross-national comparison. *Marketing Science*, 15(4), 341–358.
- Carpenter, G. S. (1987). Modeling competitive marketing strategies: The impact of marketing mix relationships and industry structure. *Marketing Science*, 6, 208–221.
- Carroll, J. D. (1972). Individual differences and multidimensional scaling. In R. N. Shepard, A. K. Romney, & S. B. Nerlove (Eds.), *Multi-dimensional Scaling, Volume I/Theory* (pp. 105–155). New York: Seminar Press.
- Caves, R. E. (1984). Economic analysis and the quest for competitive advantage. *The American Economic Review*, 74, 127–132.
- Chen, M.-J. (1996). Competitor analysis and interfirm rivalry: Toward a theoretical integration. *Academy of Management Review*, 21(1), 100–134.
- Chen, M.-J., & Hambrick, D. C. (1995). Speed, stealth, and selective attack: How small firms differ from large firms in competitive behavior. *Academy of Management Journal*, 38(2), 453–482.
- Chen, K. D., & Hausman, W. H. (2000). Mathematical properties of the optimal product line selection problem using choice-based conjoint analysis. *Management Science*, 46(2), 327–332.

- Chen, M.-J., & MacMillan, I. C. (1992). Nonresponse and delayed response to competitive moves: The roles of competitor dependence and action irreversibility. *Academy of Management Journal*, 35(3), 539–570.
- Cohon, J. L. (2013). *Multiobjective programming and planning*. Courier Corporation. New York: Academic Press, 1978.
- Colgate. (2015). http://www.colgate.co.in/app/Colgate/IN/OralCare/ToothPastes.cvsp?cid=Google_Colgate%20-%20Brand-product-toothpaste_Brand-toothpaste_Ad2. Retrieved and Accessed on 18 Dec 2015.
- Connor, J. (1981). Food product proliferation: A market structure analysis. *American Journal of Agriculture Economics*, 21, 606–617.
- Cristol, S. M., & Sealey, P. (2000). *Simplicity marketing*. New York: The Free Press.
- Day, J. M., & Venkataramanan, M. A. (2006). Profitability in product line pricing and composition with manufacturing commonalities. *European Journal of Operational Research*, 175(3), 1782–1797.
- Deng, S., Aydin, R., Kwong, C. K., & Huang, Y. (2014). Integrated product line design and supplier selection: A multi-objective optimization paradigm. *Computers & Industrial Engineering*, 70, 150–158.
- Desai, P., Kekre, S., Radhakrishnan, S., & Srinivasan, K. (2001). Product differentiation and commonality in design: Balancing revenue and cost drivers. *Management Science*, 47(1), 37–51.
- Dobson, G., & Kalish, S. (1988). Positioning and pricing of a product-line: Formulation and heuristics. *Marketing Science*, 7(2), 107–125.
- Dobson, G., & Kalish, S. (1993). Heuristics for pricing and positioning a product-line using conjoint and cost data. *Management Science*, 39(2), 160–175.
- Dowell, G. (2006). Product line strategies of new entrants in an established industry: Evidence from the US bicycle industry. *Strategic Management Journal*, 27(10), 959–979.
- Draganska, M., & Jain, C. D. (2006). Consumer preferences and product-line pricing strategies: An empirical analysis. *Marketing Science*, 25(2), 164–174.
- Dutton, J. E., & Jackson, S. B. (1987). Categorizing strategic issues: Links to organizational action. *Academy of Management Review*, 12, 76–90.
- ElMaraghy, H., Schuh, G., ElMaraghy, W., Piller, F., Schönsleben, P., Tseng, M., & Bernard, A. (2013). Product variety management. *CIRP Annals-Manufacturing Technology*, 62(2), 629–652.
- Evans, W. N., & Kessides, L. N. (1994). Living by the “golden rule”: Multimarket contact in the U.S. airline industry. *Quarterly Journal of Economics*, 109, 341–366.
- Ferrel, O. C., & Hartline, M. D. (2011). *Marketing management strategies* (5th ed.). Delhi: Cengage Learning India Pvt. Ltd..
- Fruchter, G., Fligler, A., & Winer, R. (2006). Optimal product line design: Genetic algorithm approach to mitigate cannibalization. *Journal of Optimization Theory and Applications*, 131(2), 227–244.
- Fuentelsaz, L., & Gómez, J. (2006). Multipoint competition, strategic similarity and entry into geographic markets. *Strategic Management Journal*, 27, 477–499.

- Gimeno, J. (1999). Reciprocal threats in multimarket rivalry: Staking out “spheres of influence” in the U.S. airline industry. *Strategic Management Journal*, 20, 101–128.
- Gimeno, J., & Jeong, E. (2001). Multimarket contact: Meaning and measurement at multiple levels of analysis. *Multinunit organization and multimarket strategy*, 18, 357–408.
- Gimeno, J., & Woo, C. Y. (1996). Hypercompetition in a multimarket environment: The role of strategic similarity and multimarket contact in competitive de-escalation. *Organization Science*, 7(3), 322–341.
- Gourville, T. J., & Soman, D. (2005). Overchoice and assortment type: When and why variety backfires. *Marketing Science*, 24(3), 382–395.
- Green, E. P., & Krieger, A. (1985). Models and heuristics for product line selection. *Marketing Science*, 4(1), 1–19.
- Green, E. P., & Wind, Y. (1973). *Multiattribute decisions in marketing*. Hinsdale: The Dryden Press.
- Green, E. P., Douglas Carroll, J., & Goldberg, S. M. (1981). A general approach to product design optimization via conjoint analysis. *Journal of Marketing*, 45(Summer), 17–37.
- Gresov, C., Haveman, H. A., & Olivia, T. A. (1993). Organizational design, inertia and the dynamics of competitive response. *Organizational Science*, 4, 181–208.
- GSK. (2015). http://www.gsk-ch.in/horlicks_ninja.aspx. Retrieved and Accessed on 18 Dec 2015.
- Hannan, M. T., & Carroll, G. R. (1992). *Dynamics of organizational populations: Density, legitimation and competition*. New York: Oxford University Press.
- Hannan, M. T., & Freeman, J. (1989). *Organizational ecology*. Cambridge, MA: Harvard University Press.
- Hardie, B. G. S., & Lodish, L. M. (1999). *Harvard business review on brand management*. Boston: HBSP.
- Heese, H. S., & Swaminathan, J. M. (2006). Product line design with component commonality and cost-reduction effort. *Manufacturing and Services Operations Management*, 8(2), 206–219.
- Hoch, S. J., Bradlow, E. T., & Wansink, B. (1999). The variety of an assortment. *Marketing Science*, 18(4), 527–546.
- Holdren, B. R. (1960). *in The structure of a retail market and the market behavior of retail units*. Englewood Cliffs: Prentice-Hall Inc..
- Huffman, C., & Kahn, B. E. (1998). Variety for sale: Mass customization or mass confusion. *Journal of Retailing*, 74(4), 491–513.
- Hwang, C. L., & Yoon, K. (1981). Multiple criteria decision making. Lecture notes in Economics and Mathematical Systems.
- Jacobson, R. (1992). The “Austrian” school of strategy. *Academy of Management Review*, 17, 782–807.
- Jans, I., & Rosenbaum, D. I. (1996). Multimarket contact and pricing: Evidence from the US cement industry. *International Journal of Industrial Organization*, 15, 391–412.

- Jayachandran, S., Gimeno, J., & Rajan Varadarajan, P. (1999). Multimarket competition and interfirm rivalry: A synthesis and implications for marketing strategy. *Journal of Marketing*, 63(August), 49–66.
- Karnani, A., & Wernerfelt, B. (1985). Multiple point competition. *Strategic Management Journal*, 6, 87–98.
- Kekre, S., & Srinivasan, K. (1990). Broader product line: A necessity to achieve success? *Management Science*, 36(10), 1216–1231.
- Kiesler, S., & Sproull, L. (1982). Managerial response to changing environments: Perspectives on problem sensing from social cognition. *Administrative Science Quarterly*, 27, 548–570.
- Kim, K., & Chajjed, D. (2000). Commonality in product design: Cost saving, valuation change, and cannibalization. *European Journal of Operational Research*, 125, 602–621.
- Kohli, R., & Krishnamurti, R. (1987). A heuristic approach to product design. *Management Science*, 33, 1123–1133.
- Kohli, R., & Sukumar, R. (1990). Heuristics for product line selection using conjoint analysis. *Management Science*, 36(12), 1464–1478.
- Kotler, P. (1965). Competitive strategies for new product marketing over the life cycle. *Management Science*, 12(December), 104–119.
- Lancaster, K. (1990). The economies of product variety: A survey. *Marketing Science*, 9, 189–206.
- Lant, T. K., Milliken, F. J., & Batra, B. (1992). The role of managerial learning and interpretation in strategic persistence and reorientation. *Strategic Management Journal*, 13, 585–608.
- Little, J. D. C. (1975). BRANDAID: A marketing mix model, structure, implementation, calibration and case study. *Operations Research*, 23(4), 628–673.
- Lubben, R. (1988). *Just-in-time manufacturing*. New York: McGraw-Hill.
- MacDuffie, J. P., Sethuraman, K., & Fisher, M. L. (1996). Product variety and manufacturing performance: Evidence from the international automotive assembly plant study. *Management Science*, 42, 350–369.
- Mainkar, V. A., Lubatkin, M., & Schulze, W. S. (2006). Toward a product – Proliferation theory of entry barriers. *Academy of Management Review*, 31(4), 1062–1075.
- McPhaul, J. B., Crooker, K. J., Knight, P., Cherian, J., & Manion, M. T. (2010). Which market entry and product line strategies ought organizations to adopt for emerging economies? *Organizations and Markets in Emerging Economies*, 1(1), 82–99.
- Michalek, J. J., Ebbes, P., Adiguzel, F., Feinberg, F., & Papalambros, Y. (2011). Enhancing marketing with engineering: Optimal product line design for heterogeneous markets. *International Journal of Research in Marketing*, 28, 1–11.
- Montgomery, D. B., & Urban, G. L. (1969). *Management science in marketing*. Englewood Cliffs: Prentice-Hall.

- Moorthy, K. S. (1984). Market segmentation, self-selection, and product line design. *Marketing Science*, 3(4), 288–307.
- Morgan, L. O., Daniels, R. L., & Kouvelis, P. (2001). Marketing/manufacturing trade-offs in product line management. *Iie Transactions*, 33(11), 949–962.
- Mu, L., Dawande, M., Gavirneni, S., and Sriskandarajah, S., (2013); “Product line extensions: Analysis, insights and intuitions”, Submitted for review to *Management Science*.
- Nair, S. K., Thakur, L. S., & Wen, K. (1995). Near optimal solutions for product line design and selection: Beam search heuristics. *Management Science*, 41(5), 767–785.
- Narisetti, R. (1997). P&G, seeing shoppers were being confused, overhauls marketing. *Wall Street Journal*, A1–A8.
- Netessine, S., & Taylor, T. A. (2007). Product line design and production technology. *Marketing Science*, 26(1), 101–117.
- Nichols, K. (2000). The product line pricing and positioning problem: A meta-heuristic approach. Indiana University Dissertation.
- O’Meara, J. T. (1961). Selecting profitable products. *Harvard Business Review*, 39(1), 83–89.
- Parker, P. M., & Röller, L.-H. 1997. Collusive conduct in duopolies: Multimarket contact and cross-ownership in the mobile telephone industry. *RAND Journal of Economics*, 28: 304–322.
- Penrose, E. T. (1959). *The theory of the growth of the firm*. New York: Wiley.
- Peteraf, M. A. (1993). The cornerstones of competitive advantage: A resource-based view. *Strategic Management Journal*, 14, 179–191.
- Polli, R., & Cook, V. (1969). Validity of the product life cycle. *Journal of Business*, 385–400.
- Putsis Jr., W. P. (1997). An empirical study of the effect of brand proliferation on private label-national brand pricing behavior. *Review of Industrial Organization*, 12, 355–371.
- Putsis Jr., W. P., & Bayus, B. L. (2001). An empirical analysis of firm’s product line decisions. *Journal of Marketing Research*, 38, 110–118.
- Quelch, J., & Kenny, D. (1994). Extend profits, not product lines. *Harvard Business Review*, 72, 153–160.
- Ramaswamy, V., Gatignon, H., & Reibstein, J. D. (1994). Marketing behavior in industrial markets. *Journal of Marketing*, 58(2), 45–55.
- Ramdas, K., & Sawhney, M. S. (2001). A cross-functional approach to evaluating multiple line extensions for assembled products. *Management Science*, 47(1), 22–36.
- Ratchford, B. (1990). Commentary: Marketing applications of the economics of product variety. *Marketing Science*, 9(Summer), 207–211.
- Reddy, S. K., Holak, S. L., & Bhatt, S. (1994). To extend or not to extend: Success determinants of line extensions. *Journal of Marketing Research*, 31(May), 243–262.
- Schelling, T. C. (1960). *The strategy of conflict*. Cambridge, MA: Harvard University Press.

- Schmalensee, R. (1978). Entry deterrence in the ready-to-eat breakfast cereal industry. *Bell Journal of Economics*, 9, 305–327.
- Schön C. (2010). On the product line selection problem under attraction choice models of consumer behaviour. *European Journal of Operational Research*, 206, 260–264.
- Shankar, V. (2006). Proactive and reactive product line strategies: Asymmetries between market leaders and followers. *Management Science*, 52(2), 276–292.
- Shocker, A. D., & Srinivasan, V. (1974). A consumer based methodology for the identification of new product ideas. *Management Science*, 20(February), 921–937.
- Shocker, A. D., & Srinivasan, V. (1977). LINMAP (Version II): A FORTRAN IV computer program for analyzing ordinal preference (dominance) judgments via linear programming techniques and for conjoint measurement. *Journal of Marketing Research*, 14, 101–103.
- Simon, A. H. (1955). A behavioral model of rational choice. *The Quarterly Journal of Economics*, 69(1), 99–118.
- Song, M. X., & Parry, M. E. (1994). The dimensions of industrial new product success and failure in state enterprises in the people's Republic of China. *Journal of Product Innovation Management*, 11(March), 105–118.
- Song, M. X., & Parry, M. E. (1997). The determinants of Japanese new product successes. *Journal of Marketing Research*, 34(February), 64–76.
- Sorenson, O. (2000). Letting the market work for you: An evolutionary perspective on product strategy. *Strategic Management Journal*, 21(5), 577–592.
- Srinivasan, V., & Shocker, A. D. (1973). Linear programming techniques for multidimensional analysis of preferences. *Psychometrika*, 38(September), 337–370.
- Stavins, J. (1995). Model entry and exit in a differentiated product industry: The personal computer market. *Review of Economics and Statistics*, 77(November), 571–584.
- Tang, S. C., & Yin, R. (2010). The implications of costs, capacity, and competition on product line selection. *European Journal of Operational Research*, 200, 439–450.
- Teece, D. (1982). Toward an economic theory of the multiproduct firm. *Journal of Economic Behavior and Organization*, 3, 39–63.
- Teece, D., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533.
- Thomas, L. A. (1996). Advertising sunk costs and credible spatial pre-emption. *Strategic Management Journal*, 17, 481–498.
- Tsafarakis, S., Marinakis, Y., & Matsatsinis, N. (2011). Particle swarm optimization for optimal product line design. *International Journal of Research in Marketing*, 28(1), 13–22.
- Tversky, A. (1977). Features of similarity. *Psychological Review*, 84, 327–352.
- Tzeng, H. G., & Huang, J. J. (2014). *Fuzzy multiple objective decision making*. Boca Raton: CRC Press/Taylor and Francis Group/LLC.
- Urban, G. L. (1967). SPRINTER: A tool for new product decision making. *Industrial Management Review*, (pre-1986), 8(2), 43.

- Urban, G. L. (1968). A new product analysis and decision model. *Management Science*, 14(8), 490–517.
- Urban, G. L. (1969). A mathematical modelling approach to product line decisions. *Journal of Marketing Research*, 6(1), 40–47.
- Urban, G. L. (1975). PERCEPTOR: A model for product positioning. *Management Science*, 21(April), 858–871.
- Urban, G. L., & Hauser, J. R. (1969). *Design and marketing of new products*. Englewood Cliffs: Prentice-Hall, Inc..
- Urban, G. L., Hauser, J. R., & Dholakia, N. (1987). *Essentials of new product management*. Englewood Cliffs: Prentice Hall Inc..
- van Ryzin, G., & Mahajan, S. (1999). On the relationship between inventory costs and variety benefits in retail assortments. *Management Science*, 45, 1496–1509.
- Villas-Boas, J. M. (1998). Product line design for a distribution channel. *Marketing Science*, 17, 156–169.
- Villas-Boas, J. M. (2004). Communication strategies and product line design. *Marketing Science*, 23(3), 304–316.
- Wagner, H. M. (1970). *Principles of management science*. PRENTICE-HALL, INC. Englewood Cliffs, N.J.
- Wernerfelt, B. (1984). A resource based view of the firm. *Strategic Management Journal*, 5, 171–180.
- Wind, Y., & Claycamp, H. J. (1976). Planning product line strategy: A matrix approach. *The Journal of Marketing*, 40, 2–9.
- Woosong, K., Bayus, B. L., & Balasubramanian, S. (2010). The strategic effects of multimarket contact: Mutual forbearance and competitive response in the personal computer industry. *Journal of Marketing Research*, 47(3), 415–427.
- Yager, R. R., & Basson, D. (1975). Decision making with fuzzy sets. *Decision Sciences*, 17, 560–600.
- Zadeh, L. A. (1965). Fuzzy sets. *Information and control*, 8(3), 338–353.
- Zimmermann, H. J. (1978). Fuzzy programming and linear programming with several objective functions. *Fuzzy Sets and Systems*, 1, 45–56.
- Zufryden, F. S. (1977). A conjoint measurement based approach for optimal new product design and market segmentation. In A. D. Shocker (Ed.), *Analytic approaches to product and market planning* (pp. 100–114). Cambridge, MA: Marketing Science Institute.
- Zufryden, F. S. (1979). ZIPMAP-A zero-one integer programming model for market segmentation and product positioning. *Journal of Operational Research Society*, 30(January), 63–70.
- Zufryden, F. S. (1982). Product line optimization by integer programming. *Annual ORSA/TIMS Meeting*, San Diego.

11

Industry 4.0: How to Manage Transformation as the New Normal

Thomas Ochs and Ute Riemann

Ideas in Brief While the concept of Industry 4.0 has gained enormous interest within the business community, the organizational change required for its successful deployment is still in its infancy. Based on project experience at Villeroy & Boch's production, we aim to answer the following question: How should a comprehensive approach be designed and what elements should such an approach encompass to overcome the traditional perception that change is not an episodic element but a continuum? What elements does such a comprehensive approach have to cover in order to ensure its guiding relevance within a continuous change environment? Industry 4.0 is not only about technology. It also addresses the DNA of a company leading to a continuous and in-depth change of the business backbone. When a company starts dealing with Industry 4.0, it is about moving out of their traditional industry silos, encouraging innovative thinking which leads to new business capabilities. This is where the need to manage the transformation becomes most significant; unfortunately, this is also where traditional change management methodologies come to its boundaries. Therefore, we need to find concepts and approaches that support this transformation creating the ability to validate potential solutions and opportunities and to encourage innovative thinking to allow the company gaining value on their individual path

T. Ochs (✉)
CIO, Villeroy & Boch, Mettlach, Germany
e-mail: ochs.thomas@villeroy-boch.com

U. Riemann
Business Transformation Management, SAP, Walldorf, Germany

forward in adopting Industry 4.0. We propose a blended change management approach, adding elements of Design Thinking. The key assumption is that Design Thinking does not only support innovative processes, but helps a corporate culture to continuously allow the required transformation as it is a key cornerstone on our way to make Industry 4.0 successful.

Keywords Business transformation • Change continuum • Change management • Design Thinking • Industry 4.0

Introduction

Industry 4.0 gained an enormous interest in science and practice due to the opportunities inherent in this concept. The key promise of Industry 4.0 is to witness a new industrial revolution, fueled by the advancement of digital technologies affecting all business areas. The fusion of the physical and the virtual world with the appliance of cyber-physical systems has a disruptive impact on every business domain of manufacturing companies which leads to an extensive individualization of the production and a radical change of manufacturing and selling. Key cornerstones are, to name a few:

- Doing more with less. Seventy-eight percent of industrial manufacturing CEOs have implemented a cost-reduction initiative over the past 12 months, and 70 percent expect to trim the fat in the next 12 months (Price Waterhouse Coopers 2015).
- Digitalization of products and processes. Fifty percent of investment in equipment will be for Industry 4.0 enabled solutions (Price Waterhouse Coopers 2015).
- Moving from products to solutions. Eighty-four percent of industrial manufacturing CEOs plan to change their company's R&D and innovation capacity over the next 12 months (Price Waterhouse Coopers 2015).
- Basing new business models on big data. Sixty-seven percent of organizations have little to no infrastructure for analyzing and acting on streaming Big Data (CapGemini 2015).

Companies such as Villeroy & Boch (V&B) expect massive changes in their manufacturing business model and their entire supply chain. This is due as new competitors change the entire market approach. The traditional way V&B produces today with a strong focus of supply chain efficiencies will vanish with the emergence of Industry 4.0 and its technological capabilities (Fig. 11.1).

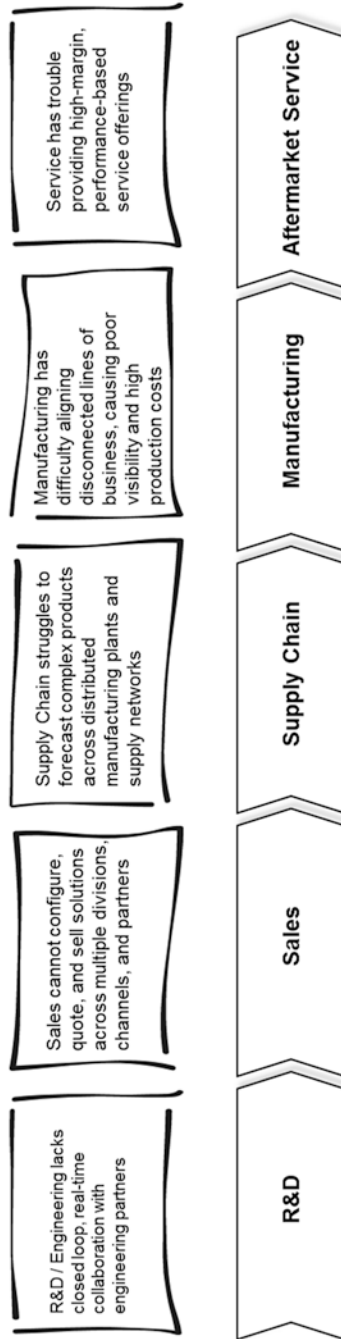


Fig. 11.1 Key changes in manufacturing and the supply chain

However, even technical challenges, uncertainties and tremendous transformation issues have not slowed down the demand for the concepts and expected benefits underlying in Industry 4.0. Therefore, V&B has taken the decision to proactively address this topic by developing their own strategy which is derived from their successful home ground combining distinctively selected Industry 4.0 capabilities and value drivers, and embed them in their existing corporate structures. For deploying such a change successfully, companies need to consider the expected corporate transformation seriously. To secure a consistent implementation, they have to address, for example, the requirements toward the digital infrastructure, the changes in leadership, as well as the governance of the transformation process itself. The diffusion of Industry 4.0 into the corporate world does not only affect the technology and the operating model of the company, it also confronts managers and employees with new working modes and demands for new capabilities. For managing such a complex transformation, an appropriate methodology needs to be in place to secure an organizational transition gaining acceptance within the organization while facing the challenging activities due to Industry 4.0. Such a methodology needs to address all dimensions of Industry 4.0, and it needs to take into account the multitude of changes to be handled while adopting Industry 4.0.

This chapter aims to contribute to these challenges with the proposition of such an approach based on a practitioner experience of a midsize production company. With the decision to apply key elements of Industry 4.0 in the V&B's manufacturing environment the decision has implicitly taken, that V&B has to be able to manage the new requirements. Where previously only stepwise changes in the production were normal, with Industry 4.0 disruptive changes become the new normal. These changes will affect core elements of the production and the change itself will become *a lasting companion* to continuously capture the new market requirements. This means that V&B has to apply a new way of thinking into the organization to successfully manage the path forward, from a defined digitalization strategy toward the implementation of Industry 4.0.

The remainder of this chapter is structured as follows. First, we outline Industry 4.0, and, with a focus on manufacturing, V&B's view regarding Industry 4.0. Our target is to sharpen the understanding of what the unique characteristics of Industry 4.0 are from a transformation perspective. The next section analyzes the currently available transformation methodologies and their limitations; it presents the key principles of Design Thinking as a methodology that includes elements that are necessary to manage the changes resulting from Industry 4.0. Having outlined the challenges within the manufacturing business, our proposition is that there is a need to proactively enabling the company for being successful. For doing so, it is not enough to just manage projects and

get used to traditional change management methodologies. It is necessary to add elements of Design Thinking to change the way of thinking and acting and being able to manage the transformation and benefit of Industry 4.0.

Industry 4.0 and V&B's Perspective

Industry 4.0: A Definition with a Special Focus on Manufacturing

Coming the long way from the first stage of the industrial revolution with the introduction of the mechanical production facilities at the end of the eighteenth century, we are now on the threshold of the fourth stage of the industrial (r)evolution that allows a very flexible production environment, with intelligent, embedded systems that communicate with each other. The term Industry 4.0 has been widely discussed, and there are various definitions available in the literature.

According to Pfrommer et al. found “[...] is characterized by the fact, that digital steered system in the production industry communicate between each other with the use of internet technologies”. With the use of one common network (...) all involved parties get direct access to more information and functionalities than before. (Pfrommer et al. 2014, pp. 1–2)

The acatech consortium stated “[...] the Internet of Things and Services is coming to the manufacturing environment.

In essence, Industry 4.0 will involve the technical integration of CPS into manufacturing and logistics and the use of the Internet of Things and Services in industrial processes. This will have implications for value creation, business models, downstream services and work organization” (acatech 2013, p. 14).

The concept of industry 4.0 leads to a totally new level of production automation. On one hand side it links to the data structures and data networks of the existing production concepts ... on the other hand side it focuses on highly flexible data structures linked to real production processes leading to entirely new types of production steering and organization of production processes ... this new level of automation based on a continuous self-optimization with intelligent IT components and autonomous degree of self-adaptation towards dynamically changing environments ... The technological basis are the so called cyber-physical systems (CPS) (Hirsch-Kreinsen 2014, pp. 1–4).

From a manufacturing perspective, the fourth generation of industrialization heralds the evolution toward smart factories leveraging the latest technological concepts and innovations. Major changes in the manufacturing business are expected due to the number of intelligent devices within the production and the amount of information provided by these devices. They increase the insight within the production significantly, and bring a higher degree of transparency into the actual situation on the shop floor. They also allow much more timely and informed decisions than in the past. This goes hand-in-hand with the vision of a network of intelligent systems, products, and machines with the ability to exchange information and make decisions more and more autonomously (Fig. 11.2).

As a result, the entire shop floor becomes more efficient, brings better insight and transparency into the actual situation, and allows more timely and informed decisions than in the past. The internal digital infrastructure serves as the key technological enabler for Industry 4.0 leading to a continuous virtualization of core business processes, such as the product design as one of the core competency of any manufacturing company. These virtual processes will then run within or even beyond company boundaries leading to a flexible collaborative environment, new collaboration models (that need to be defined and adapted), new data sharing procedures (that need to be established), and the protection of the intellectual property in a completely new way. While information technology (IT) helps to make these business models a reality, the same digital technology will strongly affect the way companies innovate while using smart solutions to increase customer value leading to completely new business models and service offerings. Supporting a company’s transformation, Fig. 11.3 shows the six key enablers of Industry 4.0 that V&B have

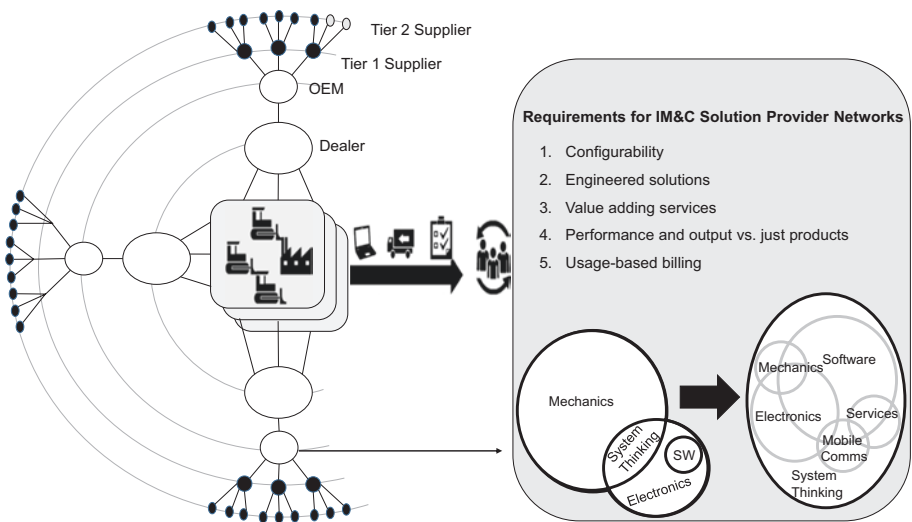


Fig. 11.2 Major changes in the manufacturing business

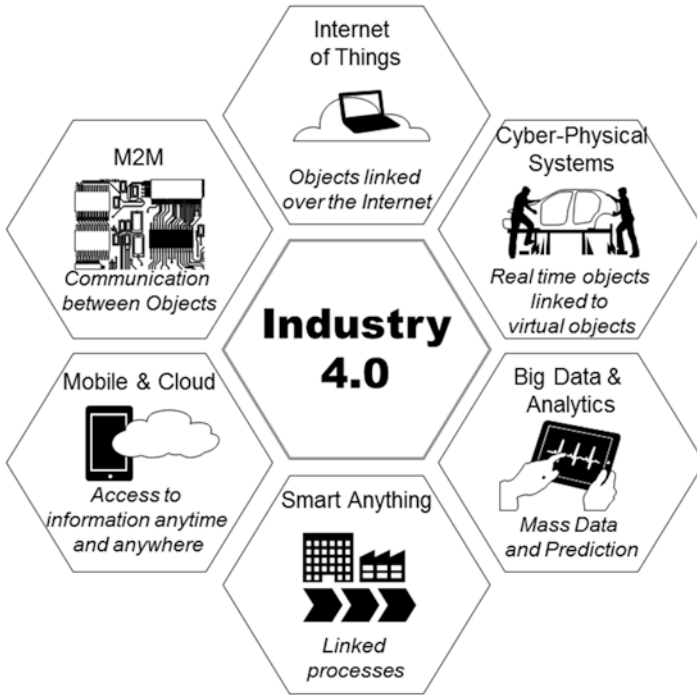


Fig. 11.3 Key enablers for a manufacturing-oriented Industry 4.0 (Villeroy & Boch project)

considered for their manufacturing-oriented Industry 4.0 approach. These key enablers are:

- Mobile and cloud,
- Internet of Things (IoT),
- Machine to Machine (M2M),
- Big Data and analytics,
- Variety,
- Smart business, and
- Cyber physical systems.

Mobile and Cloud

Cloud computing enables ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) where mobility is one of the core elements.

The provisioning can be rapidly secured with minimal management effort or service provider interaction. Cloud computing is mainly composed of dedicated essential characteristics (Mell and Grance 2011): On-demand self-service, network access, resource pooling, rapid elasticity, and resource usage (i.e. the applications delivered as services over the Internet and the hardware and systems software in the data centers that provide those services, see Armbrust et al. 2010), three basic service models, and three deployment models. The basic service models are (see Riemann 2015a): Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). For an analysis of cloud services relevant for business services within the digitalization of consumer products industry (Riemann 2015b) the main deployment models to be considered are: Private cloud, Public cloud and Hybrid cloud.

Internet of Things (IoT)

In the Internet of Things environment, augmented physical objects connected to the Internet will rearrange the rules of occupancy and patterns of mobility within the physical world—and its impact on enterprise systems. It brings concepts and technical components together into an open, service-oriented, model-based, and event-driven concept.

Machine to Machine (M2M)

Active communicating devices are connected to the Internet, using a variety of fixed and wireless networks and communicate with each other and the wider world. M2M is enabled by ubiquitous connectivity. Machines will communicate status and information, which then can be aggregated, enriched, and communicated internally or onward to other units. This in turn allows the use of these data in new and useful ways.

Big Data and Analytics

One of the most cited definitions is included in the Gartner report from 2009 (Vogel-Heuser et al. 2009): they proposed a definition encompassing the three Vs:

- Volume,
- Velocity, and
- Variety.

This idea is supported by the NIST definition, which states that big data is data which “exceed[s] the capacity or capability of current or conventional methods and systems” (Mike 2.0, Big Data Definition). All definitions make at least one of the following assertions. Size: the volume of the datasets is a critical factor. Complexity: the structure, behavior, and permutations of the datasets are a critical factor. Technologies: the tools and techniques which are used to process a sizable or complex dataset are a critical factor (Ward and Barker 2013).

Smart Business

Smart Business consists of Smart Services, Smart Innovations, Smart Supply Chains, and Smart Factories. Smart Supply Chains and Smart Factories mainly drive its efficiency. The Smart Factory constitutes a constant communication and data analysis concerning the product’s state and builds the basis for expanding the (aftersales) service business. Through the networked machines, a new level of self-organization and process optimization is enabled in the form of decentralized production control and a basis for data-driven operational excellence. Smart Solutions and Smart Innovation primarily leverage company growth. They open up paths for entirely new business models and markets through innovative service offerings and delivery models because the connectivity and rich data basis of Industry 4.0 together with powerful analytics tools provide the foundation for new service offerings. Moreover, digital technologies create further potential for optimizing existing service operating models, for example, by providing analytic models that support intelligent decision-making as well as next best action suggestions. Therefore, smart services are key market-side differentiator in the competitive environment of the future. Especially manufacturing companies based in high-cost countries need to leverage this opportunity in order to sustain their competitive edge and drive growth, allow higher benefit, enhance customer experience, and intensify the customer relationship.

Cyber-Physical Systems

Cyber-physical systems (CPS) provide new features and functions based on connectivity. They incorporate self-management as well as communication capabilities, and trigger radically new business models in an era of decentralized decision-making and autonomous operations. CPS include adaptive features and opportunities for customization to better match their surrounding

environment and tasks and are also able to self-maintain configuration and functionality throughout their lifecycle, remain connected with manufacturers, providing them with a wealth of information for product optimization and innovation. The used intelligent control technology enables autonomous product adaptation based on internal or external commands and responsive predictions at which point in the future a production system will require maintenance.

Transformation Approach for Industry 4.0

To become a digitalized company, various change dimensions need to be addressed. These significant changes will affect the entire company. Since a company has a consistent way to process all assets, we have to make sure that these processes are treated comprehensively, that interfaces between these processes are considered, and that the building blocks of the organization are transformed in a way that they merge together into a new, transformed, but again consistent way.

Industry 4.0 is not about purely implementing state-of-the-art digital technologies, which might gain short-term benefits but are likely to fall short of their real goals, nor is it a quick-fix solution. It is a long-term commitment and strategic imperative with enormous implications: the digitized manufacturing processes will bring big challenges, such as flexibility, modularity, boundlessness, and decentralization.

Flexibility

Manufacturers' operating models become more flexible to be able to quickly apply to challenges and opportunities. Rigid corporate structures are replaced by an organizational design allowing elasticity in daily operations.

Modularity

The manufacturing environment becomes progressively more dynamic. New market players, technologies and product opportunities emerge rapidly, others disappear equally fast. In order to remain sufficiently agile, manufacturing companies need to organize their businesses encapsulated around their core solution or processes. The integration or separation of a "module" should be possible without strenuous periods of transition.

Boundlessness

Manufacturers have to find solutions to seamlessly integrate and steer external resources. The virtual product model becomes a boundless and valuable resource. In order to allow the extended production, manufacturers must proactively work at creating an organization befitting changing realities.

Decentralization

The trade-off between centralized and decentralized operations has to be evaluated newly. Going forward, manufacturing companies need to target opportunities to decentralize building blocks of their operating model, thereby increasing their ability to respond quickly and effectively to local market developments. The localization of solution portfolios and sourcing markets is one aspect as well as to develop the mechanisms for balancing globally decentralized resource networks in order to achieve efficient utilization.

Transformation at Villeroy & Boch

V&B is a highly innovative company with a time-honored tradition. It is one of the most important brands in Germany, Europe, and indeed the world. Since its origins over 265 years ago, the ceramics manufacturing company founded in 1748 has developed into an international lifestyle brand. V&B is represented in 125 countries around the world and has 14 production facilities in Europe, Mexico and Thailand. The headquarters of the listed company are located in Mettlach in Saarland (Germany). The ceramics manufacturing company has two divisions: the Bathroom and Wellness and the Tableware division.⁷ The diverse, complete solutions of the product range convince consumers as well as designers and architects in every respect.

Coming from a position of strength, V&B has decided to actively rise to the challenges of Industry 4.0 aiming to take advantage of the benefits of Industry 4.0. Since the production is a key differentiator for V&B and Industry 4.0 predicts a significant benefit potential in this area, V&B decided to focus on manufacturing first. With the convergence of the physical and digital world through all layers of the production, Industry 4.0 will have a significant impact on V&B's production and its functionally related and adjacent sections as it transforms the entire way manufacturing operations run.

By defining their digitalization strategy and setting, the priority to start within the production area to optimally leverage a smart combination of the available new technologies by balance value creation and efforts to strengthen their competitiveness in a more complex (production) environment the first step has been made.

V&B is under intense pressure to develop their digital skills and smart value propositions to stay successful in a changing and highly competitive market. One key finding is, that the old management and expert model as a structuring element of the company becomes outdated

The two key cornerstones are that the entire production becomes *digital* and that the operating model becomes more *agile*. Such an agile operating model can be defined as the ability to thrive in a competitive environment of continuous and unanticipated change. Stating these cornerstones and having the fourth industrial revolution ahead, V&B has developed an own vision of how they will run their business in the future. Such kind of strategy embedded in a transition will be a process of disruptive change toward a dynamic future manufacturing environment. The key changes can be summarized as follows:

Production becomes network-supported: Roles and responsibilities will change. Mobile devices and assistance systems will simplify the flexibility to staff employees. Employee profiles and skills become more interdisciplinary, more demanding, and more versatile. An interdisciplinary teamwork, which is a basic IT competency, becomes essential as a technological footprint.

Manufacturing becomes knowledge work. New, changing, and complex topics and tasks will emerge, and a comprehensive solution competency becomes a core competency. Digital production assistance systems become important as well as the use of social media will have a positive impact toward usability.

Companies become more innovative. Consumers become prosumer as the changing customer requirements result in a higher innovation pressure. The closeness to the market and customers will lead to a better understanding of the customer needs but require a dynamic and fast translation into value delivery for the company. Such a boundless company fosters open innovation processes and innovation culture.

Learn on demand becomes a new paradigm. Interdisciplinary education, personal learning, and training on the job become more flexible and are of strategic relevance for the company. An ongoing check of employee profiles covering a broader requirement of skills and abilities covered with a learning-on-demand concept needs to be established.

Stating these changes, the complexity of the transformation process ahead can only be sustainable and successful if it is accompanied with a coherent and

governed transformation approach. By contrast, an uncoordinated array of bottom-up initiatives will block the path toward Industry 4.0. Organizational silos must be aligned to a common target setting and especially the separation of business and IT functions still witnessed today will prove to be a true showstopper. The governance mechanisms for steering such a transformation needs to ensure that business and IT mutually push for the initiation and sustained drive of technology-based change; IT must come to be seen as a central business enabler.

Industry 4.0 and Its Impact on the Manufacturing Core Model

Overall, manufacturers need to aggressively take advantage of opportunities and innovative combinations of Smart Services and Smart Products to broaden their value creation activities—or else they will be forced out of the market. While covering not only bits and pieces, but also the entire process landscape that is affected by Industry 4.0, we need to take a deeper look at V&B's end-to-end processes to better understand the effect and impact of Industry 4.0 on manufacturing (see Fig. 11.4). For an analysis on cloud services on business processes in the digitalization of consumer products industry, see Riemann (2015b).

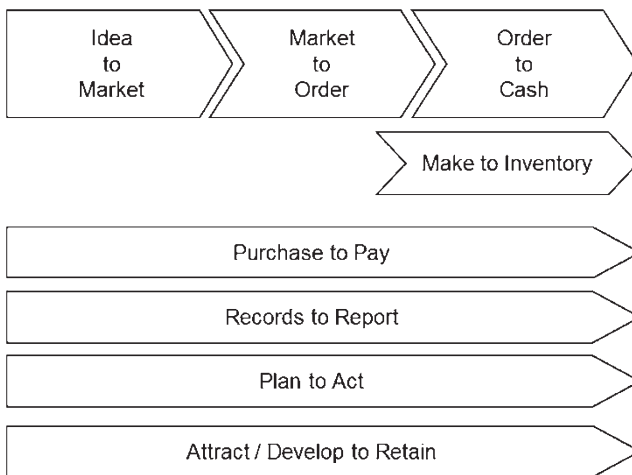


Fig. 11.4 End-to-end process serves as a basis to make the effect and impact of Industry 4.0 on manufacturing transparent

Starting with the creative process of product innovation anchored in the end-to-end process of *Idea-to-Market* interfacing toward the production with the release of prototypes and—later on—with the hand-over of the new product lines to the manufacturers, we have to consider the topic of Smart Innovations and Connected Lifecycle Innovation. Smart innovation embraces the creation and distribution of ideas across organizational borders and even beyond with the creation of virtual innovation hubs enabled by IT leveraging the product lifecycle data as a source for innovation. This concept will change the entire innovation process opening up to external partners and customers increasing the flexibility and customer orientation of manufacturers' innovation activities. The overall frequency of impulses will be boosted by the exchange of information. Collaboration in the innovation process with both customers and partners will reduce the time-to-market and drive innovation speed toward a constant flow. By sharing information throughout the manufacturers' ecosystem, the great blue of ideas out there has groundbreaking potential for innovation and the data gathered along product lifecycles provides a shockingly underexploited resource for innovation. Combined with the analytical powers of digital tools, these increasingly rich datasets provide a chance to innovate with great benefits. With the coupling of products and other relevant data, we establish the ability to create an entire and holistic new approach of product lifecycle management. The product-related information are linked with other relevant data, such as machine parameters or customer order data and then analyzed, processed, and put to use for generating innovation, enabling data-driven R&D decision-making, and business process innovation. This openness allows the incorporation of new impulses that can come from a multitude of sources outside the own organization, and they have to be proactively integrated into an open innovation process. The original owner of the innovation thus has to empower partners to participate in the process. By passing on knowledge and receiving the necessary support by all involved and affected teams in the entire company, innovation will spread and will be more sustainable for all participants.

Following V&B's end-to-end process landscape, we have to address the product and service portfolio offered to the customer. Products and services become *connected* and *smart*. This connectedness and smartness drives revenue growth by enhancing the user experience and improving the total cost of ownership which significantly intensifies the customer relationship and interaction. More general: This enables completely new value propositions and business models; it represents an enormous potential to penetrate new markets and build data-driven business models. This connectedness and smartness provides new offerings and generates new markets with a key market-side differentiation in the competitive environment of the future (Fig. 11.5).

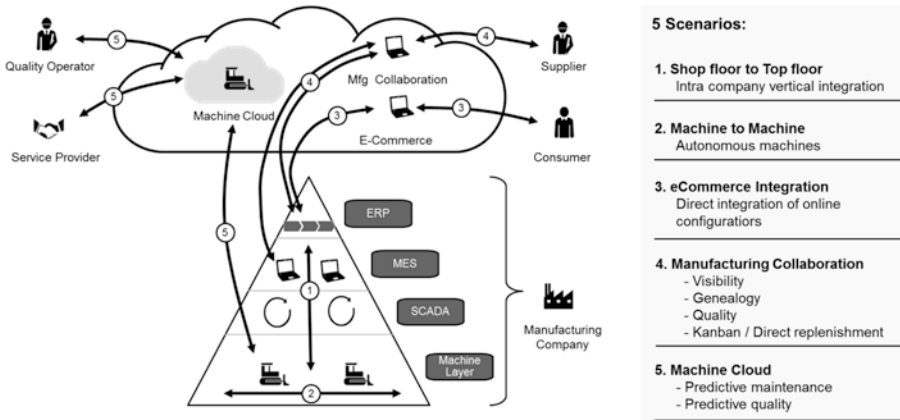


Fig. 11.5 Smart and connected product and service portfolio

Especially manufacturing companies based in high-cost countries such as V&B decided to leverage this opportunity in order to sustain their competitive edge and drive growth as the efficiency of service delivery can be greatly improved and the lifecycle value for the associated products can be optimized.

While defining their own V&B end-to-end process landscape, the company has decided to deviate from the traditional and in the literature well-defined end-to-end process definitions, and instead focus on the essentials of their business. This is why the decision was made to define an end-to-end process *Make-to-Inventory* which covers all manufacturing-related processes. Even though this might not be a classical end-to-end process as stated in the literature, it offers the advantage to focus on one single end-to-end process covering the core asset of manufacturing of V&B. With this process-view, we have the ability to directly address these “outside-in” and “inside-out” process changes enabled by digital technologies, such as community platforms, collaborative tools, or connecting knowledge resources. This digitally enabled collaborative network is a key success factor and enables highly integrated and automated processes covering the shift in horizontal integration toward a flexibly defined extended enterprise. The connected supply chains are then formed through the vertical supply network by recreating supply flows on a virtual level, allowing the seamless integration and automation of physical processes and thus provide V&B with dramatically increased transparency and to focus on core competences yet allowing them to offer customized products in any market. The basic idea here is that while focusing on their core competencies V&B can improve their value proposition with an agile collaboration moving into more project-based business areas with highly individualized products at

acceptable costs. The smart and connected supply network—where manufacturing is an integral part of it—becomes a centerpiece of operational excellence as it leads to a drastic improvement of the cost efficiency and flexibility of the operations, driving growth through improved, unique value propositions and assess production capabilities together with collaboration partners to overcome capacity bottlenecks. In order to manage the growing complexity of supply chains, physical flows have to be mapped continuously on digital platforms. Pull processes and one-piece flow will be much more feasible in digitally enabled supply chains. Instead of supply issues, production systems' physical capabilities will represent the impediment addressed. Transforming the production floor into a marketplace of capacity and production requires a new shop floor concept. Here again, V&B faces a radical change from today's production planning and control: instead of controlling the shop floor through a central system, cyber-physical production systems will be able to make decisions locally, thus decentralizing production control linked to the manufacturing ecosystem.

The concept of Industry 4.0 arises at a time as digital technologies coalesce into an ecosystem of "Digital" and the successful transformation toward Industry 4.0 depends on mastering this ecosystem. Processes and organizational structures need to correspond to the end-to-end integrated operations adapting the vision of Industry 4.0. Based on the fundamental enablement by an appropriate IT infrastructure the operations model is of key interest as the technology has a disruptive impact on the way V&B produces tomorrow. V&B defines their target picture and a transformation roadmap for their production that outlines the journey with respect to the new digital world ahead. For companies such as V&B it is therefore essential to understand how to best get advantage of a smart combination of these technologies and capabilities to create the expected value in the digital age. Leveraging the fusion of the physical and the virtual world with cyber-physical systems, this requires technologies such as machine-to-machine communication, cloud computing, and advanced analytics. Having addressed the digital layer, the mastering of the complexity of an individualized, smart, and connected production is one of the key challenges. Given physically capable production processes, a decentralized production control provides the possibility of manufacturing each product individually without additional cost with highly reliable delivery dates. The operational flexibility and productivity increase as the production line's finite capacities are allocated in the most efficient way. Contradicting targets and constraints are taken into account, and the overall production process can be holistically optimized.

Change Requirements to be Addressed by Industry 4.0

Industry 4.0 is a continuous transformation process of strategic relevance that needs to be linked to the top management and shall embed into comprehensive strategy. In a continuous dialogue with all affected groups, a holistic awareness of chances and risks need to be established. For V&B it becomes obvious that the term *Change* becomes ubiquitous, rising in frequency and intensity. Managing these changes is essential for a successful transformation process as the people's perspective of *digital* is at least as challenging as the technical one.

Change Management

Change management helps the employees to transit from the current to the future state in a way that it minimizes productivity loss, negative impact, and employee turnover, while at the same time maximizing the speed of adoption and ultimate utilization of the change throughout the organization. Organizational optimization is the process by which organizational change management facilitates the establishment of a transition to the amended infrastructure; it is necessitated by introducing new and/or revised business processes (Riemann 2015c).

Since project management focuses on the realization of the effective installation of the solution (Gareis 1989), change management ensures that people are adopting the change. Change management contains the planning, implementation, and monitoring of changes with the objective of maximizing effectiveness and efficiency and acceptance of the change process, helping to achieve economies of scale, process innovations, improving learning curve, and reduction in production time (Allen and Helms 2006). Change management adds significant value to the success of a transformation process as it enables the effective management of the human side of a business transformation, and facilitates the transition to the amended structures, necessitated by introduction of new and/or revised business processes. It assesses the impact of change on the jobs and individuals (including those who are affected outside the immediate scope), and introduces tools and mechanisms to ensure that the change is managed and implemented properly with minimum disruption to the organization (Riemann 2015c).

It is a given that the change itself belongs to the survival mechanism of a company. It is a given that it becomes an overwhelming value proposition in the light of Industry 4.0. Unfortunately, change is closely related to resistance.

Whatever the reason is for resisting change, history tells us that any competitive advantage—proposed, for example, by Industry 4.0—can disappear quickly leaving a company to question its future. Consequently, change management consists of a set of tools and practices that are used to manage this resistance. While building the bridge between implementing a solution and the affected organization ultimately helps to realize the benefits associated with the change. Especially in transformation projects, we have to manage the shift from a stable organization toward an instable situation into a dynamic organization (Hatch and Dyer 2006) and the successful management of this phase is one of the most crucial elements in any transformation project.

Now here comes the issue: the notion of change is that it is seen as episodic and can be created and planned by collecting and applying valid, often quantitative data. However, in Industry 4.0 the change becomes *the normal* and is the standard situation that every organization has to constantly face. With this increasing degree of transformation, traditional project- and change management comes to its limits as their toolbox and methodologies are not sufficient. An organization needs to be *change ready by nature*, not in the momentum of the transformation but as part of the companies' DNA. Therefore, an organization has to implement an organizational culture to be prepared to reinvent itself or face harrowing consequences in today's marketplace.

The question is what constitutes an effective culture for organizational change? There is extensive literature available offering good insight on this topic. Let us see how some authors describe the term culture. "The way we do things here" is by far the simplest definition (Schein 1990; Ashforth and Mael 1989; Ritti and Funkhouser 1977, in Schein 2006, p. 13). George et al. (1985) postulate that culture is to the organization what personality is to the individual (Kilman 1999). Schein (1992) offers a definition of culture that implies culture's role in organizational effectiveness: Culture is a pattern of shared (basic) assumptions that the group learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. Chester Barnard noted that "culture is complimentary to formal organization" (referenced in Gabor and Mahoney 2010). Having stated the limitations of change management, we need to find a way of making Industry 4.0 successful.

Design Thinking

Design Thinking is a comprehensive user-centric innovation process that has become popular in recent years. Design is argued to move into territories focusing on the idea that organizes a system or environment (Buchanan and Huczynski

2001) and has certain resemblances with organization development. At the same time, Design Thinking is just an organizational development and is at risk to disappear as one among other management facts (Johansson and Woodilla 2010). Design Thinking itself is nothing new, it has its roots in the product design agency IDEO and was made popular for a broader audience by Institute of Design of the University of Stanford and the Hasso-Plattner-Institut (HPI) of the University of Potsdam. In the 1960s, Design Thinking was known as a collaborative working model for architects and designers that worked together in small teams. It was described as a method to solve abstract problems of prototypes and artifacts. This approach has been transferred to business management in 1969 by Herbert Simon Prinaipien. At the University of Stanford, the concept of Design Thinking has been applied to complex business problems. The assumption was that an in-depth understanding of the true issue and the resulting user-oriented solution is a core asset and that one key element of this is the prototyping. For the subsequent chapters we would like to rely on the following definition and the classical step-design approach: Design Thinking is a cognitive and intellectual process that balances the rational and the emotional by combining the left and right brain thinking. When applied, it harmonizes with other modes of thinking and closes knowledge and information gaps, creating order and refining meaning. Because Design Thinking is a dynamic, constructive process that is iterative in nature, developing ideas requires ongoing definition, redefinition, representation, and assessment (Mootee 2013). For IDEO founder David Kelley, Design Thinking fosters a target-oriented creativity that enables the development of new solutions (Kelley 1996). Professor Ulrich Weinberg, head of Design Thinking at the University of Potsdam, defines Design Thinking as a “systematic innovation methodology that can be applied to all areas of human being” (Plattner et al. 2009a, pp. 3–18). Tim Brown describes Design Thinking in an article of the Harvard Business Review as “a method to match people’s needs with what is technologically feasible and what available business strategy can convert into customer value and market opportunity” (Brown 2009, pp. 3–5). The Design Thinking methodology is structured in phases addressing the new challenge, creating choices and alternatives, and support convergence toward a solution. Design Thinking fosters on a chance in the mind-sets that is structured in a stepwise manner shown in Fig. 11.6 consisting of planning, realization, and synthesis is reflected in Design Thinking (Riemann 2015c). All ideas are acceptable, open communication and creativity is the key elements of this methodology.

Design is the action of bringing something new and desired into existence—a proactive stance that resolves or dissolves problematic situations by design. It is a compound of routine, adaptive and design expertise brought to bear on

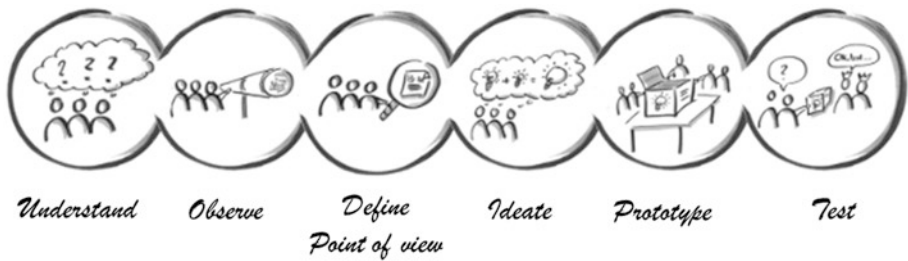


Fig. 11.6 Design Thinking methodology and its key phases

complex dynamic situations (Nelson and Stolterman 2012). All definitions of Design Thinking have the following key elements in common: whereas analytical approaches focus on narrowing the choices, Design Thinking enables to broaden the choices that are created of a specific situation (Brown 2009). This fundamental shift allows us to see problems not as a problem, but as an opportunity to adopt the change, and accept the transformation as a motivation, as a chance.

Industry 4.0 is all about innovation and competitiveness; a company needs to adopt the capabilities to handle these challenges. While change management relies on a classical stage-gate concept, Design Thinking is an iterative approach that links creative and analytical methods. It fosters the development of new ideas and strengthens the innovative power and the competitiveness of an organization. In contrast to project- and change management, it is a comprehensive methodology with the goal to support the availability of creative information for any further decision to get easily adapted by the organization. With the element of prototyping as part of Design Thinking, any idea of the transformation will not only be understood in theory, but will become reality and therefore much better understandable and acceptable. Having stated this, it becomes obvious why Design Thinking is of core value for applying to the introduction of Industry 4.0: Industry 4.0 is not yet fully thought-through and there are still a lot of uncertainties to be solved. However, the potential and the opportunities are huge and need to be filled with creativity; creativity needs to be introduced to a company in a structured way addressing carefully the impacts of each organization. Design thinking helps to get a common understanding of the challenge/problem space within the entire transformation situation. Coming from this common understanding, it is possible to find key insights that serve as an inspiration for the affected people and gain empathize for them in regards to the transformation, so that their voices can be represented when design decisions are made. Based on the shared thoughts it is then possible to generate a joint view toward the changed environment.

This is where the team is not only affected but also has the ability to familiarize them with the situation; it can be the designer for their future situation and get back “to the driver seat”.

The Value-Add of Design Thinking for Change Management

Having stated the need for a continuous change, we have to provide a methodology that allows a company to sustain in the adventure of Industry 4.0. To successfully manage this transformation we believe that this methodology needs to address both, the rational side (business, technology) and the emotional side (people). Sparing more than a thought on the people’s side of this transformation, this is where the benefit of Design Thinking starts. Where traditional approaches purely balance the business needs, the feasibility, and the change readiness of an organization, Design Thinking addresses the innovation and the dynamics of such a change. Since it is best to manage a transformation holistically, deliberately, and proactively we propose to add components of Design Thinking addressing on one hand side the tangibles and on the other hand side the change how to view things and the mind-set of the people and get them involved in the transformation. Facing Industry 4.0 most of the changes are a change of the corporate culture as Industry 4.0 affects the entire way the business runs—thus a high degree of an individual change of mind-set needs to take place. Design Thinking applies design principles to the strategy of Industry 4.0. While doing so an innovative way of thinking becomes an integral part of the company, the success rate for innovation dramatically improves.

Proposed Transformation Approach

Large transformation projects as they happen due to Industry 4.0 have at least one key success factor in common: it will be crucial to see the journey toward Industry 4.0 as a strategic and transformational approach where a digital leadership is essential and IT becomes the core business partner across the value chain. Design Thinking integrates various creativity methodologies, for example the fast development of prototypes. Design Thinking thus involves employees and integrates their points of view into the outer view of the management.

Design Thinking and change management may therefore see as a purposive cooperation and as a creative asset toward a management duty focusing on human beings and their needs while changing the way the management performs their duties as well.

Until now, Design Thinking has been mainly applied to develop new product ideas as it is best tailored to analyze the customer needs and develop innovative solutions that have not been defined clearly. We believe that Design Thinking is now on its way to emerge into innovations that are more abstract or for organizational development. Considering that Industry 4.0 deserves a high level of change readiness combined with a creativity potential to apply the new (technological) capabilities to the own business, it is clear that we have to deal with a high degree of insecurity while being in the position of an initial analysis and prototyping and thereafter starting with a systematic development of the implementation plan. If we now assume that we start in such an Industry 4.0 project the traditional way we will forgive the chance to understand the new potential and to combine the novelties to the existing company strategy and requirements; we will pass the chance to fully cover all dimensions of what to be addressed within Industry 4.0 and consequently to realize the full benefits.

With the application of selected Design Thinking elements, we open the door to realize the benefits. The most value-adding principles are:

- The integration of a collaborative and co-creative power of diverse teams,
- A systematically and open innovation approach to generate new perspectives and ideas due to diverse thinking,
- An agile and iterative working,
- A user-centric understanding of the holistic situation, and
- A fast development and testing due to prototyping.

Design Thinking however may only add value when it is carefully applied to the context of the project, meaning that it is not about bringing in Design Thinking elements for the sake of doing so but to carefully apply the right elements to the companies' culture, the project targets, and the entire context. This, of course, leads to the conclusion that we no longer talk about change management and Design Thinking, but we have a blended approach integrating the power of the three methodologies that are required to manage a transformation, as they are project management, change management, and Design Thinking (see Table 11.1).

The right composition of both left- and right-brain methodologies generates the right mixture to turn over all the rocks that lie on the path forward for a successful transformation. The mix needs to be combined into

Table 11.1 Characteristics of project management, change management, and Design Thinking

Project management	Change management	Design Thinking
Objective	Subjective	Intuitive
Logical oriented	Mental oriented	Emotional oriented
Focus on stability	Focus on empathy	Focus on novelty
Analyzing	Mediating	Experimenting
Solution is the target	Consensus is the target	Change is the target

one approach that addresses the key conclusion: For a successful transformation in the light of Industry 4.0 we have to bridge creativity, analytics, and consensus. In other words, we have to link project management, change management, and Design Thinking to best serve transformation. One key element within Design Thinking is the phase of prototyping. Design Thinking is based on prototyping solutions and failing early and often. If a prototype fails validation by the rest of the team, a new one can be created in a very short time. It establishes a culture that encourages failure to move to solutions and focuses on the most important person in the scenario, the user. This approach helps to ensure that the right solution is built and that development teams are equipped to do so. The effort in the beginning to understand and validate what the right problem is avoids expensive redesigns in later phases during the entire project.

Exemplary Actions Undertaken by V&B

Right in the beginning of the project start-up phase, V&B has clearly defined the project purpose. The Design Thinking principle that adds an important benefit to the entire project is the project briefing to better understand various backgrounds, opinions, and views toward the project. Such a workshop allows a better understanding and thorough handling of potentially diverse perspectives of Industry 4.0 applied to V&B's manufacturing. Having made this transparent right in the beginning an open and trustful discussion and acting on these mind-sets got immediately enabled. While doing this, we create an easy-to-go way forward to understand the entire situation and the backgrounds including the important factor of the user-centricity to involve the affected groups' right in the beginning. This is then well linked to typical change management activities, such as stakeholder interviews and stakeholder management. Again, only in case the user-centric requirements are well understood from all dimensions and clearly defined, we have a basis to get used to the well-known cornerstones from project management and change management.

For V&B Industry 4.0 represents a huge opportunity for companies—the question was how to start?

Having the digitalization strategy defined to set the broader framework and having identified the production as the core area it all starts with detailing what it is you want to achieve with Industry 4.0. For doing this, an employee-centric 3-step approach has been defined:

Step 1: Define the Use Cases for Industry 4.0 in the Area of Manufacturing by Plant Managers

Coming from a solid value proposition, the plant managers have been advised focusing on specific use cases, build the ideas, and highlight the value to the organization. The questions to be answered here are:

- What is my company trying to achieve that data can help me solve?
- Do we have the data in-house or should I acquire it?
- What would be the effort to get there?

Step 2: Build the Strategy Based on the Use Cases You First Identified

The strategy should be focused on the business value the Industry 4.0 component in each use case can bring and the specific technical requirements need to be considered. The questions to be answered here are:

- What are the business priorities?
- What are the quick wins I can reach?
- What are the longer-term big hits that require a bigger investment?

Step 3: Build an Infrastructure to Execute on the Strategy

It is time to think about your high-level architecture you will need to set up to address your use cases. Look at your current environment and assess your readiness: maybe you have already most of the pieces in place.

- What are the costs to set up this new infrastructure and what are the technical gaps in my infrastructure?
- Are there any technological dependencies I need to consider?
- Is my organization ready for Big Data?
- How my business processes will be impacted?

Especially for radically new and complex approaches such as applying Industry 4.0 to one's manufacturing makes it essential to understand these requirements holistically and with honesty. Within Design Thinking this is a central element: the clearer and more specific problems and requirements are understood the more creative and tailor-made the resulting solutions become. *Fail early and cheap to get faster to success* is a key principle within Design Thinking. Therefore, V&B apply a prototyping with the selection of a few *easy-to-go* use cases to iteratively test and to validate the approach, the company capabilities of handling the changes and the benefits—nothing more, nothing less. Dependent on how successful these prototypes have been it leads to a totally new start of the problem definition, a fallback of one or two steps of the prototype or a continuous following of the defined path forward. The iteration phases shall be as long as needed but somehow analogue to the sprints already known from agile project approaches to keep the team dynamic.

Design Thinking was then as well applied to a pilot installation—while testing new operating models in a selected plant the iterative and cooperative elements have been used as well. With the completion of the prototype phase, the most promising use case has been selected. This selected use case will lead to a significant change in V&Bs operating model. This use case was applied to two plants first to gain a better learning curve before going into the global roll out across all plants worldwide.

If we generalize from these few examples: The main difference to the traditional change management is an early ideation with a strong involvement of affected people—the generation of ideas—that focuses on a totally user-oriented solution. This solution are user-centric, created by a multi-disciplinary team and the responsible plant managers with a high level of creativity to encompass a mostly comprehensive solution that is and leads often to a prototype.

Design Thinking is all about novelty and finding better possibilities. With the introduction of the blended methodology combining elements of project management and change management, Design Thinking we add a significant level of subjective thinking that is drawn from the emotional insight. It is a contrast to a pure business thinking which is mainly objective and rational, based on logical deduction and numerical models. Bringing these diverse elements of project management, change management, and Design Thinking together it becomes obvious that they are valuable in their specific way because they address the various dimensions of a complex transformation process. Especially the linking of Design Thinking to transformation project provides significant value to capture innovation compared to the unison use of project management and change management. This is mainly due to the fact that Design Thinking provides a way of thinking that is even close to a philosophy to change a company's traditional culture into a dynamic culture that has a core competency of

transformational readiness. Design Thinking, correctly applied allows the identification of existing chances and opportunities and to gain the full benefit from them. In a nutshell, this means that the change becomes an integral part of the company's culture and that any transformation is not a one-time event causing resistance but is continuously managed and accepted within the company.

Conclusion

The past decades have already shown that the advances in IT and globalization, among other factors, have significantly affected even the largest firms. Facing the disruptive changes ahead, companies are challenged with one core question: How can I adapt or even (r)evolutionize my business model in order to optimize the generated value in the next industrial era?

One key success element is to emerge as a digital-enabled infrastructure with a carefully selected portfolio of digitally enhanced solutions. Industry 4.0 will force manufacturers to rethink how to actually create value in the future; that is how to rethink the back-end of their entire business models and becoming an innovation-driven company, based on a strong partner network and smart innovation processes. This will all happen in the light of fundamental changes, for example, while outsourcing major physical production processes or being a product-driven company with an extremely agile production focusing on customized products in batch sizes of one.

As already outlined in the example of V&B, manufacturers have to consider strongly individualized value propositions as well as comprehensive solutions covering complementary products and especially services. The creation of such a "solution ecosystem" will influence manufacturers' business models either through the development of the appropriate portfolio or in the search for the right partners. The optimization of the products' lifecycle value and open interfaces will be a further element.

Being within such a transformation, we would find out our current mechanisms to handle the transformation that may fail. As described, we need to think about how to bring innovation and business thinking together. As Merholz (2009, p. 1) suggests, "it is foolish to accept a dichotomy between both ways of thinking". Design Thinking in a transformation environment is a diverging and converging process at the same time for creative leaders who wish to incorporate innovative problem solving methods into their organization. It fosters on iteration, prototyping, and testing. Thus, it provides a creative platform for feedback and will lead to qualitative, hence sustainable organizational change. With change management, we learned to support a transition in the various dimensions more reliably and predictably but we still have

issues with adoption and acceptance by the target groups. With the blended approach that includes Design Thinking, we open a new dimension to sustain a transition. While Design Thinking is best used to understand and prioritize the possibilities, project as well as change management enables the realization.

References

- Acatech. (2013, April). Securing the future of German manufacturing industry. Recommendations for implementing the strategic initiative INDUSTRIE 4.0, *Final report of the Industry 4.0 Working Group*, Federal Ministry of Education and Research.
- Allen, R. S., & Helms, M. M. (2006). Linking strategic practices and organizational performance to Porter's generic strategies. *Business Process Management Journal*, 12(4), 433–454.
- Armbrust, M., et al. (2010). *A view of cloud computing*. *Communications of the ACM*, 53(4), 50–58.
- Brown, T. (2009). *Change by design: How design thinking transforms organizations and inspires innovation* (1st ed.). New York: Harper Collins Publishers.
- CapGemini. (2015, July 20). *Die Zukunft von Big Data*.5.
- d.school (Hasso Plattner Institute of Design at Stanford). HPI School of Design Thinking (Hasso-Plattner-Institut, Potsdam, Germany) *German Design Thinking Research Program*.
- Gabor, A., & Mahoney, J. T. (2010). *Chester Barnard and the systems approach to nurturing organizations*. Retrieved October 5, 2015, from http://www.business.illinois.edu/Working_Papers/papers/10-0102.pdf
- Gareis, R. (1989). 'Management by projects': the management approach for the future. *International Journal of Project Management* 7(4), 243–249.
- Germany Trade and Invest (GTAI). (2014, July 1). *INDUSTRIE 4.0 – Smart manufacturing for the future*. Retrieved October 5, 2015, from <http://www.gtai.de/GTAI/Navigation/EN/Invest/Service/Publications/business-information,t=industrie-40-smart-manufacturing-for-the-future,did=917080.html>
- Hatch, N. W. & Dyer, J. H., (2006). Relation-specific capabilities and barriers to knowledge transfers: creating advantage through network relationships. *Strategic management journal*, 27(8), 701–719.
- Hirsch-Kreinsen, H. (2014). *Wandel von Produktionsarbeit – „Industrie 4.0*, TU.
- Hirsch-Kreinsen, H., & Weyer, J. (2014). *Wandel von Produktionsarbeit – „Industrie 4.0*, Soziologisches Arbeitspapier, TU Dortmund, Nr. 38/2014.
- IEEE Std 802.15.1-2005 Part 15.1. *Wireless medium access control (MAC) and physical layer (PHY) specifications for wireless personal area networks (WPANs)*. IEEE Standards Association. doi:10.1109/IEEESTD.2005.96290.
- Intel Peer Research on Big Data Analysis. (2013). Retrieved October 5, 2015, from <http://www.intel.com/content/www/us/en/big-data/data-insights-peer-research-report.html>

- Johansson, U., & Woodilla, J. (2010, June 30–July 1). How to avoid throwing the baby out with the bath water: An ironic perspective on design thinking. *EGOS Colloquim 2010* Lisbon, Portugal.
- Kelley, D. (1996). The designer's stance, an interview with David Kelley by Bradley Hartfield. In *Bringing design to software*. Reading: Addison-Wesley.
- Mell, P., & Grance, T. (2011). *The NIST definition of cloud computing*. Recommendations of the National Institute of Standards and Technology, 6.
- Merholz, P. (2009, October 9). *Why design thinking won't save you*, BR Blog network, Harvard Business Review. Retrieved December 1, 2013, from <https://hbr.org/2009/10/why-design-thinking-wont-save>
- MIKE2.0. *The open source methodology for Information Development*. Retrieved February 1, 2016, from <http://mike2.openmethodology.org/wiki/Big%20Data%20Definition>
- Mootee, I. (2013). *Design thinking for strategic innovation: What they can't teach you at business or design school*. Hoboken: Wiley.
- Nelson, H. G., & Stolterman, E. (2012). *The design way, intentional change in an unpredictable world*. Cambridge: The MIT Press.
- NIST Big Data Working Group (NBD-WG). (2011). Retrieved October 2, 2015, from <http://bigdatawg.nist.gov/home.php>
- OPC. (2011). *Unified architecture 1.0 ed.* International Electrotechnical Commission, Geneva.
- Pfrommer, J. et al. (2014). Begrifflichkeiten um Industrie 4.0 – Ordnung im Sprachwarrwarr, In *Ergebnisse des Fachausschusses 7.21 „Industrie 4.0“* der VDI/VDE-Gesellschaft Mess- und Automatisierungstechnik (GMA).
- Plattner, H, Meinel, C., & Weinberg, U. (2009a). *Design thinking*. Landsberg am Lech: Mi-Fachverlag.
- Plattner, H. et al. (2009b). *Design thinking*. mi-Wirtschaftsbuch.
- Price Waterhouse Coopers. (2015). *Industry 4.0 – Opportunities and challenges of the industrial internet*. Retrieved October 6, 2015, from <http://www.pwc.de/en/digitale-transformation/pwc-studie-industrie-4-0-steht-vor-dem-durchbruch.html>
- Riemann, U. (2015a). Benefits and challenges for BPM in the cloud. *International Journal of Organizational and Collective Intelligence*, 5, 32–61.
- Riemann, U. (2015b). Analysis on cloud services on business processes in the digitalization of consumer products industry. In *Delivery and adoption of cloud computing services in contemporary organizations* (pp. 129–165). Hershey: Information Science Reference.
- Riemann, U. (2015c). The power of three. In *Organizational change management strategies in modern business* (pp. 74–94).
- SAP. (2012). *OCM fundamentals*. Department of Business Transformation Services, SAP SE.
- Schein, E. H. (1992). *The role of the CEO in the management of change: The case of information technology*. Cambridge: Massachusetts Institute of Technology.
- Schein, E. H. (2006). *Organizational culture and leadership* (p. 13). San Francisco: Wiley.
- Vogel-Heuser, B., Kegel, G., Bender, K., & Wucherer, K. (2009). *Global information architecture for industrial automation* (Atp 1–2 ed.). Volkan: Verlag.
- Ward, J., & Barker, A. (2013). *Volume, velocity, variety. Undefined by data: A survey of big data definitions in School of Computer Science University of St Andrews, UK.*

12

Digital Transformation in Manufacturing

Klaus Holzhauser and Philipp Schalla

Ideas in Brief In recent years, digital transformation has been heralded as a strategic concept for companies of all sectors. The Internet of Things could be seen as representing the most tangible form of digital transformation because it refers to the digitalization of end products and services geared toward customers. The insertion of an ever-increasing amount of software into physical products and the associated integration of intelligence into machines and systems has led to the gradual conversion of production-oriented added value into service-oriented added value. In the medium term—provided it is implemented systematically—Industry 4.0 will have a far more profound influence on corporate business models and processes than the aspect primarily associated with digital transformation up to now, namely the customer experience/customer relation factor. The increasing “intelligence” in manufacturing plants, the consistent incorporation of local intelligence such as sensors and embedded software into the production process and logistics chain and the resulting information management opportunities facilitate different decision-making paths and reactions that will bring massive changes to the entire process of work in manufacturing companies and to the direct environment of individual workers. Furthermore, the fact that the manufactured products

Keywords Industrial Internet • Industry 4.0 • Internet of Things • Manufacturing • Smart Services

K. Holzhauser (✉) • P. Schalla
PAC Germany, PAC GmbH, Munich, Germany
e-mail: k.holzhauser@pac-online.com; philippschalla@web.de

also increasingly contain local intelligence and communication technology completes the cycle leading to another altered form of customer experience. Today, even after delivery to the customer, manufactured goods maintain contact with the manufacturer. This promises enormous added value potential for the manufacturing industry. But this development also bears a great responsibility for corporate management to successfully manage this process of change.

Introduction

Digital transformation is currently shaping many different industries all over the globe. After information technology (IT) having pushed industrial production further over the last 30 to 40 years, it is now about digitalization and knowledge-based ways of working when it comes to global wealth in the future (Nefiodow and Nefiodow 2014). Internet of Things technologies such as sensors, M2M connectivity, cloud platforms, and powerful analytical engines promise significant business opportunities when combined and leveraged in the right way. For manufacturing companies, digital transformation means merging their operational technology with their IT and furthermore bringing closer together the traditional tasks of knowledge workers and factory workers (Bullinger and Spath 2013). Consequently, manufacturing companies will be able to exploit new efficiency potentials in their production lines and even start transforming their traditional products into new services and new business models (Porter and Heppelmann 2014). The possibilities seem to be unlimited, and so are the questions that currently arise in many organizations.

Among the key questions are often the following:

- How does digital transformation lead to future growth?
- What are the bottlenecks of today's production processes?
- How can a digital company position itself in the market?
- Why is joint product development becoming one of the major drivers for future success?

Finding answers to these questions is a complex challenge for all companies in the market. Working out these answers involves a time-consuming change process, at the end of which processes, organizations, people, and products may no longer be the same.

Corporate change through digital transformation is going to take place at two levels: there is an internal perspective on the organization and processes of a company and there is an external perspective in terms of positioning and

market perception. It is difficult to define a quantitative measure of the relevance of each of these two levels, as the importance of a level always depends on a company's maturity, strategic objectives, and business background. However, it can be stated that a successful, sustainable market positioning requires a successful internal change of processes, roles, and people. A manufacturing company needs to take into account both perspectives for successful digital transformation. This brings up the challenge of identifying specific activities and tools which companies can use in order to implement external and internal change.

Managing Internal Change in Digital Transformation

Internal change of a manufacturing company in the realm of the Internet of Things is often described with the term *Industry 4.0*. Industry 4.0 means the usage of IoT-related technologies in order to increase the efficiency and quality of manufacturing production processes (PAC 2015). While this term is typically used in German-speaking countries, the underlying concept and initiatives are not limited to geographical borders. In other regions, this change process is named *Industrial Internet* or *Manufacturing Excellence* for instance.

Taking a closer look at the internal change of manufacturing companies, two additional perspectives can be determined: the Internet of Things will have an impact on the internal processes of the manufacturing company of the future; it is likely to change the processes themselves, making them data-centric. Furthermore, the Internet of Things will have an impact on corporate governance and, in accordance with that impact, on the understanding of the roles of individual people (Thomson 2015).

Therefore, it is important for all people and roles to be equally embedded in the corporate change process. Usually management takes over the initiating role of change, puts change into practice, and partially also acts as gatekeeper. Change is driven and realized, however, by the people involved in the business processes of a company (Cook and Jenkins 2014). And depending on business unit and operational tasks, these people are influenced by several factors.

Given the increasing complexity of customer channels, product requirements, and competition, manufacturing companies need to have modern tools and concepts at hand in order to manage the processes within an organization efficiently and align the corporation with a digital value chain. In most of the companies, these tools and concepts have not been implemented to a sufficient degree yet. (Loeffler and Tschiesner 2013) Especially in the manufacturing industry, many small- and medium-sized companies in the

past often followed the principle of “Never touch a running system” with regard to tools and processes. Today, in the age of the Internet of Things, this principle no longer seems to be applicable.

As a consequence, there is a strong need for simple and efficient methodologies that enable the digital transformation of companies of any size and in any industry. One of the most important success factors is the consistent involvement of all the people and roles affected by the innovation process of digitally transforming a company. This involvement can be accomplished by dedicated management measures.

The Role-based Innovation Management Process

The classic value chain of a manufacturing company (Porter 1985) includes various process steps and roles that need to be addressed which can be seen in Fig. 12.1. In terms of primary activities, there are five core processes in manufacturing, from inbound logistics to after-sales services, which are impacted by digital transformation. Furthermore, there are secondary activities such as procurement or technology development that offer major starting points for digital transformation.

Primarily, this change requires rethinking the strategic alignment of the production area, leaving behind operational, reactive processes and focusing on proactive, strategic innovation processes in order to determine the future identity and market positioning of a company. By doing so, especially in *Operations and Technology Development*, but also in *Marketing & Sales* and *Services*, various people can be identified who are able to successfully realize both a classic production process and a future-oriented innovation process.

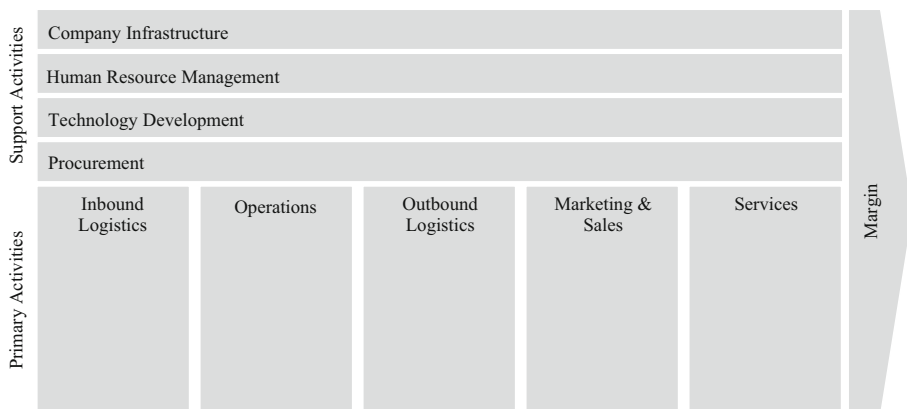


Fig. 12.1 Manufacturing value chain

Depending on an organization's vertical range of manufacture, the allocation and importance of individual roles may differ. For instance, in companies with a small range of manufacture, activities such as *Logistics* and *Procurement* play a more important role than *Operations*. Whatever an organization's process focus is, in order to advance an innovation process, all the roles and people involved need to be integrated. For this purpose, it is necessary to match identified and relevant roles and people with the individual steps of an innovation process.

Therefore, PAC uses a role-based innovation management process in custom-specific consulting projects. As shown in Fig. 12.2, this process consists of five individual steps, from the initiation of the process through several steps of influencing and altering to taking the final decision on the process topic. The latter can be a procurement or investment decision, it can be a decision to change organizational units and business processes, or it can be a decision to stop the entire transformation process at that stage.

Initiation takes place through a single person or a group of people that bring up an idea or business need within a regular business operation. This idea or need is focused on the issue of change and optimization. Afterwards, in a second step, this input will be taken up by several other people in the organization and will be subject to some additional thinking and real-life checks in order to prove the usefulness of the idea against the daily business.

Furthermore, the idea will be altered by different persons in order to make it their own and either strengthen or weaken the concept. At this stage, a first proof of concept will have been positively validated, and rather personal motivations and objectives are bound to have an influence. Usually people with a profound business background and a higher positioning in the organization will do this customization.

Before any decision can be taken in this process, the idea or the business need has to pass the bouncer stage, where an individual person or group determines the future lifecycle of an idea. This gatekeeper role is performed by a person who is well connected in the enterprise and collects, shares, or blocks relevant business information for personal purposes. Finally, the innovation process ends with the decision-making, often through the management board, and either leads to a transformation and downstream implementation process or stops.

In these five steps, several roles that were identified in the manufacturing value chain before can also be found. The innovation process can be posi-



Fig. 12.2 Innovation process

tioned on a meta-layer above the manufacturing process. The roles involved often experience the same types of influencing factors.

These factors include trigger events, business pain points, and corporate as well as personal objectives. All of them have a significant impact on a person's ability to act in the individual steps of the process. This area of conflict can be visualized as shown in Fig. 12.3.

- A trigger event is directly linked to the previous step of the innovation process and “hands over” the preliminary results of the process. The previous event can be related to the same role or to a different person in the organization. The activation by the trigger event starts up the process step.
- Business pain points include organizational, operational, or process-related challenges a person is faced with in the operational business and that become relevant in a specific process step. These challenges also have a significant impact on a person's ability to act as well as on the prioritization in the decision-making process.
- Corporate objectives are performance targets that have been agreed on between an individual person and the company, and that are to be met within a certain time frame (usually a fiscal year). These performance targets are aligned with the overall business targets of the organization.
- The personal objectives, on the other hand, are related to an individual person and define this person's understanding of his/her current and future role within the organization as well as along his/her personal career path. In certain situations, personal objectives may conflict with corporate objec-

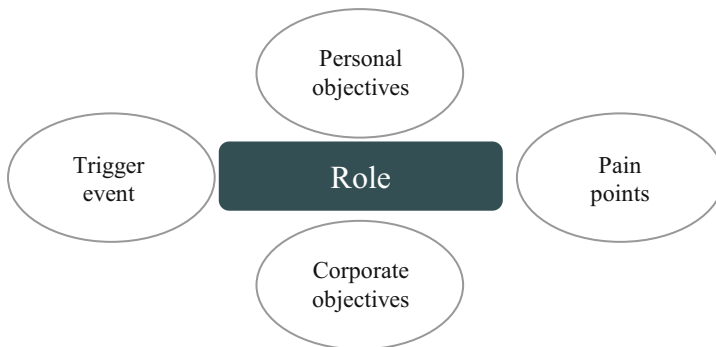


Fig. 12.3 Influencing factor conflict

tives. In general, however, they are taken into consideration in the target agreement process.

In a third step, it is now possible to combine these influencing factors with the generic innovation process and determine the individual business roles within the process steps. The result of this process is a matrix view on a role-process map of the innovation process of a company. Depending on the type of company, its industry segment, and the specific business challenge it is facing, it is possible to create dedicated maps of digital transformation activities and identify specific access points along individual influencing factors that enable the successful management of that process.

In terms of “Industry 4.0”, a role-process map as shown in Fig. 12.4 can be defined in order to visualize the innovation process.

This process includes all the relevant roles that are interested in the optimization of production processes and the more efficient usage of resources through IT technologies and the analysis of production data. Usually an internal role initiates this process, either at business unit level or at IT level. Key driver for this process may be the COO or a line of business (LoB) manager and/or an IT manager. Decision-making as well as bouncing the idea is usually done by the roles of CFO and CEO.

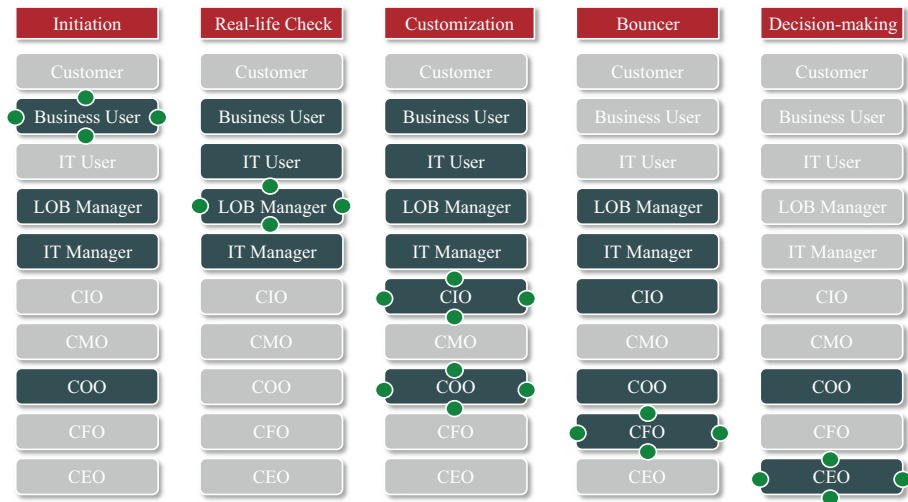


Fig. 12.4 “Industry 4.0” role-process map

This process can be shown best by taking a predictive maintenance use case at a medium-size manufacturer as an example. Predictive maintenance comprises the entry, processing, and storage of machine and device data to predict downtimes, identify quality and process-related issues, and control maintenance and repair work in a cost-optimized way (PAC 2014).

In a typical production process at a manufacturer, a business user, typically a factory worker or the manager of a manufacturing execution system (MES) identifies the pain point of machines failing or shutting down during runtime. The reasons for this pain point can be various, from abrasion to unexpected incidents. The business user reports this pain point and an adequate solution proposal to his manager. He suggests analyzing the machinery data and trying to predict downtimes before they occur. The appropriate manager, typically the head of production or the manager of a certain production line, has to keep up productivity of their area of responsibility and to ensure that challenging business objectives can be met. They understand the pain point and analyze the solution proposal from their team member. They decide to request such an investment and create a project proposal including a summary of how this investment will impact corporate objectives, a rough project plan and a first cost estimation. Typically, they send the proposal to their supervisor, in this example the chief operation officer (COO) of the company. The COO has to improve the productivity of the entire manufacturing activities of the company, and the proposed project could work as a blueprint to be rolled out in all factories. This promises significant improvements in efficiency and quality. So the COO teams up with the CIO or the IT department, respectively, in order to prepare an official letter of intent, they identify potential solution partners and eventually select a partner of choice, given that the internal IT department will not execute the project independently. Having all parameters set now, besides the financial approval, the project proposal as well as a potential external proposal from a solution partner will be forwarded to the finance department. Within a medium-size manufacturer usually the head of finance, or the chief financial officer (CFO), will verify all information. Provided the proposal is in line with the corporate financial objectives, it will be approved.

Eventually, depending on the governance structure of any particular manufacturing company, the investment decision for a predictive maintenance solution within the production line will be taken directly by the CFO or forwarded to the chief execution officer for final decision.

Afterwards, in a last step of this role-based innovation management process, it is possible to connect individual influencing factors that people experience within the individual process steps in order to highlight specific target conflicts or decision-making chains that are critical for the success of the entire innovation process. Figure 12.5 visualizes this step.

In general, this methodology is applicable to any company or industry. Adoption basically requires taking into account individual topics within the

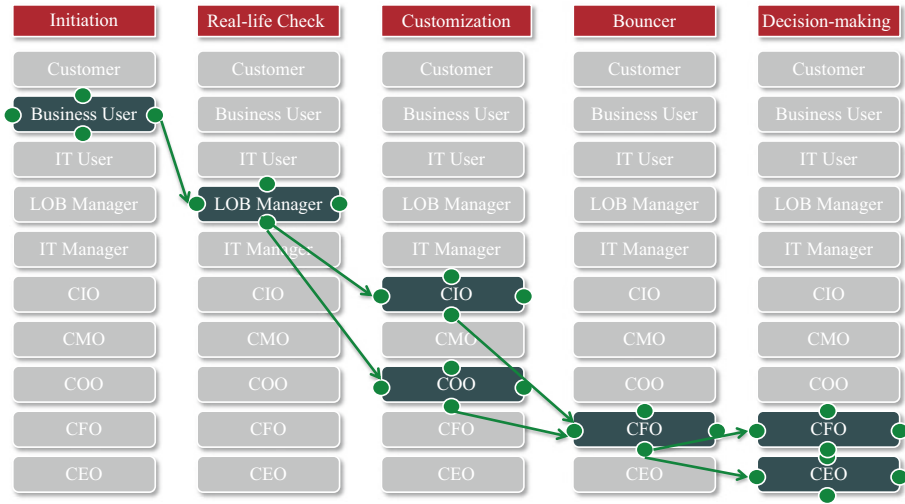


Fig. 12.5 “Industry 4.0” decision-making chain

process of digital transformation. For the manufacturing industry, Industry 4.0 is currently one of the most interesting topics, focusing on the optimization of factory-related business processes with the objective of realizing an autonomous production line.

Another highly interesting topic is the transformation of traditional products into so-called *smart products* or *smart services*, integrating IT, telecommunications technology and sensors into the production results of a company. This *smart product* may be able to provide additional services and functionalities for the customer, thus generating additional revenue for the manufacturer. Figure 12.6 visualizes how a role-process map can be drawn for the process of developing smart products.

The major difference from the previous map, which showed an internal perspective, is the fact that customers take part in this external-bound innovation process, either by initiating a demand for a new product or service, or by acting as a bouncer for new business ideas when talking about quality and user experience.

Furthermore, the CMO plays a significant role in this process, basically being involved in every step toward decision-making. Depending on the individual company, the CMO may also act as the decision-maker and therefore be more or less independent. This is not the norm, though.

Role-process maps easily visualize what persons within an organization are involved in an innovation process to what extent. This shows the individual footprint of different roles in the process of digital transformation and is an important input for corporate governance. By creating such maps, a company can ensure the availability and capacity to act of an individual person before starting the actual implementation of digital transformation.

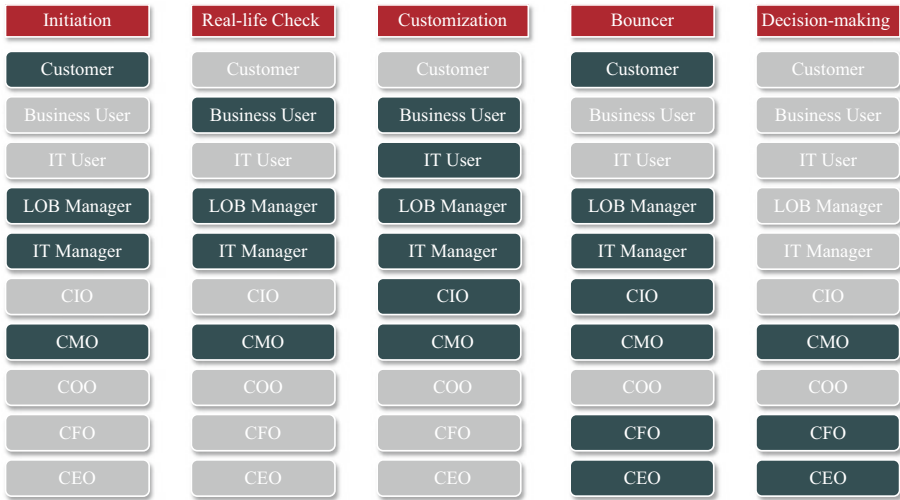


Fig. 12.6 “Smart product” role-process map

By analyzing relevant influencing factors and creating target conflict chains, critical processes can be identified and measurements can be started in time to guarantee the successful execution of an innovation process while at the same time ensuring the alignment of corporate with personal objectives.

Once they are able to manage digital transformation from an internal perspective, companies can concentrate on the external perspective by redefining their market positioning and go-to-market strategy.

Digital Transformation Enables New Market Perception

While the internal change of a manufacturing company represents a complex but manageable challenge, its success heavily depends on the vision of how an organization is supposed to change in the future. And this is where digital transformation really develops its disruptive potential (Westerman et al. 2014).

The impact of new technologies and the optimization potential along the production process itself are huge. The usage of M2M connectivity, the analysis of sensor and machine data, and a seamless communication and data exchange between individual production machines and backend systems have a huge potential to increase productivity, reduce failure, and solve quality issues. But this digitalization of production itself is not brand new to the manufacturing industry (Bitkom, VDMA and ZVEI 2015). It has been more of a continuous improvement process for decades, especially in mature regions such as Europe,

where manufacturing companies have to deal with a huge legacy of technologies in the production space. Therefore, digital transformation in the factory environment is a continuous improvement rather than a disruptive change.

There are tremendous opportunities, though, when talking about the transformation of physical products into digital services, or the extension of physical products by digital services. This is where digital transformation for manufacturers really comes into play. This potential is not limited to the manufacturing industry. Customers' changing buying behavior—from buying products to using business services—is a trend that can be seen globally across several industries.

The most obvious example is the transformation of the software market and the success of *software as a service*, including ensuing topics such as infrastructure and platform as a service (Wieland 2014). The fact that customers are no longer willing to make large upfront payments for licenses, and are therefore looking for new offerings with a rather usage-based pricing model is currently fundamentally changing the entire IT industry (Carnelley and Niemann 2012).

This change, however, is not limited to the IT industry. Other examples can be found in the automotive industry, for instance, where the increasing use of car-sharing offerings in urban areas goes hand in hand with a declining need to own a car at all. Vehicle manufacturers are therefore preparing to transform their business models from the production of cars to the provision of mobility services. Another example can be found in insurance, where in the near future fees for insurance services will depend on the way the insured goods are used, for instance *pay as you drive* in the car insurance business (Barry 2011).

These examples show that many different companies are currently faced with the question of how their traditional business models need to change in order to stay attractive in the future, how they should position themselves on the market with these new business models, and how their organizations need to change internally to be able to provide these new services instead of going on producing traditional products (Keese 2014).

This means that the overall change in buying behavior does not stop at the more traditional manufacturing industry. This leads to strategic initiatives focusing on the transformation of products into services that are intended to create new business opportunities or even give a competitive edge over competitors.

In order to successfully transform their products into services, manufacturers should consider the following points:

Keep the Basic Purpose of the Product With most of the *serviced products*, the availability of the product or service is the key element that users expect. For example, an elevator takes you from the ground level to the top level of a building whenever required. An escalator also helps you reach the next level or walk long distances at many airports almost at any time during a day.

Availability is key here. Companies that in the past bought such products and accepted the risk of technical failures now buy the availability of the service.

Rethink Your Business Model In many cases, digital transformation will not make the physical product disappear; instead, it will enhance existing functionalities with new digital services. Manufacturers will still be producing physical goods, but potentially with a reduced range of manufacture. The real disruptive change will happen on the commercial side through a redefinition of business models and a shift in the ownership of products in the future. As connected products now remain within reach of manufacturers and customers are no longer willing to buy and own products, but simply want to use them, ownership is likely to also stay with the manufacturers. Companies then have to come up with new ways of charging for the services their products provide for customers, and of running a business based on this. Interesting examples of this change can already be seen in the market, such as the *air as a service* model from Kaeser Kompressoren, which found a new way of selling its air compression products, or Hilti, the drilling machine company that now offers *holes as a service* instead of selling physical drilling machines.

Embrace Information Technology To enable this kind of *serviced products*, information and communication technology plays a key role. New business models based on availability would not be possible without M2M communication, sophisticated analytics and, above all, predictive analytics functionalities. Manufacturing companies need to develop a new understanding of IT, from *supporting the business* to *enabling the business*, and becoming a mandatory part of the final products.

Include the Entire Organization As shown above, manufacturers need to include all the relevant people and roles in the internal change process in order to make this transformation a success.

Rebuild Your Go-to-Market Strategy Transforming products into services not only involves changing processes and redefining roles within the change process. Companies' traditional organization may not be suitable for a new business model. This transformation requires accepting a possible short-time revenue cannibalization and a significant impact on the cash flow, which a long-standing manufacturer may not be willing to do. Therefore, companies need to ensure a quick and efficient go to market of their new services in order to avoid any kind of business disruption. This also includes rethinking their partner ecosystem in order to identify new customer channels.

Enable a Mind Shift Digital transformation also requires a new way of thinking within a manufacturing company. An organization must transform itself from a ‘Yes, but’ mentality to a ‘Why not?’ way of thinking. This target may be one of the hardest to reach.

The Seven Levers of Growth

In order to enable companies to initially defined or adjust their business models, market perception and go-to-market strategy, PAC provides a conceptual model for business growth (Wieland 2014). As Fig. 12.7 shows, this model consists of seven individual work packages and giving clear guidance.

For manufacturing companies aiming at digital transformation, this model provides an iterative step-by-step approach that ensures the alignment of operational processes with innovative business models while keeping everyone involved in the change process.

The basis of any growth initiative is to find attractive markets offering growth potential, that is, sufficient market volume, high growth rates, low competition, and high visibility of a company’s brand, among other aspects. Manufacturers transforming products into services will be faced with a wave of new competition from companies from potentially different industries, such as the services industry, which used to offer similar services in the past that will now be replaced by machines. A manufacturer of cleaning machines,

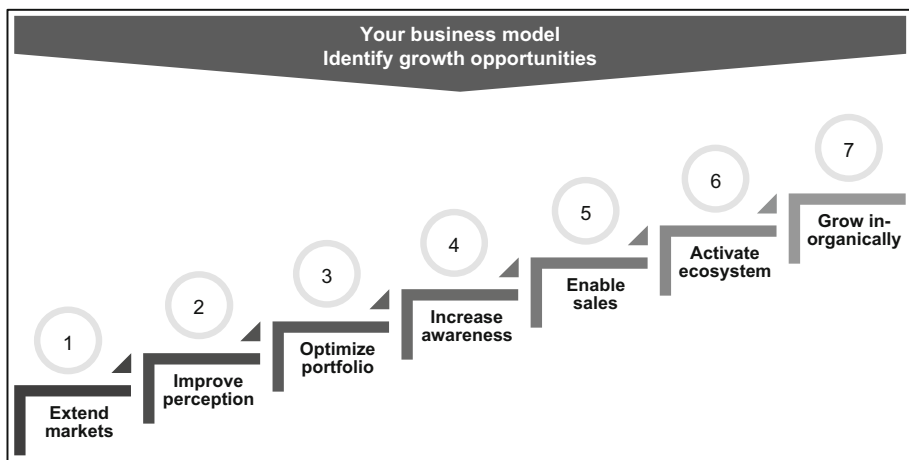


Fig. 12.7 PAC's seven levers of growth model

for instance, now offers the service of keeping buildings clean, which used to be the business of other companies.

Entering new markets brings the challenge of lacking perception and visibility. This becomes even more critical when a company's perception had been within another domain or industry in the past, for instance related to producing a certain product and not offering a specific service. The challenge is to differentiate from competition, meet customers' expectations, and be recognized as a relevant business partner for customers and prospects. For manufacturing companies, the shift from products to services also causes a shift of identity and requires revamping the brand image in a new context.

For many manufacturing companies, the traditional way of selling machinery is a very people-related process that relies on long-term relationships between customers and sellers, and that refers to a comprehensive but stable portfolio of products and related services such as maintenance. When shifting the corporate value proposition from products to services, manufacturing companies face new requirements from their customers and need to think in new dimensions regarding portfolio management. Then a marketing portfolio becomes the storefront to their customers, trying to sufficiently reflect customers' needs and make them listen to the company. Furthermore, a sales portfolio demonstrates to customers that a company is able to meet their needs, and how it does that. Manufacturers do not yet think in these dimensions and they quickly need to start doing so.

In times of information overflow, companies' main challenge in marketing and sales is to make customers remember them as a relevant business partner. Here a service offering provides recurring business for manufacturers and also keeps them in the perception of their customers. Therefore, the risk is not being "forgotten" by customers, but being replaced by companies that offer better quality or a better price. As switching service providers is easier than exchanging products, manufacturing companies need to place a strong focus on quality assurance.

With increasing competition in traditional manufacturing markets and manufacturing companies entering new markets, sales has to set the right priorities in order to identify the biggest client potential for successful closings. As the goods to be sold are changing, so is the process of selling them. Therefore, the right sales tactics on how to handle prospects, opportunities, and also competitors' strengths will become a key sales success factor.

While the share of IT rises in many industrial products, the range of manufacture declines for many companies. As a consequence, supply chains in the manufacturing industry become more and more complex and companies need to identify and strengthen their role in the supply chain. Therefore,

it is important to be recognized as a relevant business partner in both directions, among prospects and customers as well as among suppliers. For manufacturing companies, this brings new challenges, such as the organization, training, and management of a business partner ecosystem, which is more complex than managing a supply chain.

Finally, a popular measure aiming to change a company's direction and perception is to set up a joint business with another company that may be a competitor or a company from a targeted new market. Mergers and acquisitions offer a profound way of realizing growth targets and market opportunities by making up for an internal lack of necessary sales and delivery capabilities and capacities.

These seven steps can serve as a guideline for manufacturing companies when transforming their business model, market perception, and go-to-market strategy in order to remain relevant players in their markets in the future.

Conclusion

Digital transformation in manufacturing companies means merging operational production processes with innovation processes, bringing together operational technology and IT. This represents a complex challenge for many manufacturers; however, it is manageable. Companies have to take care of digital transformation from both an internal as well as an external perspective.

For internal change, it is mandatory to involve all the people and roles that are part of the operational process also in the innovation process in order to guarantee decision-making with organizational support. Then connecting individual influencing factors within specific process steps helps to identify critical decision-making paths that need to be managed more carefully than others. A role-based innovation management process can provide a guideline on how to successfully implement an innovation process in a manufacturing environment.

The external change, including the transformation of the actual business product into a custom-specific service as well as the process of defining a new business model and market perception, requires the ability to follow a holistic approach across different business units and stakeholders and act as a company within the company. This includes more than just involving people. This requires a corporate alignment of business objectives, metrics, and processes.

In order to enable a product transform into a business service, designing a service needs to start from the customer value and then be planned backwards toward technology. In order to determine a compelling value proposition for their customers, manufacturers should take a look into other industries or other countries and gather new ideas on what may be possible in their usual environment.

The transformation itself is an incremental, seven-step change process leading companies from the (re)definition of their business models up to enabling measure regarding sales forces and partner ecosystems.

Bibliography

- Barry, K. (2011). Insurance company telematics trade perks for privacy. Retrieved November 14, 2015 from <http://www.wired.com/2011/08/insurance-company-telematics-trade-perks-for-privacy/>
- BITKOM, VDMA, & ZVEI. (2015). Umsetzungsstrategie industrie 4.0. Retrieved August 4, 2015 from <https://www.bmwi.de/BMWi/Redaktion/PDF/II/industrie-40-verbaendeplattform-bericht,property=pdf,bereich=bmwi2012,sprache=de,rwb=true.pdf>
- Bullinger, H.-J., & Spath, D. (Eds.). (2013). *Manufacturing work of the future – Industry 4.0*. Stuttgart: Fraunhofer Institute For Industrial Engineering.
- Carnelley, P., & Niemann, F. (2012). *Software as a service - Market development, trends, challenges & risks*. Paris: PAC.
- Cook, R., & Jenkins, A. (2014). Building a problem-solving culture that lasts. In Author (Eds.), *The lean management enterprise* (pp. 113–118). Detroit/Washington, DC: McKinsey & Company.
- Keese, C. (2014). *Silicon Valley – Was aus dem mächtigsten Tal der Welt auf uns zukommt*. München: Albrecht Knaus Verlag.
- Loeffler, M., & Tschiesner, A. (2013). *The Internet of things and the future of manufacturing*. Stuttgart: München McKinsey & Company.
- Nefiodow, L. A., & Nefiodow, S. (2014). *The sixth kondratieff: The long waves of economic*. CreateSpace Independent Publishing Platform.
- PAC. (2014). *Definition predictive maintenance*. Paris: PAC.
- PAC. (2015). *PAC research cluster “Internet of Things” segmentation*. Paris: PAC.
- Porter, M. E. (1985). *Competitive advantage: creating and sustaining superior performance*. New York: Simon and Schuster.
- Porter, M. E., & Heppelmann, J. E. (2014). How smart, connected products are transforming competition. *Harvard Business Review*, 92(November), 64–88.
- Thomson, P. (2015). *New ways of working in the company of the future*. Published in: Reinventing the company in the digital age. BBVA.
- Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital – Turning technology into business transformation*. Boston: HBS Press.
- Wieland, C. (2014). *Key business application software platforms driving services*. Paris: PAC.

13

Country-of-origin Effects in a Global Market: The Case of China

Dirk Holtbrügge and Annalena Zeier

Ideas in Brief Although many industries are becoming more and more global, the national background of firms still matters. Especially latecomers from emerging markets, such as China, face considerable competitive disadvantages due to negative country-of-origin effects. These can be observed particularly in countries with strong local competitors. The aim of this study is to explore the perceptions of Chinese cars by European consumers. More specifically, we analyze the impact of country-of-origin effects on product evaluations and purchase intentions of German and French consumers. Based on the literature on country-of-origin effects and product evaluations, we develop five research hypotheses and test them in a sample of 347 consumers in France and Germany. The study reveals that Chinese cars are evaluated significantly worse than German cars in terms of quality and performance and appearance and attractiveness. These negative country-of-origin effects are moderated by socio-demographic, psychographic, and product-related factors.

Keywords Brand management • Car industry • China • Country-of-origin effects • Industry shift

D. Holtbrügge (✉)

International Management, Friedrich-Alexander-University Erlangen-Nürnberg, Nürnberg, Germany

e-mail: dirk.holtbruegge@fau.de

A. Zeier

Friedrich-Alexander-University Erlangen-Nürnberg, Nürnberg, Germany

© The Editor(s) (if applicable) and The Author(s) 2017

H. Ellermann et al. (eds.), *The Palgrave Handbook of Managing Continuous Business Transformation*, DOI 10.1057/978-1-137-60228-2_13

Introduction

Today's global car industry is characterized by fundamental change. Though car makers from Europe, Japan, and the USA have dominated the industry for many years, an increasing number of firms from emerging markets are entering the global market. Besides companies from Korea and India, especially Chinese firms, such as SAIC, Dongfeng, Geely, or BYD, have started to internationalize. Often heavily supported by their government, these companies are challenging the traditional business models of the current market leaders and grow at a rapid pace (Alon and McIntyre 2008; Guillén and García-Canal 2013).

While Chinese car makers are able to exploit low-cost advantages and the potential of large home markets, they are also faced with negative country-of-origin effects. Because Chinese cars are barely known among consumers in industrialized countries, they are likely to judge them based on their stereotypical beliefs about this country (Yasin et al. 2007). Given China's 'low-level, low-tech and low-cost image' (Kreppel and Holtbrügge 2012, p. 79), one of the biggest challenges for Chinese car makers is therefore to build a strong and positive brand image and to overcome customer animosity against their products (Fetscherin and Toncar 2009). For example, in a study among British consumers, Leonidou et al. (2007) revealed that US products were rated better with regard to features, technology, quality, distribution service, and promotional issues than Chinese products, whereas the latter were only evaluated more positively on pricing considerations. This is similar to the findings of Pappu et al. (2007), who identified the country image of China among Australian consumers was the least favorable of the countries under research. According to Sharma (2011), consumers from the USA, UK, India, and China tend to prefer products from the USA and UK to those from the emerging markets of China and India. This compliments the findings of Laforet and Chen (2012), who demonstrated that British consumers favor brands from the West, Japan, and South Korea to those from China. Generally, Chinese products were evaluated as inferior to others.

While these and other studies provide interesting insights into country-of-origin effects of Chinese firms in foreign markets, they are faced with several limitations. First, potential socio-demographic influences on the evaluation of Chinese cars are often not considered. For example, it is unclear whether perceptions differ between consumers of different age, gender, or income. Similarly, the potential impact of psychographic factors, such as price consciousness and brand loyalty, remains unexplored. Moreover, there is a shortage of studies that focus on the variation of perceptions of Chinese cars between different European countries and consumer groups. Finally, studies often discourage drawing concrete implications for marketing decisions, such as target group selection, brand positioning, or market segmentation for Chinese companies.

Based on these considerations we aim to explore whether Chinese automobile companies suffer from negative country-of-origin effects in Europe and whether certain consumer characteristics influence the strength of these effects on car evaluation. In particular, we aim (a) to analyze whether Chinese car companies face negative country-of-origin effects in Europe in terms of various car attributes using a multi-dimensional measurement scale, (b) to investigate the moderating influence of various consumer-related factors on the country-of-origin effects, and (c) to derive management implications for the market positioning and branding strategies of Chinese car companies in Europe.

The remaining part of the study is organized as follows. In the following section, the theoretical framework is explained and five research hypotheses are derived. This is followed by the explanation of the research methodology. Afterwards, the results of the study are presented and discussed. The chapter ends with a summary of its main contributions and limitations as well as some implications for brand management and future research.

Theory and Hypotheses

Country-of-origin Effects and Product Evaluation

A major challenge of Chinese car companies in Europe is the negative 'Made in China' image that they hold. Previous studies concerning Chinese products have found that Western consumers usually prefer Western products or products from Japan and South Korea over Chinese products. For instance, products from China were evaluated more negatively than those from other countries among consumers in Australia (Pappu et al. 2007) and in the USA, UK, and India (Sharma 2011). This is not only the case for the general evaluation, but also with regard to specific product features, such as technology, quality, distribution service, or promotional issues (Leonidou et al. 2007). Additionally, it has been revealed that the brand personality perception of Chinese cars differs from Indian and US cars with regard to certain attributes (Fetscherin and Toncar 2009). Therefore, it can be inferred that the evaluation will also vary with regard to different car characteristics, such as perceived quality, durability, innovativeness, or costs.

In many previous studies, German cars were usually evaluated highest, especially with regard to reliability, quality, and performance. Moreover, many consider owning a German car to be prestigious, in contrast to French cars which generally are evaluated rather poorly (Lawrence et al. 1992). Also, it has been discovered that consumers tend to have a stronger preference for cars from the home country or from the same geographic region (Hsieh 2004).

This indicates that Europeans will perceive cars with European origin better than those from China. Based on these considerations, the following hypothesis is derived:

H1: The country of origin has a significant effect on consumers' car evaluation. Chinese cars will be evaluated worse than German cars.

Country-of-origin Effects, Product Evaluation, and Socio-Demographic Factors

Earlier studies have revealed that the relationship between the country of origin and product evaluation may be moderated by socio-demographic factors. Generally, younger people tend to be more open for new, more exotic products and are less likely to stick to certain patterns, whereas older persons are more inclined to choose familiar brands and value their daily routine (De Mooij 2004). Younger people are more exposed to a huge variety of products through constant usage of the internet and are usually less ethnocentric (Kreppel and Holtbrügge 2012). Wang and Gao (2010) also argued that the country of origin is less important for younger consumers than for older people, and consequently Chinese products were found to have more potential for success among the younger generation. Thus, it is assumed that the strength of the country-of-origin effect on car evaluations may vary among different age groups, which leads to the following hypothesis:

H2a: Country-of-origin effects on car evaluations are moderated by the respondent's age.

Another demographic factor that may influence the evaluation of foreign products is gender. While some studies revealed that women tend to rate foreign products more favorably than men (Good and Huddleston 1995), others showed that females have a higher bias toward foreign products and thus prefer domestic goods (Balabanis et al. 2002). In terms of Chinese products, Wang and Gao (2010) found that women are slightly more aware of Chinese brands than men.

With regard to automobiles, women tend to prefer to buy smaller, less-performing, cheaper cars and highlight quality and safety aspects. Men, on the other hand, are often overall more interested in automobiles, and for many it is important to own an expensive car with a good reputation, exclusive design, and great performance (Cleveland et al. 2011). Therefore, it can be assumed that men evaluate Chinese cars more negatively than women as Chinese cars are seen as having inferior design and lack a strong brand reputation. This leads to the following hypothesis:

H2b: Country-of-origin effects on car evaluations are moderated by the respondent's gender.

Earlier studies discovered that education levels have an influence on perceptions of country-of-origin effects, namely that people with a higher education level tend to be less open to foreign products and consequently have a more negative attitude toward them (Insch and McBride 2004). This seems to be especially true for products from China and the Southeast Asia. For instance, Ahmed and d'Astous (2001) revealed that the higher the education level of a consumer, the less favorable his or her perception of products from these countries is.

With regard to the car industry, Kreppel and Holtbrügge (2012) discovered a significant negative effect of education on the perceived attractiveness of Chinese automobiles in Germany. This may be explained by the fact that people with a higher education are more aware of the lack of corporate social and environmental responsibility as well as human rights violations in China. Thus, the negative country-of-origin effect for Chinese cars as compared to German cars may be stronger among consumers with a higher education and weaker for those with a lower education level. Based on this argumentation, the following hypothesis is proposed:

H2c: Country-of-origin effects on car evaluations are moderated by the respondent's level of education.

Previous studies showed that individuals with higher income are more inclined to buy expensive cars with a good reputation, exclusive design, and a high performance (Dargay 2001). On the contrary, consumers with lower income would rather buy cheaper cars with basic functions that are economical and easy to maintain.

Since Chinese products usually cost less than German products, it can be assumed that Chinese cars will be evaluated more positively by consumers with lower income. This is underlined by the findings of Ahmed and d'Astous (2001) who revealed that the lower the income of consumers, the more favorably they evaluate products made in China. Therefore, it may be assumed that the negative country-of-origin effects for Chinese cars are less pronounced for respondents with lower income and more pronounced for those with higher income. Thus:

H2d: Country-of-origin effects on car evaluations are moderated by the respondent's income level.

Previous studies discovered that there are significant perception differences across cultures and that country-of-origin effects are influenced by nationality (Hsieh 2004). For example, French consumers are not overly ethnocentric and, although they prefer domestic products, will also buy foreign products if they have a good reputation (Baumgartner and Jolibert 1978;

Javalgi et al. 2005). As revealed by a study of ethnocentrism in Germany across different product categories, German consumers show a strong domestic country bias with regard to cars with the majority of consumers naming German cars as their first choice (Evanschitzky et al. 2008).

It may thus be argued that Germans will evaluate German cars far better than Chinese cars due to more pronounced negative country-of-origin effects for Germans. It is highly important for them to have a performing car from a well-known car brand. Moreover, Germans tend to spend more on cars than French people (Evanschitzky et al. 2008). French consumers would rather spend their money on clothes, restaurants, and cosmetics than on expensive cars (Souiden and Diagne 2009). It can therefore be argued that there will be differences in the car evaluations of Germans and the French and that negative country-of-origin effects may be less pronounced for the latter. This leads to the following hypothesis:

H2e: Country-of-origin effects on car evaluations are moderated by the respondent's nationality.

Country-of-origin Effects, Product Evaluation, and Product-Related Factors

Previous studies reveal the influence of product-related factors, such as the number of cars owned in the household, on car choice (Prieto and Caemmerer 2013). Moreover, familiarity with a brand has a positive influence on the purchase intention, and if a consumer has already owned a certain brand before, he or she is likely to buy the same or a similar one again (Grewal et al. 1998). In terms of car brands, it has been found that the country of origin of the last car owned has a positive influence on the evaluation of cars from this particular country (Lawrence et al. 1992). Therefore, consumers who possess a German or French car may tend to evaluate cars from these countries more positively than Chinese cars. On the contrary, consumers who already own an Asian car from Japan or Korea may rate Chinese cars more positively since they come from the same geographic region (Prieto and Caemmerer 2013). Thus:

H3: Country-of-origin effects on car evaluations are moderated by car-related factors (number of cars in household and current car brand).

Country-of-origin Effects, Product Evaluation and Psychographic Factors

It can be assumed that a consumer's evaluation of a car is not only influenced by demographic characteristics, but also by his or her automotive interests, attitudes, and car purchasing behavior. For instance, price-sensitive

consumers will probably evaluate Chinese cars more positively since they are usually cheaper than cars from Western countries. Brand loyal consumers, on the other hand, tend to stick to their brands and are less open to new brands (Morgan and Hunt 1994).

For Chinese cars, it can be assumed that brand loyal consumers will evaluate Chinese cars negatively. Moreover, consumers that usually buy cars with a high performance and exclusive design will probably continue to buy expensive and luxurious cars. Since China has yet to gain the reputation for high-performing and luxurious products, it can be assumed that these consumers will evaluate Chinese cars rather negatively. The same may be true for consumers who are highly interested and knowledgeable about cars. They tend to favor cars with a good reputation and desire the ability to exchange experiences about their car with others. In contrast, consumers who are less interested in cars may evaluate Chinese cars more positively. In addition, consumers for whom quality and security are extremely important will favor well-established German cars with high quality reputation. Thus, it may be assumed that negative country-of-origin effects will be more distinct for respondents with a high quality and safety consciousness than those who do not care that much about these aspects. Based on this argumentation, the following hypothesis is proposed:

H4: Country-of-origin effects on car evaluations are moderated by psychographic factors (price consciousness, brand loyalty, need for design & performance, quality & security consciousness, and interest in & knowledge about cars).

Product Evaluation and Purchase Intention

The evaluation and perception of a product is influenced by the stereotypical image of the country of origin which, in turn, often affects the willingness to buy the product (Yasin et al. 2007). Previous research has found that perceived value and perceived product quality have a positive influence on purchase intention (Grewal et al. 1998). Similarly, Hui and Zhou (2002) revealed that information about the country of origin has a direct effect on product evaluation and an indirect effect on purchase intention.

Based on these considerations, it can be concluded that product evaluations will influence the willingness to buy a product. This is underlined by the findings of Chinen and Sun (2011), who revealed that the perception of Chinese cars has a positive influence on consumers' purchase intention. Therefore, the following hypothesis is derived:

H5: Car evaluation has a positive influence on purchase intention.

Figure 13.1 summarizes the hypotheses and includes them in the underlying research model of this study.

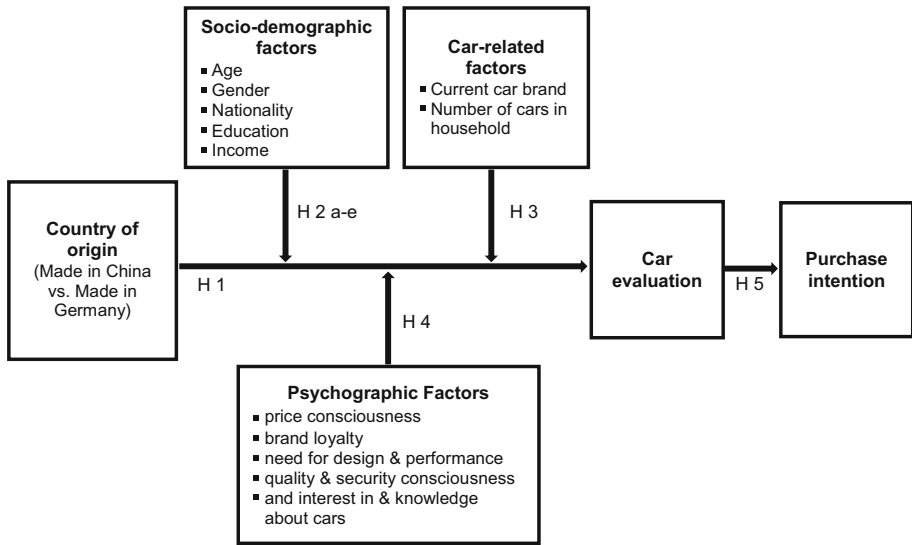


Fig. 13.1 Country-of-origin effects: research model and hypotheses

Methodology

Sample and Data Collection

In order to test the research hypotheses, an empirical study was conducted in France and Germany in October and November 2013. The two countries are the largest car markets in Europe and host a large number of car manufacturers. Moreover, they belong to the key target markets of Chinese car makers. The survey was conducted in shopping malls and shopping streets due to the respondents' high purchase intention as well as the heterogeneity of the respondents (Pappu et al. 2007). In Germany, the study was conducted in Nuremberg, and in France in Strasbourg. The two cities are comparable in size and economic structure.

Since most items were taken from previous studies published in English, the questionnaire was first developed in English and then translated into German and French. Additionally, the German version was translated into French and compared with the original version in order to check for differences. The modified questionnaires were then pretested by a small convenient sample of German and French individuals and slightly adapted to ensure understandability and cross-country equivalence.

In the beginning, respondents were told that several new automobile brands from different countries will likely be introduced into the European market

in the next years and they were supposed to rank them according to their first impression. A similar within-subject design was used by Sharma (2011) in order to be able to directly compare the respondents' ratings.

The questionnaire consisted of two parts. The first part presented pictures of two cars and some information about them, such as price, horsepower, equipment, or data (Häubl 1996). Except for the country of origin, the information about the two cars was exactly the same but arranged in a different order. Then respondents were asked to evaluate each car with regard to 13 items (Johansson and Nebenzahl 1986) and whether they could imagine to buy the car.

In the second part of the questionnaire, the respondents were asked ten questions about their car purchasing behavior, attitudes about and interest in cars. Finally, the questionnaire contained socio-demographic and car-related questions. In order to avoid an influence of the picture on the car evaluation or the order in which the cars are presented, two different versions of the French and German questionnaire rotating the country of origin were used (Sharma 2011).

The total number of usable questionnaires received was 174 in France and 173 in Germany, summing up to a total of 347 respondents used for further analyses. Generally, male respondents are slightly overrepresented with 53 % versus 47 % female respondents as compared to French (men: 48.46 %, women: 51.54 % [Institut National de la Statistique et des Études Économiques 2013]) and German (men: 49.1 %, women: 50.9 % [Statistisches Bundesamt 2013]) population in 2012. With regard to age group, the youngest respondent is 18 and the oldest 82 years old with a mean age of 37.33 and a median of 32. The majority of respondents has an education level higher than A-levels; therefore, respondents with a high education are slightly overrepresented in the sample.

Measures

Car Evaluation and Purchase Intention

In order to measure potential country-of-origin effects in the context of car evaluation, a multi-dimensional scale was developed by Nagashima (1970, 1977) and adapted by Johansson and Nebenzahl (1986). It contains 13 items that are evaluated on a 7-point bipolar scale. This multi-dimensional car evaluation scale does not only allow for an overall evaluation, but rather provides an understanding of the specific attitudes that respondents have with regard to Chinese versus German cars ('Chinese car' was coded as 1 and 'German car' as 2).

Table 13.1 Factor loadings of car evaluation items

	Factors		
	1	2	3
	Quality & performance	Appearance & attractiveness	Costs
Reliability	.825	.283	.038
Workmanship	.821	.359	.050
Quality	.843	.325	.043
Performance	.732	.329	.061
Durability	.875	.232	.059
Exclusivity	.228	.837	.023
Ownership pride	.519	.661	-.013
Stylishness	.333	.803	.021
Imitation	.482	.648	.044
Operating costs	-.051	.116	.854
Service costs	.158	-.079	.832

A factor analysis was conducted for the 13 car evaluation items. Since the KMO value (Brosius 2011) is very high (.913) and Barlett's test of sphericity reveals a high chi-square (6498.735) at a highly significant level (.000), the requirements of this method are met. In a first step, the two items 'target group' and 'price reasonability' were excluded because of their low communality extraction values (.036 and .286) (Brosius, 2011). Afterwards, a principal axis factoring with varimax rotation was conducted. Three factors with eigenvalues >1 were extracted which explain 74.49 % of the total variance. Factor 1 describes the perceived quality and performance of the car, factor 2 looks at the perceived appearance and attractiveness, and factor 3 analyzes effects of the perceived costs (Table 13.1).

Purchase intention was measured according to Bilkey and Nes (1982) and Peterson and Jolibert (1995) by asking respondents to indicate on a 7-point Likert-scale (from 1 = 'not at all' to 7 = 'definitely') whether they could imagine buying the respective car.

Socio-Demographic Factors

Respondents were asked to provide their year of birth and gender with 'male' = 1 and 'female' = 2. For education, respondents were to state their highest achieved education out of six levels from 'no degree' = 1 to 'master or diploma' = 6. With regard to income, the respondents were asked to indicate their household income in comparison to their perception of the average household income in their country. Answers had to be given on a 7-point Likert-scale with 'very low' = 1 and 'very high' = 7. Moreover, the respondents were asked to indicate their nationality with 'German' = 1 and 'French' = 2.

Car-Related Factors

The respondents were asked to tick off the number of cars in their household ('no car' = 0, '1 car' = 1, '2 cars' = 2, '3 cars' = 3, and 'more than 3 cars' = 4). Moreover, they were asked to provide the name of the car brand they currently drive. Due to the high number of car brands available in Europe, the brands were categorized according to the producer's country of origin. Of the respondents, 46 % own a German car, 35 % a French car, 12 % percent an Asian (Japanese or Korean) car, and 19 % a car from another country (multiple answers possible).

Psychographic Factors

In analyzing the psychographic factors that are relevant in the process of evaluating and buying cars, a 10-item scale developed by GfK Mediamark Research & Intelligence (2011) was applied. The ten items reflect five dimensions, namely 'car brand loyalty', 'interest in & knowledge about cars', 'quality & security consciousness', 'design & performance consciousness' and 'price consciousness'. The reliability of all items is sufficient ($.503 < \text{Cronbach's } \alpha < .781$) (see Table 13.2).

As we used a self-report questionnaire, collecting data at the same time from the same participant and deriving independent and dependent variables from

Table 13.2 Psychographic factors measurement scale

Construct	Items	Cronbach's α
Car brand loyalty	I'm loyal to my vehicle brands and stick with them	.503
	I typically look at several vehicle brands when shopping for a new vehicle	
Interest in and knowledge of cars	I often take the opportunity to discuss my knowledge of automobiles with others	.781
	I consider myself to be an automotive enthusiast	
Quality and security consciousness	The quality of workmanship/construction of a vehicle is more important than anything else	.563
	I consider safety first when shopping for a new vehicle	
Design and performance Consciousness	I look for vehicles that offer spirited performance and powerful acceleration	.637
	I seek out vehicles with bold, innovative designs that stand apart from others on the road	
Price consciousness	I want the cheapest and easiest to maintain vehicle I can find	.757
	I generally purchase the most expensive model with all the luxury appointments and options (reverse coding)	

Source: GfK Mediamark Research & Intelligence (2011)

the same respondent, common method variance may be a concern. To reduce this risk, the respondents were assured full confidentiality and anonymity (Chang et al. 2010). We also avoided terms that could be ambiguous, vague, or unfamiliar to the respondents, formulating items as concisely as possible. Finally, following Podsakoff et al. (2003), we used different scale endpoints and formats in order to avoid biases caused by anchor effects and commonalities in the endpoints. As an ex-post measure, a Harman's single-factor test for common method variance was applied (Harman 1976; Podsakoff et al. 2003). With the highest value at 13.78 %, no single factor accounted for the majority of the variance. Hence, combined with our ex-ante measures, common method variance was not regarded as a problem.

Results and Discussion

Table 13.3 presents the means, standard deviations, and correlations of all variables. Although some variables are highly correlated, all variance inflation factors are far below the critical level of 10, as recommended by Chatterjee and Price (1991) and Gujarati (2003). Therefore, there are no concerns for multicollinearity.

In a first step, an ANOVA analysis was conducted to test whether there are differences in the respective mean values of the two countries of origin and whether these differences are significant (Table 13.4). The results show that German cars are rated better in terms of quality and performance (mean = 5.49) than Chinese cars (mean = 3.55). The difference is highly significant ($p < .001$) which means that, although the cars are identical except for the country of origin, the knowledge that a car comes from China leads to a much lower evaluation with regard to quality and performance. In terms of appearance and attractiveness, a similar tendency is found. The German car is perceived as significantly more attractive (mean = 4.52) than the Chinese car (mean = 3.22) on a $p < .001$ -level. Pertaining to perceived costs associated with the two cars, the German car (4.04) is evaluated as marginally less attractive than the Chinese car (4.05). However, the difference is not significant ($p > .1$).

To test our hypotheses, multivariate regression analyses for the three different dependent variables 'quality & performance', 'appearance & attractiveness', and 'costs' were conducted (Table 13.5). Models 1a, 2a, and 3a only include the independent variable 'country of origin', while models 1b, 2b, and 3b were run with the independent variable and all moderating variables. All four models for the dependent variables 'quality & performance' and 'appearance & attractiveness' are significant on a very high level ($p .001$; $.253 < \text{adj. } R^2 < .521$). For the dependent variable 'price', only model 3b with all moderating variables is significant,

Table 13.3 Means, standard deviations, and correlations

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Country of origin (China = 1; Germany = 2)	1.50	.500															
2 Age	37.33	14.19															
3 Gender (male = 1; female = 2)	1.47	.499															
4 Nationality (German = 1; French = 2)	1.50	.500															
5 Education	4.50	1.39															
6 Income level	4.04	1.21															
7 Number of cars in household	1.74	1.37															
8 Car brand loyalty	3.71	1.54															
9 Interest in and knowledge of cars	4.00	1.82															
10 Quality and security consciousness	4.98	1.27															
11 Design and performance consciousness	3.40	1.59															
12 Price consciousness	4.30	1.37															
13 Quality and performance	4.52	1.37															
14 Appearance and attractiveness	3.87	1.28															
15 Costs	4.04	1.15															
16 Purchase intention	3.56	1.92															

N = 347; * = $p < .05$; ** = $p < .01$; *** = $p < .001$

Table 13.4: ANOVA analysis of car evaluations

	Chinese car	German car	Significance
Quality and performance	3.55	5.49	***
Appearance and attractiveness	3.22	4.52	***
Costs	4.05	4.04	n.s.

$N = 347$; *** = $p < .001$

albeit the explanatory power is very low ($p .01$; adj. $R^2 = .026$). In all three cases, the inclusion of the socio-demographic, psychographic, and car-related factors increased the explanatory power of the models, though only to a small degree.

With regard to hypothesis 1, the regression analyses show that the country of origin has a highly significant impact on the perceived quality and performance and appearance and attractiveness of cars. On the contrary, model 3a reveals no significant influence on costs. The coefficient becomes significant on a low level only when the moderating variables are included (model 3b). Therefore, hypothesis 1 is accepted for 'quality & performance' as well as 'appearance & attractiveness', but not for 'costs'. A potential reason for the similar evaluation of the two cars in terms of costs may be that the respondents perceive Chinese cars to be more economical in terms of operation and maintenance costs than German cars. However, the perception of this costs advantage is likely to be compensated by a perceived high proneness to defects and a low resale price (Fetscherin and Toncar 2009). As a consequence, country-of-origin effects with regard to costs do not appear.

Hypotheses 2a-2e proposed a moderating effect of socio-demographic factors on country-of-origin effects. Table 13.5 reveals expected and significant effects for age and nationality only, while the coefficients for the other socio-demographic variables are not significant. A closer look shows that the country-of-origin effect is stronger for French individuals in terms of quality and performance and appearance and attractiveness, while it is more pronounced for Germans with regard to costs. One explanation for this finding may be that French consumers have a strong tendency to prefer domestic products in general and only like to buy foreign goods only if they have a very high reputation or are significantly less expensive (Javalgi et al. 2005). In comparison, German consumers seem to be less ethnocentric with regard to the evaluation of Chinese cars in terms of quality and performance and appearance and attractiveness, which partially contradicts the finding of previous studies in this context (Javalgi et al. 2005; Evanschitzky et al. 2008).

Hypothesis 3 proposed a moderating effect of car-related factors on country-of-origin effects. Table 13.4 shows that none of the coefficients is

Table 13.5 Regression analyses on car evaluation

	Quality and performance			Appearance and attractiveness			Costs		
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b			
Country of origin (China = 1; Germany = 2)	.708***	.466***	.504***	.166*	-.003	-.171*			
COO * Age		.004		.136**		.152**			
COO * Gender (male = 1; female = 2)		-.029		-.050		.047			
COO * Nationality (German = 1; French = 2)		.109*		.296***		-.207***			
COO * Education		-.031		-.001		.071			
COO * Income level		-.029		-.062		.035			
COO * Number of cars in household		.016		.024		.054			
COO * Current car German		-.031		.011		-.052			
COO * Current car French		.002		-.023		.053			
COO * Current car Asian		.040		.047		.058			
COO * Car brand loyalty		-.020		-.042		-.002			

continued

Table 13.5 (continued)

	Quality and performance			Appearance and attractiveness			Costs		
	Model 1a	Model 1b	Model 2a	Model 2b	Model 3a	Model 3b			
COO * Interest in & knowledge of cars		-.037		-.022		.002			
COO * Quality & security consciousness		.145**		.158**		.066			
COO * Design & performance consciousness		.046		-.029		-.008			
COO * Price consciousness		.065		.070		.044			
adj. R ²	.500	.521	.253	.305	.001	.026			
Δ adj. R ²		.021		.052		.025			
F-value	694.39***	51.27***	235.74***	21.22***	.01	2.25**			

N = 347; * = $p < .05$; ** = $p < .01$; *** = $p < .001$

significant. Thus, neither the number of cars in the household nor the current car brand impacts the evaluation of Chinese versus German cars.

Hypothesis 4 proposed that country-of-origin effects on car evaluation are moderated by psychographic factors. Table 13.4 shows that only quality and security consciousness has a significantly positive effect on quality and performance and appearance and attractiveness, while all other coefficients are not significant. An explanation for the high relevance of quality and security consciousness may be the failed crash tests of Chinese cars in the mid-2000s that gained large media attention. For example, Jingling Motors failed the Euro NCAP test in 2005 with the worst result to date. Similarly, Chinese car maker Brilliance received only one out of five possible points in a crash test in 2007. This may have resulted in a very negative reputation of Chinese car makers in terms of quality and safety that may particularly influence respondents who are very conscious with regard to this factor.

Hypothesis 5 proposed that car evaluation has a positive influence on purchase intention. In order to test this, a regression analysis of the influence of the three dimensions of car evaluation on purchase intention was conducted. Table 13.6 shows that the coefficients for quality and performance and appearance and attractiveness are highly significant, while no significant impact of costs is found. Hence, hypothesis 5 is confirmed for quality and performance as well as appearance and attractiveness, but not for costs.

A country-wise analysis shows that for German cars, appearance and attractiveness has a higher influence on purchase intention than quality and performance. Hence, a respondent who finds the German car attractive and stylish will be more willing to buy it. For Chinese cars, quality and performance has a higher influence on the purchase intention than appearance and attractiveness, that is, respondents who evaluate the quality and performance of Chinese cars comparably higher will have a stronger purchase intention. Costs do not have a significant influence on the purchase intention for both countries of origin.

Table 13.6 Regression analysis on purchase intention

	Purchase intention		
	Total sample	Chinese car	German car
Quality and performance	.492***	.356***	.305***
Appearance and attractiveness	.305***	.284***	.364***
Costs	.032	.083	.055
adj. R ²	.560	.371	.351
F-value	294.94***	68.94***	63.21***

$N = 347$; * = $p < .05$; ** = $p < .01$; *** = $p < .001$

Contributions, Limitations, and Implications

The purpose of this study was to analyze whether Chinese automobile companies face negative country-of-origin effects in Europe and to examine whether socio-demographic, psychographic, and car-related factors moderate these effects. Considering this, a study among 173 German and 174 French consumers in major shopping centers and streets in France and Germany was conducted.

The present study contributes to the existing country-of-origin literature by exploring how Chinese automobiles are evaluated in comparison to German cars by European consumers. Although the media frequently discusses that Chinese cars have not yet been successful in Europe due to country-of-origin effects, there is a lack of studies that confirm this effect empirically. This study supports the claim that Chinese cars suffer from negative country-of-origin effects and that this may be a major reason why they have not gained a significant market share in Europe. Their negative evaluation with regard to quality and performance may be attributed to the 'Made in China' image which is usually associated with poor quality, low workmanship, and non-durability (Bell 2008; Loo and Davies 2006). This is reinforced by China's image and reputation as a low-cost producer (Chinen and Sun 2011) and by frequent recalls of Chinese products such as toys, drugs, or tires. Furthermore, the failed crash tests of Chinese car brands Landwind and Brilliance may have contributed to the negative image of Chinese cars in Europe.

While previous research examined the brand personality perception of Chinese cars (Fetscherin and Toncar 2009) and the general attractiveness of Chinese cars compared to other Chinese products (Kreppel and Holtbrügge 2012), this study also examined how evaluations of cars are moderated by socio-demographic, psychographic, and car-related factors. Particularly, we found a strong effect of age and nationality on the evaluation of Chinese cars. Moreover, quality and security consciousness demonstrated significant moderating effects. In contrast, car-related factors had no significant impact in this context.

Several management implications can be drawn from the results of this study. In particular, the findings may help Chinese automobile companies to understand how Chinese cars are perceived in France and Germany and to derive implications for target group selection, brand positioning, and market segmentation. Most importantly, Chinese car makers can recognize the need to improve their image, especially with regard to quality and security, before they can successfully penetrate the European market. Assuming that their

quality and workmanship level meets European standards, Chinese car makers could voluntarily pass the European NCAP crash test in order to signal their the improved quality and communicate these positive results in order to convince European consumers that they can buy Chinese cars without concern. Moreover, they may offer longer warranty periods like some Japanese and Korean car makers have previously done in order to abate concerns over quality and safety. This would help to build trust among European consumers and may facilitate gaining higher market shares in Europe.

Another management implication for Chinese car makers is to consider factors that moderate the observed negative country-of-origin effects. A promising target group is younger consumers who tend to evaluate Chinese cars significantly better than older customers. It was discovered that the quality and performance of Chinese cars is evaluated best among the youngest age group of 18–25. These first-time car buyers are obviously more price-sensitive, less ethnocentric, and more open to new products from emerging market companies. In addition, Chinese companies should pay attention to psychographic factors in their branding decisions. The most prospective target group is consumers with low quality and security consciousness. For example, they may place advertisements on television or in magazines which show a young Chinese car owner with his/her friends talking about how convenient the car is to drive and how inexpensive it is. Additionally, Chinese car makers may target consumers on the internet and place advertisements for those who frequently visit special offers or websites that are mainly used by younger age groups.

Finally, Chinese automobile companies could make use of the positive image of German car makers in order to improve their image among European consumers. For example, they may source parts from German automobile suppliers renowned for quality and security, such as braking systems. Moreover, they may cooperate with German engineers and designers to improve the quality, performance, appearance, and attractiveness of Chinese cars.

A limitation of the study is its regional bias. The questionnaires in France have mainly been distributed in the city center in Strasbourg and surroundings shopping centers. Due to the history and proximity to Germany, French consumers in this area may be rather similar to German consumers. Although some moderating influence of nationality has been found on the country-of-origin effect, it can be assumed that these differences would have been more pronounced among respondents from the south or north of France. The same might be the case for Germany where significant differences between consumer attitudes in the Western and Eastern parts of the country exist.

Furthermore, the present study only included German and French respondents and thus it is not representative for Europe as a whole. Since German and French consumers both rate Chinese cars rather negatively and have a relatively similar income level, it would be interesting to repeat the study in other European countries. Future research should focus particularly on Eastern European countries where the income level is lower and no strong local automobile industry exists.

Another limitation of the present study is its restriction to only one foreign and one local car brand. In reality, customers choose from a large number of cars from different countries. Thus, it may be interesting to analyze whether Chinese cars would be evaluated differently if compared with cars from other countries, such as Italy, Japan, or Korea. It would be particularly interesting to consider automobile companies from other emerging markets that are planning to enter Europe, such as India and Russia.

It should also be considered that this study relates to the overall country-of-origin effects of Chinese cars. A more fine-grained conceptualization of the country-of-origin construct may distinguish, for example, between the countries of assembly, design, manufacturing, component, and brand (Ahmed and d'Astous 2007; Fetscherin and Toncar 2010). Thus, it could be interesting to examine whether the evaluation of Chinese cars improves if they would be, for example, designed in Germany or assembled in Eastern Europe. Future studies may therefore distinguish between these functions and test how Chinese automobile companies can mitigate their negative country-of-origin effects by configuring their value-added activities across different countries.

Generally, this study shows that Chinese car makers are faced with strong negative country-of-origin effects when they enter the European market. In order to increase their global market share they have to plan their market entry strategies thoroughly. In particular, the market segmentation and brand management policies have to be adapted to the specific conditions in the various foreign target markets. This study points to various socio-demographic, psychographic, and product-related variables that should be considered in this context. If Chinese companies are able to cope with these factors and to overcome existing customer animosity, they have the potential to fundamentally change the structure of one of the largest and most attractive industries in the world.

Bibliography

- Ahmed, S. A., & d'Astous, A. (2001). Canadian consumers' perceptions of products made in newly industrializing East Asian countries. *International Journal of Commerce and Management*, 11(1), 54–81.
- Ahmed, S. A., & d'Astous, A. (2007). Moderating effect of nationality on country-of-origin perceptions: English-speaking Thailand versus French-speaking Canada. *Journal of Business Research*, 60(3), 240–248.
- Alon, I., & McIntyre, J. R. (2008). *Globalization of Chinese enterprises*. New York: Palgrave Macmillan.
- Balabanis, B., & Diamantopoulos, A. (2004). Domestic country bias, country-of-origin effects, and consumer ethnocentrism: A multidimensional unfolding approach. *Journal of the Academy of Marketing Science*, 32(1), 80–95.
- Balabanis, G., Mueller, R., & Melewar, T. C. (2002). The human values' lenses of country of origin images. *International Marketing Review*, 19(6), 582–610.
- Baumgartner, G., & Jolibert, A. (1978). The perception of foreign products in France. *Advances in Consumer Research*, 5, 603–605.
- Bell, S. (2008). *International brand management of Chinese companies – case studies of the Chinese household appliances and consumer electronics industry entering US and Western European markets*. Heidelberg: Physica.
- Bilkey, W. J., & Nes, E. (1982). Country-of-origin effects on product evaluations. *Journal of International Business Studies*, 13(1), 89–99.
- Brosius, F. (2011). *SPSS 19* (1st ed.). Heidelberg: Mitp.
- Statistisches Bundesamt. (2013). *Statistisches Jahrbuch 2013- Bevölkerung, Familien, Lebensformen*. Retrieved from https://www.destatis.de/DE/Publikationen/StatistischesJahrbuch/Bevoelkerung.pdf?__blob=publicationFile
- Chang, S.-J., van Witteloostuijn, A., & Eden, L. (2010). From the editors: Common method variance in international business research. *Journal of International Business Studies*, 41(2), 178–184.
- Chatterjee, S. R., & Price, B. (1991). *Regression analysis by example*. New York: Wiley.
- Chinen, K., & Sun, Y. (2011). Effects of country-of-origin on buying behavior: A study of the attitudes of United States consumers to Chinese-brand automobiles. *International Journal of Management*, 28(2), 553–563.
- Cleveland, M., Papadopoulos, N., & Laroche, M. (2011). Identity, demographics, and consumer behaviors: International market segmentation across product categories. *International Marketing Review*, 28(3), 244–266.
- Dargay, J. M. (2001). The effect of income on car ownership: Evidence of asymmetry. *Transportation Research Part A: Policy and Practice*, 35(9), 807–821.
- De Mooij, M. (2004). *Consumer behavior and culture: Consequences for global marketing and advertising*. Thousand Oaks: Sage.
- Evanschitzky, H., Wangenheim, F., Woisetschläger, D., & Blut, M. (2008). Consumer ethnocentrism in the German market. *International Marketing Review*, 25(1), 7–32.

- Fetscherin, M., & Toncar, M. (2009). Country of origin effect on U.S. consumers' brand personality perception of automobiles from China and India. *Multinational Business Review*, 17(2), 111–127.
- Fetscherin, M., & Toncar, M. (2010). The effects of the country of brand and the country of manufacturing of automobiles: An experimental study of consumers' brand personality perceptions. *International Marketing Review*, 27(2), 164–178.
- GfK Mediamark Research and Intelligence. (2011). The GfK MRI psychographic sourcebook. Retrieved from <http://www.gfkmri.com/PDF/GfKMRIPsychographicSourcebook.pdf>
- Good, L. K., & Huddleston, P. (1995). Ethnocentrism of Polish and Russian consumers: Are feelings and intentions related? *International Marketing Review*, 12(5), 35–48.
- Grewal, D., Krishnan, R., Baker, J., & Borin, M. (1998). The effect of store name, brand name and price discounts on consumer's evaluations and purchase intentions. *Journal of Retailing*, 74(3), 331–352.
- Guillén, M. F., & García-Canal, E. (2013). *Emerging markets rule. Growth strategies of the new global giants*. New York: McGraw-Hill.
- Gujarati, D. (2003). *Basic econometrics*. New York: McGraw-Hill.
- Harman, H. H. (1976). *Modern factor analysis*. Chicago: University of Chicago Press.
- Häubl, G. (1996). A cross-national investigation of the effects of country of origin and brand name of a new car. *International Marketing Review*, 13(5), 76–97.
- Hsieh, M. H. (2004). An investigation of country-of-origin effects using correspondence analysis: A cross-national context. *International Journal of Market Research*, 46(3), 267–295.
- Hui, M. K., & Zhou, L. (2002). Linking product evaluation and purchase intention for country-of-origin effects. *Journal of Global Marketing*, 15(3/4), 95–116.
- Insch, G. S., & McBride, J. (2004). The impact of country-of-origin cues on consumer perceptions of product quality: A binational test of the decomposed country-of-origin construct. *Journal of Business Research*, 57(3), 256–265.
- Institut National de la Statistique et des Études Économiques (INSEE). (2013). *Population Totale par Sexe et Âge au 1er Janvier 2013, France Métropolitaine*. Retrieved from http://www.insee.fr/fr/themes/detail.asp?reg_id=0&ref_id=bilan-demo&page=donnees-detaillees/bilan-demo/pop_age2.htm
- Javalgi, R. G., Khare, V. P., Gross, A. C., & Scherer, R. F. (2005). An application of the consumer ethnocentrism model to French consumers. *International Business Review*, 14(3), 325–344.
- Johansson, J. K., & Nebenzahl, I. D. (1986). Multinational production: Effect on brand value. *Journal of International Business Studies*, 17(3), 101–126.
- Kreppel, H., & Holtbrügge, D. (2012). The perceived attractiveness of Chinese products by German consumers – a sociopsychological approach. *Journal of Global Marketing*, 25(2), 79–99.
- Laforet, S., & Chen, J. (2012). Chinese and British consumers' evaluation of Chinese and international brands and factors affecting their choice. *Journal of World Business*, 47(1), 54–63.

- Lawrence, C. C., Marr, N. E., & Prendergast, G. P. (1992). Country-of-origin stereotyping: A case study in the New Zealand motor vehicle industry. *European Journal of Marketing*, 26(3), 37.
- Leonidou, L. C., Palihawadana, D., & Talis, M. A. (2007). British consumers' evaluations of US versus Chinese goods: A multi-level and multi-cue comparison. *European Journal of Marketing*, 44(7/8), 786–820.
- Loo, T., & Davies, G. (2006). Branding China: The ultimate challenge in reputation management? *Corporate Reputation Review*, 9(3), 198–210.
- Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), 20–38.
- Nagashima, A. (1970). A comparison of Japanese and U.S. attitudes toward foreign products. *Journal of Marketing*, 34(1), 68–74.
- Nagashima, A. (1977). A comparative “Made In” product image survey among Japanese businessmen. *Journal of Marketing*, 41(3), 95–100.
- Pappu, R., Quester, P. G., & Cooksey, R. W. (2007). Country image and consumer-based brand equity: Relationships and implications for international marketing. *Journal of International Business Studies*, 38(5), 726–745.
- Peterson, R. A., & Jolibert, A. J. P. (1995). A meta-analysis of country-of-origin effects. *Journal of International Business Studies*, 26(4), 883–900.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903.
- Prieto, M., & Caemmerer, B. (2013). An exploration of factors influencing car purchasing decisions. *International Journal of Retail and Distribution Management*, 41(10), 738–764.
- Sharma, P. (2011). Country of origin effects in developed and emerging markets: Exploring the contrasting roles of materialism and value consciousness. *Journal of International Business Studies*, 42(2), 285–306.
- Souiden, N., & Diagne, M. (2009). Canadian and French men's consumption of cosmetics: A comparison of their attitudes and motivations. *Journal of Consumer Marketing*, 26(2), 97–109.
- Wang, X., & Gao, Y. (2010). Irish consumers' perception of Chinese brands and how to improve the ‘Made in China’ image. *Journal of Asia Business Studies*, 4(2), 80–85.
- Yasin, N., Noor, M., & Mohamad, O. (2007). Does image of country-of-origin matter to brand equity? *Journal of Product and Brand Management*, 16(1), 38–48.

Part 4

Dealing with New Technology

14

Customer Integration into Continuous Development of IT-based Services

Klaus Brockhoff

Ideas in Brief Developers of IT-based services should be aware of potential conflicts arising from involving customers in co-development projects. This is a first step toward securing continuous development processes. The analysis in this chapter is based on extensive use of literature, including empirical research on the topic. The topic is developed from the perspective of the service supplier, and four contextual conditions are analyzed: (1) Stage specific or continuous, unspecific integration; (2) Customer abilities; (3) Intensity of involvement and its enhancement; (4) Number of customers involved. With a limited number of competing customers involved in the co-development, three types of conflicts might arise. As not all conflicts can be foreseen, building trust can contribute to reduce disruptions of the development processes. The exposition and the findings should be of interest and help decision makers on co-development projects as well as those involved in running the projects.

Keywords Co-development • Conflict • IT-based services • Supplier-customer relations • Trust

K. Brockhoff (✉)

WHU – Otto Beisheim School of Management, Vallendar, Germany

e-mail: klaus.brockhoff@whu.edu

Introduction

Customer integration into development processes is frequently recommended to align better development outcomes with customer wants and expectations. Reports on success of this involvement are mixed. Most empirical results supporting the recommendations relate to customer–supplier relations that are characterized either by large numbers of non-competing customers or by a 1:1 relationship. It is less well understood what happens in those relationships which involve a small number of competing customers. This is typical of highly complex development projects. Then, particular conflicts might arise between customers and suppliers and among customers, each using their own power base to influence the outcome. These types of conflicts are explained. Complexity and uncertainty make it impossible to regulate all conflicts by contractual relations, which invites to opportunism. Therefore, it is important to understand and to consider the reasons for conflicts and to invest in building trust as a means to reduce opportunism. This is particularly so when repeated developments are necessary to assure a continuous new product flow.

For some, customer integration in service development is an undisputed demand or suggestion (Fähnrich and Meiren 2010; Shostack 1984). Furthermore, in the world of consumer products this integration can be supported by IT-products that interact with the customer via the internet and that can lead to virtual customer interaction (Rohrbeck et al. 2010; Melton and Hartline 2010; Nambisan and Baron 2009). This promises to broaden the base for customer integration by reducing the cost for the customers and by increasing the number of potential contributors. Contrary to great hopes of achieving value by customer involvement in development processes, a meta-analysis finds that such “benefits ... have not been strongly demonstrated” (Ives and Olson 1984, 600). The results on value creation by customer involvement can depend on contextual conditions of the development task. Some studies identify success of customer involvement at least with respect to some dimensions of the development task, while others do not find significant benefits as compared with in-house developments (Sundbo 1997; Melton and Hartline 2010). It is also shown that profitability of development processes declines beyond a certain level of customer involvement (Ernst 2001). In our view, this can be the result of mounting conflicts arising in parallel with the increasing involvement. Thus, customer integration is not a quasi-automatic route to successfully creating customer value as well as value for the supplier. Major sources of problems can be attributed to the particular contextual types of

interactions, and to conflicts between and among the people involved. These conflicts need to be foreseen and managed, at least in principle.

We argue that success of customer integration into development of IT-based services depends greatly on contextual conditions, and following from these can lead to conflicts between supplier and customers as well as among customers. This is vastly overlooked. However, responsible service developers should be aware of possible conflicts and should try to avoid them.

IT-Based Services and Development Types with Customer Involvement

Characteristics of Services

Services, as other products, can be considered as bundles of characteristics or performance criteria which are compiled by suppliers to satisfy demand of a value-maximizing group of customers. In marketing it is long known that performance criteria can be objective (for instance, the time it takes to deliver a service) (Lancaster 1971) or subjectively perceived (for instance, quality of a service) (Shocker and Srinivasan 1974). Compared with traditional manufacturing products many services are intangible, customized and customer contact-related. Benefits expected by using services depend to a certain degree on willingness and ability of the customer to co-operate with the supplier. Simply put: If you shake your head at the barber's, you cannot expect to get a satisfying haircut. Economics speaks of integrating the traditional internal factors of production with an external factor, namely the activity of the customer. In an instructive case study on an IT-based service, the key component of service innovation is labeled "participative value delivery" (Wooder and Baker 2012, 14). Therefore, collecting information on product characteristics which enhance the value to the customers is of more importance in most services than in other products. Design of a particular service has to consider the resources of a given supplier (which include its expertise), its competitive environment and the demands of the customers (which should include their specific expertise). The latter manifests itself in a perception of a bundle of *ideal* characteristics or performance criteria for each customer. Because of the service characteristics, customers can be expected to have particular expertise to identify their ideal service.

Types of IT-Based Service Developments

Customer interaction promises particular benefits in more complex developments. Dealing with voice networks in the telecommunications industry it was found that more complex product developments call for more experienced customers to secure their involvement (Sioukas 1995). Using the degree of complexity of the service on the one hand and the IT complexity involved on the other hand, Meyer and van Husen (2008) have shown that four different types of development can be defined (Fig. 14.1). *Routine development* is of little interest because value-enhancing suggestions or complaints by customers are easily collected. The three remaining types are shortly described in the following.

Service engineering is a systematic process of developing new or improved services which are supported by IT. The development follows what is called a service-dominant logic (Ordanini and Parasuraman 2011). Take automatic teller machines as one example. *Software engineering* uses software as the main value driver and applies it to a service with relatively low complexity. Automatic identification of engine failures of different sort to alarm service technicians might serve as an example. Both of these cases are supported by relatively well-known and well-understood development methods. Among other capabilities, the parties involved need to have the competence to manage networks of contributors (Boss 2011). However, available standardized development procedures reduce the probability of conflicts. This is not as well understood in the remaining case.

The *co-development of IT and service* is of a more challenging character. Some prefer to call this co-design or co-creation of a service innovation, the latter aiming at radical innovation (Perks et al. 2012). Speaking of IT in this context might mean hardware as well as software, because sometimes the one

		Complexity of service		
		Low	Medium	High
Complexity of IT	Low	Routine development	Service engineering	
	Medium	Software engineering	Co-development or co-design of IT and service	
	High			

Fig. 14.1 Types of IT-based service development alternatives (based on Meyer/van Husen 2008)

may substitute the other. The choice between the two is in itself a multifaceted decision problem. Commercial success often relies on integrating both hardware and software components rather than being driven by a single factor on its own. These choices and the complexities offer many opportunities for customer involvement. Examples for co-development may be found in fields like exoskeletons or tactile internet applications such as in almost real-time coordination of manufacturing machinery. Such examples illustrate that experts from different fields need to integrate their knowledge to achieve a solution. Some of these experts may be employed primarily by customers of IT-based services. In other words: The asymmetric distribution of expertise calls for a distribution of expert labor in such development projects on the one hand as well as its coordination on the other hand. It is also likely that in this particular type of co-development it is of high importance to reveal tacit knowledge or sticky information. This requires “socially richer interaction and processes of communication than the information-processing approach that dominated the literature on customer involvement” (Lundkvist and Yakhlef 2004, 251).

In the following, the locus of initiative for expert involvement in the service development project is assumed to be with a supplier, who solicits customer contributions (Brockhoff 2003). In the next paragraphs, four contextual conditions for customer involvement in IT-based service developments are discussed. Building on these we turn to those conflicts that might arise from an interaction of suppliers with a limited number of potential users. A warning note of the potential spread of a conflict concludes the chapter together with a sketch of possible remedies.

Contextual Condition 1: Stage Specific or Continuous, Unspecific Integration

The service development process can be collectively organized in a number of stages or phases, ranging from idea generation to market introduction. Customers can be involved in all or some of these stages. Customer involvement in only some stages can be unsolicited by the supplier (Alexy et al. 2012) or be initiated by the customer or can be planned by the supplier. Unsolicited customer involvement may decline from one stage of the development process to the next, as has been found in consumer goods industries (Hansen and Raabe 1991). Such a decline could be an important source of later product failure if the reason for the resignation lies in dissatisfaction with the acceptance of the customer’s contributions.

Here, we concentrate on solicited customer involvement in response to the complexity of co-development. Even in this case customers involved in one stage may not stay active to a following stage. Besides customers' own participation decision, this may be planned by the supplier. The reason is that disagreement prevails as to whether an involvement has relatively more impact in the early and the late stages of the development process as compared with other stages (Gruner and Homburg 2000; Ernst 2004) or whether the activities should be more or less evenly distributed over all phases to be effective (Coviello and Joseph 2012). Platforms to support virtual customer integration often specialize on one of the stages (Rohrbeck et al. 2010; Melton and Hartline 2010) to correct or to supplement perceived particular weaknesses of the supplier's expertise. In this way, they support selective customer involvement rather than a continuous involvement through all stages. Customers involved in only one or a few of all development stages might find the final bundle of characteristics offered to be unsatisfactory because their contributions are overruled in other stages, or by other customers' contributions.

Thus, stage-specific customer involvement in particular can frustrate customers and ignite conflicts among them; the supplier, however, benefits from stage-specific customer abilities.

Contextual Condition 2: Customer Abilities

A second contextual condition relates to the type of customers involved. Most researchers agree that—given a relatively large number of customers—the collection of the views of a representative sample of all customers on ideal product characteristics leads at best to low innovativeness in product development (Bohlmann et al. 2013; Bartl et al. 2012; Zhao et al. 2012). This may be different when specifically experienced customers in a particular product class can be involved (Poetz and Schreier 2012). In particular, customers who might complement the knowledge of in-house experts are of special interest. A particular ability of such customers might be to imagine or envision future uses of a service concept beyond immediate application at their or some other place, which is called “emergent nature” (Hoffmann et al. 2010). Furthermore, it seems to be more advantageous to single out customers who might promise to give more support to high innovativeness and who might also have a higher half-life time of the service usage in the market, because both are established success factors of new service developments (Boss 2011).

To identify the more experienced future-sensitive and innovative customers, observable customer attributes signaling their respective abilities are sought by classical marketing research. This is not trivial in the real world, particularly because different customers represent different market segments (Brockhoff and Rao 1993). Identification failure might be a reason for unsatisfactory development results in spite of customer involvement.

By combining customer experience with stages of the development process, we arrive at particular potentially valuable customer contributions. The customer types considered here are collectively called “providers” (Tranekjer and Knudsen 2012) or “pilot customers” (Brockhoff 2003) to set them apart from average customers. An overview is given in Fig. 14.2.

In the cases of solicited involvement, pilot customers can be idea generators, concept developers and evaluators, launching customers accompanying service development, lead users (von Hippel 1988), prototype testers and evaluators or experience collectors after market introduction (Kottkamp 1998; Coviello and Joseph 2012). The last group might overlap with the idea generators, influencing the development of the next generation of the service. A slightly

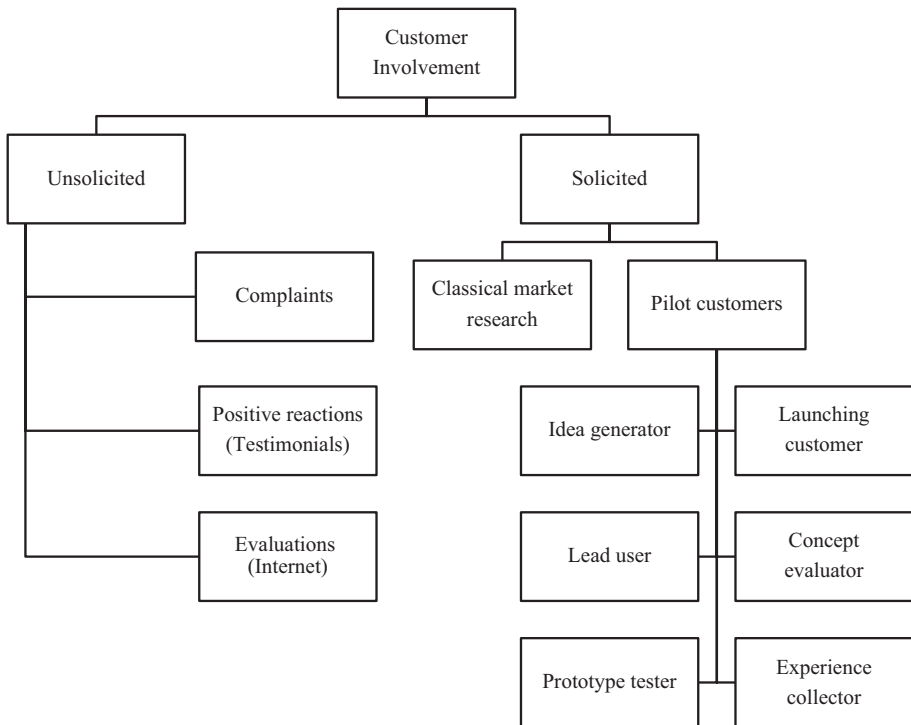


Fig. 14.2 Types of customer involvement

different concept is that of customers assuming certain roles in the development process. Ten such roles were identified (Coviello and Joseph 2012). The concept of roles is favored by its authors because they have the impression that highly structured stages might not be a good process organization for the highly uncertain development processes. However, this critique of structured development processes does not seem to apply in general (Boss 2011). Furthermore, the roles can be easily related to the stages after the unsolicited customer contributions and those from classical market research are excluded. Also, co-development in this chapter is a much broader concept than co-development as a role in Coviello and Joseph (2012).

For applications, it is important to identify those customers who have the one or the other of the pilot customers' abilities before the start of a co-development project. Considering lead users alone, quite a bit of effort has gone into attempts of identification (Morrison et al. 2004; Franke et al. 2006), even by use of virtual stock markets (Spann et al. 2009). However, the use of virtual stock markets in particular phases might be constrained by the number of knowledgeable participants. If the virtual market is not "liquid," artificial market makers or persons assigned as market participants may be needed (Waitz and Mild 2013). Whether this leads to realistic results reflecting customer demands can be questioned. Therefore, more traditional signals for customer contributions need to be considered. Also, identification approaches need to be developed for the other types of expected contributions and their customer contributors.

Different types of customer expertise, however, can lead to divergent development goals, and then to conflicts.

Contextual Condition 3: Intensity of Involvement and Its Enhancement

Low-intensity participants called "experimenters" (Rohrbeck et al. 2010) do not seem to be of great help in co-development. Instead, sustainable engagement is requested. To achieve this, it may require offering certain incentives to customers to stay on a full development process or at least a full stage. It was observed that even approaches with relatively little physical resource input, such as idea generation or concept evaluation by virtually integrated customers, need to develop incentives to keep customers active for as long as is deemed appropriate by the supplier. One study on service innovations finds that Euro Stoxx 50 companies have not been too successful in achieving continuous interaction (Rohrbeck et al. 2010).

Co-development which is organized as a project may need to secure the joint interactive efforts for the defined length of the project. Frequently, exit-clauses have to be offered at the same time. If used, their interpretation may raise conflicts. In publicly visible projects, such exits have earned controversial comments in the media.

This leads to questioning the motivation driving customers to contribute to a development process (see Fig. 14.3). Some customers may be motivated by the participation itself. Entertainment and curiosity, social recognition in a peer group (Lüthje 2004), pride (Dabholkar and Bagozzi 2002) or self-esteem (Franke et al. 2010), or early product usage have been identified as motivators in studies on real or virtual customer integration (Rohrbeck et al. 2010). In a further study on customer value creation by participating in virtual customer environments in three firms of the electronics and IT-industries it is found that the opportunity of product-related learning, better social relationships between supplier and customer, gains in reputation or status and hedonic benefits explain customer value of their participation (Nambisan and Baron 2009).

Other motivators have to be provided by the supplier (see Fig. 14.3; Rohrbeck et al. 2010). These cause expenditures to the supplier, which should

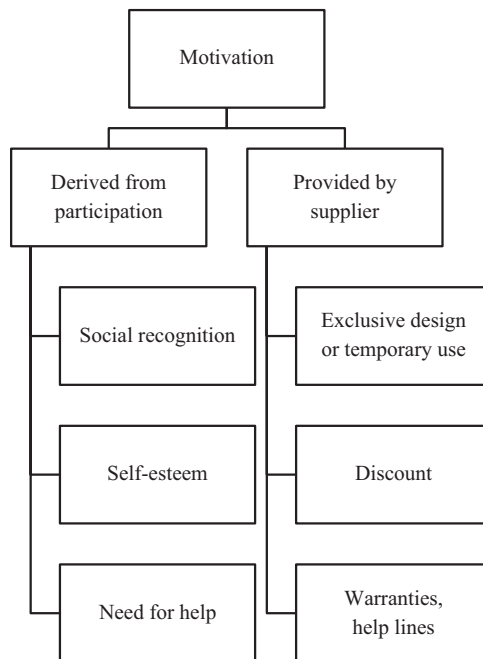


Fig. 14.3 Examples for motivation of customers

not be larger than the value of the contributions. Even in low-involvement IT-based prediction markets participants expect adequate compensation for revealing their information (Waitz and Mild 2013; Skiera and Spann 2004). In IT-based services, early access to a new development or exclusive use for a limited time period might be such rewards. They are valuable to customers because they support standard setting and fast network building on the side of the customer and thus reimburse him for his contributions and efforts. Furthermore, extended warranties, access to special help-lines, discounts and similar benefits could be offered to participating customers.

It is realistic to assume that customers try to optimize their inputs to a particular development process. On the one hand, this includes the willingness to pay higher prices for the resulting product depending on the actual use of the customer's contribution (Franke and Piller 2004). On the other hand, it involves selective participation decisions on the customers' side depending on the compensation received for the customer's contribution including its real and opportunity costs. To foresee and evaluate this requires a certain degree of at least qualitative optimization on the supplier's side. Thus, the other side of the coin that shows motivation to participate on its face is intensity of participation. Only few attempts at measuring this intensity of involvement have been reported (Ives and Olson 1984; Gruner and Homburg 2000).

To summarize this point: Utility of customer involvement is determined by the difference between expected benefits and expected cost of frequency and intensity of participation (Brockhoff 2003). Conflicts can be the result of divergent evaluations of this utility.

Contextual Condition 4: Number of Customers Involved

The number of customers to be involved is another contextual factor in co-development of IT-based service products. Keeping in mind the uneven distribution of potential inputs to product design among customers or alternatively the different customer roles, one should not expect large numbers of customers who could contribute to complex co-developments. This implies that suppliers need to have the ability to manage "a portfolio of tightly and loosely coupled customer relationships" for successful co-development (Coviello and Joseph 2012; Boss 2011).

As before, we restrict ourselves to a supplier-initiated setting where one service developer seeks valuable inputs for co-development of one project in the

above mentioned sense from customers. We disregard the extreme of suppliers overtaking their customers' development contributions, before they can do it, and then also their market (Harhoff et al. 2003; Helm and Kloyer 2004). This is an important issue because the characteristics of service products are often difficult to be protected from imitation (Boss 2011). Furthermore, we do not consider the decision problem of customers to which of many potential suppliers they should reveal their knowledge (Brockhoff 2005).

As argued above, the number of pilot customers is most likely small relative to the total customer base because of the uneven distribution of expertise and the level of complexity. Only pilot customers might offer substantial contributions to service co-development. Because of this valuable and scarce resource, they have the power to influence the development process. This power may become a source of divergent views on development. Therefore, a first idea to avoid this might be to concentrate the number of pilot customers involved even more or to rely upon one development partner only. A choice must then be made from the potential partners in a co-development alliance. With a strong focus on observable technological criteria, first ideas for the governance of the choice process have been presented (Emden et al. 2006). However, market potential of the customer chosen is an additional criterion to observe. Both criteria may not be correlated.

A hidden assumption underlying this choice process is that customers do not have the power to force themselves into the development process at one or more stages due to their technological or market power base. In markets with hundreds or thousands of potential buyers, the individual does not have such market power. This is different in markets where the customer base is more or less an oligopoly for reasons such as market share, financial strength or market-related knowledge, particularly in highly fragmented markets. Then, reducing the number of co-developers may not be feasible, and if done, it bears the danger of becoming too dependent on a single organization.

Consequently, concentration on one customer is rarely feasible. However, involving a small number of customers can broaden a potentially limited supplier–customer conflict to more areas of conflict.

Consider the following example. In the aircraft industry it is common that not one but a small number of airlines usually become launching customers, helping in the co-development of a new type of aircraft. Here, potential buyers can easily slow down the development process. The delay in the delivery of the Airbus A380 was explained by divergent interior design ideas of 16 launching customers which led to frequent re-designs and to excessive problems of laying cables. Software for optimizing wirings was blamed for more

problems (Anonymus 2006). Anecdotal evidence is given for similar problems in co-designing complex services. Development problems of digitized radio communication for federal as well as state governmental institutions in Germany serve as another example (Anonymus 2014). Each potential customer represents specific and divergent requirements.

Conflicts in Small-Number Co-developments

With a limited number of co-developing customers, conflicts can arise at three different levels as illustrated in Fig. 14.4:

- Conflicts between a customer and a supplier;
- Conflicts among customers; and
- Conflicts of both sorts.

Conflicts Between a Customer and a Supplier.

This is illustrated by vertical arrows in Fig. 14.4. Four typical problems can emerge at this level:

No Unity of Decision Making “The supplier” is usually represented by a number of different functional departments or even separate national entities, each with its own agenda or objectives. Aggregating her empirical results, Boss (2011) finds for instance that the major responsibility in the service development process is given in 19 percent of all cases to the respective product line, closely followed by the IT-department in 17 percent of the cases. This represents larger shares than for instance of marketing or sales.

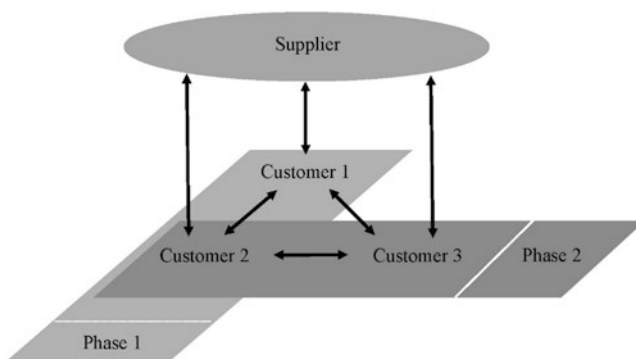


Fig. 14.4 Potential types of conflicts

Should only one internal department deal with customers in a co-development, it is of importance to determine which department this should be. With respect to internal new product developments, it was shown that differences exist even between marketing and sales departments (Ernst et al. 2010). Apart from other departmental idiosyncrasies, these differences are possibly related to different thought worlds of these departments (Homburg and Jensen 2007).

More typically, more than one department is involved in service development. This is nicely demonstrated in a case study of a credit-rating agency with its many organizational units involved in the development (Weiß and Opitz 2008). This can lead to well-known interface problems within a firm as well as to problems of how to harmonize sub-projects, where different internal groups are represented in the different sub-projects. In yet another IT-based service project 40 sub-projects were identified and five organizations represented by 19 people contributed to the final result (Perks et al. 2012). “The supplier” might thus not meet customers with a single view.

Divergent Characteristics of Ideal Service The optimal bundle of ideal product characteristics envisioned by the customer might not be the same as the one planned by the supplier. This leads to a number of questions. To what degree will demand be reduced if the ideal of a customer is not met? Could the loss of value on the customer’s side be compensated? If we model this as a cooperative gaming situation with a Nash-equilibrium as its solution the amount of compensation can be calculated (Brockhoff 2005). Empirical research tells us that a supplier needs strong capabilities or substantial resources to increase the effectiveness of its market orientation (and thus places high value to customers’ contributions), unless the development result is incremental innovation only (Baker and Sinkula 2005). A further question is: Can customers take over business from the suppliers’ by combining the supplier’s knowledge gained during the co-development process with their own, particularly with their own tacit knowledge?

Where customers have been given sign-off responsibility at various stages of a development process, conflict might arise on whether the criteria for passing on to the next stage have been achieved. These criteria may relate to the distance of the development achieved from an agreed upon ideal solution. Here, technical performance measures as well as the process of measuring need to be defined and agreed upon before starting the co-design activity. For services—even for simple services such as the already mentioned haircut—performance measurement is far from trivial.

No Agreement on Value of Involvement We have already mentioned that customers expect their contributions to be valuable. The value ascribed to them by the supplier might be considerably lower than the estimate of the customer. This results in a conflict on valuation. Does this lead to negotiations on compensation levels? Can this be prevented by contracts that foresee such behavior? Here, we have strong doubts.

Avoidance of Single-Sourcing Customers interested in multiple sourcing of repeatedly required IT-based services might force the supplier to share with other suppliers the proprietary customer information which enters the service product, reducing the suppliers' market. This is reported of normal product markets (Johnes 1994). Furthermore, the management of multi-sourcing is not trivial and could, if not properly executed, lead to "breakdowns in service deliveries" (Cohen and Young 2006).

Conflicts Among Customers

These types of conflicts might arise even within one development stage which the customers involved share, such as between Customer 2 and Customer 3 in Fig. 14.4. Usually, customers involved in service development initiated by a supplier are competitors. They may not accept other competitors to have access to the same solution which incorporates their own good ideas. For very many reasons, like differences in markets served or differences in technological expertise or in engineering traditions, the optimal bundle of product characteristics can differ from one customer to the next.

As the Airbus example has evidenced, when customers insist on their ideal development goals this can result in a dilemma situation. Everyone contributes to the delay by asking to accept their own design. This can have an effect on the supplier as well, particularly by initiating over-engineering, which in turn might affect customers by higher prices or the supplier by reducing margin. The issue of competition among the customers—not only for market shares but also for individual special interests, as mentioned with respect to inter-governmental radio systems—makes the situation different from one where no competition exists, such as potential future users contributing to game products. Here, conflicts are less likely. In the absence of competitive conflicts even consumer-to-consumer support interaction might be initiated by a supplier (Jeppesen 2005; Lüthje 2004), which is unlikely among competing business customers.

Conflicts of Both Sorts

These conflicts can arise between different phases of development, when the customers involved in the phases vary from one phase to another phase. In Fig. 14.4, this is shown by arrows between Customer 1 and Customer 2 or between Customer 1 and Customer 3, which each cross the borders of a specific development stage. As mentioned above, it is claimed that customer contributions are not equally valuable in all development phases. This can influence the value of the involvement.

The major reason for the potential conflicts lies in differences of ideal service product perceptions which are brought forward into development projects. The supplier might reduce this by choosing one or a stable group of pilot customers through all stages. This is reasonable if it promises a higher value of contributions over all stages as compared with the value sum from those customers who contribute maximum value per stage, but do not form a stable group. The latter would be optimal over all phases only if the potential costs of conflict would be lower than the value difference between a stable number of contributors and a changing set of customers from one stage to the next. With varying groups of customers, the supplier might furthermore encounter the problem to defend a development compromise of an earlier development stage in a later stage. Choosing a later compromise, however, will most often send the project back to an earlier phase, with many implications regarding cost, time to completion, frustration of customer groups who contributed to earlier stages and so on.

Conclusion

Our analysis suggests that customer interaction in IT-based development projects can ignite conflicts at different levels. Why are conflicts—in particular the three types of conflicts just mentioned—of great importance? Co-design or co-development activities are heavily loaded with uncertainty. In addition, Chesbrough and Spohrer (2006, 37) state that “(w)hile information asymmetries have always existed in economic exchange, the intangibility of services and the scale of modern B2B IT result in new levels of coordination complexity.” Therefore, it is impossible to foresee the outcomes of all process stages and to find perfect contractual regulations for customer involvement regarding their different types of contributions, their value, the number of customers and the number of development stages they are involved in. Because contractual

regulations cannot be perfect, this leaves room for opportunistic behavior. A substitute for the lack of regulation is trust in partner's ethical behavior. The importance of trust in co-development has been extensively studied both considering co-operations among competing suppliers and cross-border co-operations. As game theory shows, lack of trust reduces success of co-developments (Carbon-dhersin and Ramani 2004). Trust is reduced or destroyed by conflicts, which in turn reduces satisfaction with the process and its continuation (Bstieler 2006).

These effects might also extent to other projects and future co-operations. A well-documented example is that of a supplier to the automobile industry and one of its customers, who together developed software and hardware for an innovative braking system for passenger cars. The automobile producer trusted in the oral assertions that it could be the first to use the final system in practice. Much to its surprise a competing company came out a few weeks ahead of the co-developer. The break of trust deteriorated the relations between the original partners for the next few years (Bingmann 1993). Also, copying or infringements of intellectual property rights in the context of R&D co-operations can have behavioral consequences beyond the case in point (Lorenz and Veer 2012). We learn from this that conflicts cannot be contained to the project or the development stage where they evolve.

Assuming that trust is more easily maintained within one organization than if organizational boundaries are crossed this would explain that in yet another study no substantial benefit of customer involvement over in-house development was identified (Campbell and Cooper 1999). In the past, explanations of these and similar results were attributed to selection biases of customers, type of industries, reward structures and so on. In this study, it is suggested that self-interested organizations which take part in co-development activities can be a source of conflict and therefore of trust reduction which is detrimental to the success of the respective project. Expecting conflict might be closer to reality in these situations than assuming identical joint objectives.

The messages of this are manifold: Involvement of customers in co-development of IT-based services should not be rejected. It might generate value for both sides. But the structure of the relationship in terms of which types and how many competing customers in how many stages of co-development are involved needs particular attention. From such contextual conditions, one may conclude what power customers might apply. Specific areas of conflict can emerge from the chosen structure. These should be foreseen and considered. They might lead either to choose a less conflict-ridden structure, for instance by managing the number of contributing customers, or to think of general regulations to handle the arising conflicts. These could include rules

for appointing an arbitrator to settle conflicts, agreements on fines in case of premature opt-outs, incentives to reduce opportunism, communication rules to support trust and so on. This is particularly so when a supplier deals with institutional customers which operate in a competitive environment, and which need to stress their own agenda. Conflict management is important to achieve co-development success in co-developments.

Bibliography

- Alexy, O., Criscuolo, P., & Salter, A. (2012). Managing unrequested innovative ideas. *California Management Review*, 54(3), 116–139.
- Anonymus. (2006). Hunderte Kilometer Kabel, FAZ 6th October.
- Anonymus (2014). <http://www.ingenieur.de>, Fachbereiche, Kommunikationstechnik, Digitaler-Behoerdenfunk-flaechendeckend-2014. Accessed 3 Dec 2014.
- Baker, W. E., & Sinkula, J. M. (2005). Market orientation and the new product paradox. *Journal of Product Innovation Management*, 22(6), 483–502.
- Bartl, M., Füller, J., Mühlacker, H., & Ernst, H. (2012). A manager's perspective on virtual customer integration for new product development. *Journal of Product Innovation Management*, 29(6), 1031–1046.
- Bingmann, H. (1993). Anti-blocking system and fuel injection. In H. Albach (Ed.), *Culture and technological innovation. A cross-cultural analysis and policy recommendations* (pp. 736–821). Berlin: deGruyter.
- Bohlmann, J. D., Spanjol, J., Qualls, W. J., & Rosa, J. A. (2013). The interplay of customer and product innovation dynamics. An explanatory study. *Journal of Product Innovation Management*, 30(2), 228–244.
- Boss, J. (2011). *Innovationserfolg im Dienstleistungssektor. Eine empirische Untersuchung unter Berücksichtigung des Dienstleistungsgrads*. Wiesbaden: DUV.
- Brockhoff, K. (2003). Customers' perspectives of involvement in new product development. *International Journal of Technology Development*, 26(5, 6), 464–481.
- Brockhoff, K. (2005). Konflikte bei der Einbeziehung von Kunden in die Produktentwicklung. *Zeitschrift für Betriebswirtschaft*, 75(9), 859–878.
- Brockhoff, K., & Rao, V. (1993). Toward a demand and forecasting model for preannounced new technological products. *Journal of Engineering & Technology Management*, 10(Sept.), 211–228.
- Bstieler, L. (2006). Trust formation in collaborative new product development. *Journal of Product Innovation Management*, 23(1), 56–72.
- Campbell, A., & Cooper, R. G. (1999). Do customer partnerships improve product success rates? *Industrial Marketing Management*, 28(5), 507–519.
- Carbon-dhersin, M., & Ramani, S. V. (2004). Does trust matter for R&D cooperations? A game theoretic examination. *Theory & Decision*, 57(2), 143–180.

- Chesbrough, H., & Spohrer, J. (2006). A research manifesto for service science. *Communications of the ACM*, 49(7), 35–40.
- Cohen, L., & Young, A. (2006). *Multisourcing. Moving beyond outsourcing to achieve growth and agility*. Boston: Harvard Business School Press.
- Coviello, N. E., & Joseph, R. M. (2012). Creating major innovations with customers. Insights from small and young technology firms. *Journal of Marketing*, 76(November), 87–104.
- Dabholkar, P. A., & Bagozzi, R. P. (2002). An attitudinal model of technology-based self services. Moderating effects of consumer traits and situational factors. *Journal of the Academy of Marketing Sciences*, 30(3), 184–201.
- Emden, Z., Calantone, R. J., & Droge, C. (2006). Collaborating for new product development. Finding the partner with maximum potential to create value. *Journal of Product Innovation Management*, 23(4), 330–341.
- Ernst, H. (2001). *Erfolgsfaktoren neuer Produkte. Grundlagen für eine valide empirische Forschung*. Wiesbaden: DUV/Gabler.
- Ernst, H. (2004). Virtual customer integration. Maximizing the impact of customer integration on new product performance. In S. Albers (Ed.), *Cross-functional innovation management. Perspectives from different disciplines* (pp. 191–208). Wiesbaden: Gabler.
- Ernst, H., Hoyer, W. D., & Rübsaamen, C. (2010). Sales, marketing and research-&-development cooperation across new product development stages. Implications for success. *Journal of Marketing*, 74(November), 80–92.
- Fährnrich, K.-P., & Meiren, T. (2010). Service engineering. State of the art and future trends. In D. Spath & K.-P. Fährnrich (Eds.), *Advances in services innovations* (pp. 3–16). Berlin/Heidelberg: Springer.
- Franke, N., & Piller, F. (2004). Value creation by toolkits for user innovation and design. The case of the watch market. *Journal of Product Innovation Management*, 21(6), 401–415.
- Franke, N., Schreier, M., & Kaiser, U. (2010). The ‘I Designed It Myself’ effect in mass customization. *Management Science*, 56(1), 125–140.
- Franke, N., von Hippel, E., & Schreier, M. (2006). Finding commercially attractive user innovations. A test of lead-user theory. *Journal of Product Innovation Management*, 23(4), 301–315.
- Gruner, K. E., & Homburg, C. (2000). Does customer interaction enhance new product success? *Journal of Business Research*, 49(1), 1–14.
- Hansen, U., & Raabe, T. (1991). Konsumentenbeteiligung an der Entwicklung von Konsumgütern. *Zeitschrift für Betriebswirtschaft*, 61(2), 171–194.
- Harhoff, D., Henkel, J., & von Hippel, E. (2003). Profiting from voluntary information spillovers. How users benefit by freely revealing their innovations. *Research Policy*, 32(10), 1753–1769.
- Helm, R., & Kloyer, M. (2004). Controlling contractual exchange risks in R&D interfirm cooperation. An empirical study. *Research Policy*, 33(8), 1103–1122.

- Hoffmann, D. L., Kopalle, P. K., & Novak, T. P. (2010). The 'right' consumers for better concepts. Identifying consumers high in emergent nature to develop new product concepts. *Journal of Marketing Research*, 47(October), 854–865.
- Homburg, C., & Jensen, O. (2007). The thought worlds of marketing and sales. Which differences make a difference? *Journal of Marketing*, 71(July), 124–142.
- Hoyer, W. D., Chandry, R., Dorotic, H., Krafft, M., & Singh, S. S. (2010). Consumer cocreation in new product development. *Journal of Service Research*, 13(3), 283–296.
- Ives, B., & Olson, M. H. (1984). User involvement and MIS success. A review of research. *Management Science*, 30, 586–603.
- Jeppesen, L. B. (2005). User toolkits for innovation. Consumers support each other. *Journal of Product Innovation Management*, 22(4), 347–362.
- Johne, A. (1994). Listening to the voice of the market. *International Marketing Review*, 11(1), 47–59.
- Kottkamp, S. (1998). *Erprobung innovativer Investitionsgüter bei Erstkunden*. Wiesbaden: DUV.
- Lancaster, K. (1971). *Consumer demand. A new approach*. New York/London: Columbia Univ. Press.
- Lorenz, A., & Veer, T. H. (2012). *Once bitten, twice shy? Learning from experience in the context of R&D cooperation & copying of IP*. Manuscript: DRUID Society. Berlin: Technische Universität.
- Lundkvist, A., & Yakhlef, A. (2004). Customer involvement in new service development. conversational approach. *Managing Service Quality*, 14(2, 3), 249–257.
- Lüthje, C. (2004). Characteristics of innovating users in a consumer goods field. An empirical study of sport-related product consumers. *Technovation*, 24(9), 683–695.
- Lüthje, C., Lettl, C., & Herstatt, C. (2003). Knowledge distribution among market experts. A closer look into the efficiency of information gathering for innovation projects. International. *Journal of Technology Management*, 26(5, 6), 561–577.
- Melton, H. L., & Hartline, M. D. (2010). Customer and frontline employee influence on new service development performance. *Journal of Service Research*, 13(4), 411–425.
- Meyer, K., & von Husen, C. (2008). Die ServCase-Methode im Überblick. In K.-P. Fähnrich & C. von Husen (Eds.), *Entwicklung IT-basierter Dienstleistungen. Co-design von Software und Services mit ServCase* (pp. 11–25). Heidelberg: Springer.
- Morrison, P. D., Roberts, J. H., & Midgley, D. F. (2004). The nature of lead users & measurement of leading edge status. *Research Policy*, 33(2), 351–362.
- Nambisan, S., & Baron, R. A. (2009). Virtual customer environments. Testing a model of voluntary participation in value co-creation Activities. *Journal of Product Innovation Management*, 26(4), 388–406.
- Ordanini, A., & Parasuraman, A. (2011). Service innovation viewed through a service-dominant logic lens. A conceptual framework and empirical analysis. *Journal of Service Research*, 14(1), 3–23.

- Perks, H., Gruber, T., & Edvardsson, B. (2012). Co-creation in radical service innovation. A systematic analysis of microlevel processes. *Journal of Product Innovation Management*, 29(6), 935–951.
- Poetz, M. K., & Schreier, M. (2012). The value of crowdsourcing. Can users really compete with professionals in generating new product ideas? *Journal of Product Innovation Management*, 29(2), 245–256.
- Rohrbeck, R., Steinhoff, F., & Perder, F. (2010). Sourcing innovation from your customer. How multinational enterprises use Web platforms for virtual customer integration. *Technology Analysis and Strategic Management*, 22(4), 117–131.
- Shocker, A. D., & Srinivasan, V. (1974). A consumer based methodology for the identification of new product ideas. *Management Science*, 20(6), 921–937.
- Shostack, G. L. (1984). Designing services that deliver. *Harvard Business Review*, 62(1), 132–139.
- Sioukas, A. V. (1995). User involvement for effective customization. An empirical study on voice networks. *IEEE Transactions on Engineering Management*, 42(1), 39–49.
- Skiera, B., & Spann, M. (2004). Opportunities of virtual stock markets to support new product development. In S. Albers (Ed.), *Cross-functional innovation management. Perspectives from different disciplines* (pp. 39–49). Wiesbaden: Gabler.
- Spann, M., Ernst, H., Skiera, B., & Soll, J. H. (2009). Identification of lead users for consumer products via virtual stock markets. *Journal of Product Innovation Management*, 26(3), 322–335.
- Sundbo, J. (1997). Management of innovation in services. *The Service Industries Journal*, 17(3), 432–455.
- Tranekjer, T. L., & Knudsen, M. P. (2012). The (unknown) providers to other firms' new product development. What's in it for them? *Journal of Product Innovation Management*, 29, 986–999.
- von Hippel, E. (1988). *The sources of innovation*. Oxford/New York: Oxford University Press.
- Waitz, M., & Mild, A. (2013). Corporate prediction markets. A tool for predicting market shares. *Journal of Business Economics*, 83(3), 193–212.
- Weiß, S., & Opitz, M. (2008). Organisation der Entwicklung IT-basierter Dienstleistungen. In K.-P. Fähnrich & C. von Husen (Eds.), *Entwicklung IT-basierter Dienstleistungen. Co-design von Software und Services mit ServCase* (pp. 91–99). Heidelberg: Springer.
- Wooder, S., & Baker, S. (2012). Extracting key lessons in service innovation. *Journal of Product Innovation Management*, 29(1), 13–20.
- Zhao, M., Hoeffler, S., & Dahl, D. W. (2012). Imagination difficulty and new product evaluation. *Journal of Product Innovation Management*, 29(1), 76–90.

15

Toward a Safer Tomorrow: Cybersecurity and Critical Infrastructure

Solomon Karchefsky and H. Raghav Rao

Ideas in Brief With the discovery of the Stuxnet worm in June 2010 came the first documented cyber-attack on critical infrastructure that resulted in mass physical damage. This attack spurred governments and private industry owners of Critical Infrastructure to inspect their cybersecurity practices with the hopes of improving their protection methodologies. While this introspective approach has helped owners and operators of critical infrastructure realize the startling deficiency of security in this area, it has also spawned many attempts to remediate these problems that do not solve the underlying causes of the existing gaps in protection. In this chapter, three “post-Stuxnet” cyber-attacks against critical infrastructure sectors in three different countries are investigated—the USA, Germany, and Turkey. This analysis details the vectors of attack in each incident, the resulting impact, and measures that have been taken by both the public and private sectors in each country to bolster the security posture of their infrastructure after the incident. The result indicates common issues among all three incidents, namely faults in the design of the underlying control systems used and a dichotomy between the actions taken by corresponding governments and private industry. In order to address

S. Karchefsky
University of Buffalo, New York, NY, USA

H.R. Rao (✉)
University of Texas, San Antonio, TX, USA
e-mail: mgmtrao@gmail.com

these faults, there needs to be scalable and risk-based processes to improve supporting processes of cybersecurity in critical infrastructure—namely information sharing, accountability, and risk assessment. This research provides insights into the effects of recent destructive cyber-attacks and the divide between governments and private industry, as well as lapses in security programs that prevents the effective defense of critical infrastructure.

Keywords Critical infrastructure • Cybersecurity • Information sharing • Risk assessment • Security policy

Introduction

An area that has been gaining more attention recently is that of critical infrastructure—systems such as power grids, banking systems, telecommunications, and more. These systems carry with them many interconnected relationships and dependencies that link individuals, organizations, and entire nations through complex network connections, high volumes of data being moved and stored, and automated operations that are essential to daily life (Wallen 2015). Cyber-attacks on such systems have prompted the re-prioritization of critical infrastructure protection. The damages left in the wake of these attacks aren't always easily visible to the naked eye, or they aren't far reaching enough to cause distress in the daily lives of individuals. However, as attacks such as the Stuxnet worm against Iranian nuclear facilities have demonstrated, the trend of cyber-attacks has started to change for the worse and can result in very real physical damage. The scalability of these types of damages is a concern for everyone that has resulted in the re-imagining of defensive mechanisms and processes worldwide. Unfortunately, the efforts of this labor have not yet been able to turn the tide, as there has been a steadily increasing amount of cybersecurity incidents from 2009 to 2014 according to a study on risk-based security (Wallen 2015). Among these incidents, multiple attacks have resulted in heavy physical damages, or rendered the infrastructure vulnerable for potential damages. In this chapter, three cases of cyber-attacks are analyzed to reveal the extensiveness of such attacks on critical infrastructure and the potential danger they pose that can cause severe physical damage. It is clear that there is a disconnect between defensive strategies and the occurrence of breaches based on this data. While many frameworks of technical controls have been created by bodies like the National Institute of Standards and Technology (NIST) in the USA and the European Network Information Security Agency (ENISA), more attention needs to be allocated to the supporting processes that surround security—in areas such as infor-

mation sharing between the private and public sectors (which is extremely important as about 80 % of internet-driven critical infrastructure is owned and operated by the private sector, according to the (Trend_Micro 2015)), and the risk assessment strategies of critical infrastructure owners and operators.

What Is Critical Infrastructure?

Critical infrastructure is fairly easy to conceptualize, however, it seems that every group has their own definition of what it actually is. The standard definition used for this discussion comes from the US government (The White House 2013):

Systems and assets, whether physical or virtual, so vital to the (United States) that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters.

While there are obvious examples that would meet the criteria set forth in this definition (such as those already mentioned—power grids, banking systems, and telecommunications), the realm of critical infrastructure spans far beyond these areas.

According to Integrated Partnership for Regional Emergency Management in Metro Vancouver, (IPREM 2013), a high level overview of critical infrastructure would include the following ten domains: Information & Communications Technology; Finance; Manufacturing; Food ; (Agriculture); Health; Energy & Utilities; Water; Transportation; Safety; Government. It is important to create an outline of what critical infrastructure is so that the interdependencies and importance of these systems can be understood. This understanding will aid in the development of effective protection methods, both in the technical and non-technical realms. Each of the ten critical infrastructure sectors mentioned above are vulnerable to cyber-attacks, and many of which already have been attacked and damaged (as seen by a quick survey of the Repository of Industrial Security Incidents) (RISI 2015).

A Tale of Three Incidents

There are many examples of cyber-attacks across critical infrastructure sectors, which shouldn't be surprising, based on the breadth of what the term covers. In order to facilitate a discussion of how this infrastructure needs to

be protected, some attacks that have occurred and caused damaged should be analyzed and understood. The consequences of malicious behavior in this area are best seen through a series of recent incidents, all found through the Repository of Industrial Security Incidents (Tudor and Fabro 2010). A discussion of these attacks will give framing to current protection strategies and also necessary adaptations for the future.

Incident #1: Baku-Tbilisi-Ceyhan pipeline explosion (Turkey—2008)

The first incident presented here is a pipeline explosion that occurred in Refahiye (Turkey) in August 2008. The Baku–Tbilisi–Ceyhan pipeline, owned by BP, was infiltrated and tampered with by an unknown attacking party. The end result was an explosion that sent flames 150 feet in the air and incinerated any potential evidence of physical aids used in the attack. This incident was originally considered a physical terrorist attack as Kurdish separatists claimed credit, but evidence slowly leaked out that indicated a network intrusion preceding the possible physical sabotage. Many western intelligence agencies see this action as a mark of highly skilled cyber warfare with hackers having “shut down alarms, cut off communications and super-pressurized the crude oil in the line” (Robertson and Reilly 2014).

This particular pipeline was built with security in mind, as every mile of the 3-foot 6-inch diameter pipe was buried underground and equipped with fenced valve stations to isolate sections in the case of emergencies, while also having various monitoring sensors at each mile marker. While this provided some level of physical security, the information technology infrastructure of the pipeline proved to be more vulnerable. Independent security analysis determines that vulnerability in the software that governed security cameras at the Refahiye site allowed the attackers to burrow deep into the internal network to identify the Windows computer running the alarm management software. From here, the attackers placed malicious software, opening a backdoor in the system that established persistent access. With control of the alarms and cameras, it was relatively easy for the attackers to then finish their plan by gaining physical access to the control systems of the supposedly physically secure pipeline. The result was the aforementioned explosion and destruction of a segment of the pipeline, leaving very little digital evidence (and no physical evidence) of the attack.

This incident served as a wakeup call for the rest of the world’s governments to assess their own energy infrastructure. Since this attack, countries such as Iran, China, Russia, and the USA have been thought to be infiltrating other

nations' energy sectors and identifying vulnerabilities to be used in the event they were needed for espionage or war. These same nations also surveyed their own infrastructure to help secure them against similar attacks. The USA, for example, has 182,000 miles of hazardous liquid pipelines, 325,000 miles of natural gas transmission pipelines, and 2.15 million miles of natural gas distribution pipelines (TSA 2014). These numbers are similar in other countries, and understandably are a cause for concern.

While the news of Stuxnet was quicker to hit the mainstream media, this pipeline explosion served as one of the first recorded and confirmed incidents where a cyber-attack resulted in extreme physical damage to the targeted infrastructure. This is significant because it creates a strong “business case” to justify securing critical infrastructure. With this being a watershed moment in cyber warfare, governments and the private owners of critical infrastructure (in this particular case that is BP) understand what they stand to lose from the result of one of these attacks—energy supply, economic security, reputation damages, and public safety.

Incident #2: “Dragonfly” Energy Sector Espionage (USA and EU – 2013)

The attacks on critical energy infrastructure have continued to evolve from the Baku–Tbilisi–Ceyhan pipeline in Turkey. In early 2013, Symantec discovered a series of attacks on energy infrastructure worldwide. These attacks were launched against numerous countries, such as the USA, Canada, Spain, Germany, and several others (Symantec 2014). The mechanisms for the intrusion showed great capability by the attacker, as they used multiple vectors to achieve their goals. The attacks began in early 2013 with a spam email campaign, using spear phishing techniques in the form of PDF attachments that were sent to office administrators of various energy infrastructure sites. This evolved into taking over energy-related websites that ran certain vulnerable content management systems and also software update repositories for industrial control systems in a “watering hole attack”, that is, gaining control of common points of interest for energy infrastructure operators and injecting them with malicious code, waiting for employees (or software) to access those sites and repositories and automatically download the code into the infrastructure networks. The attacks are thought to be state sponsored because of their adept technical construction and sound strategic targeting. The timeline of the spam emails in the early stages of the campaign support this line of thinking, as they were primarily sent out between the hours of 9 am and 5 pm in the UTC +4 time zone (which encompasses parts of Russia and the Middle East).

While the mechanisms for the attack are fairly well understood, the real motives of the attackers are yet to be decided. The original consensus was that espionage and (eventual) sabotage were the main reason behind the intrusions. While those may still be secondary goals or fallback actions, research from Joel Langill of RedHat Cyber claims that the actual target may have been the pharmaceutical industry; that is, the manufacturing sector of critical infrastructure (MacKenzie 2014). This is a significant conclusion to draw, as the manufacturing sector has not often been attacked by such a complex attack vector. Most attacks on the manufacturing industry revolve around industrial espionage, allowing developing countries to reduce the time it takes to create and innovate their own solutions and instead use existing (stolen) technological advancements to speed up their growth and development. As it was later discovered, the Dragonfly attacks did not actually cause any sabotage or performance impacts on the control systems it affected. Based on all of the available data and analyses, this all adds up to being an extremely sophisticated industrial espionage mission.

A takeaway from the Dragonfly attacks is that cyber-attacks against critical infrastructure are continuing to get more complex and have wider-reaching consequences. This ranks as one of the most in depth assaults on the energy and manufacturing sectors both in the technical intricacies at play, but also in the global impact that resulted. Countries from both hemispheres were impacted, and they used this attack as another part of the motivation to continue to revamp their cybersecurity programs (e.g. Executive Order No. 13636 in the USA, 2013). An attack against critical infrastructure no longer meant that it was an isolated incident, but that if one control system was exploited that several others just like it around the world could be, and likely would be, exploited as well.

Incident #3: Steel Mill Explosion (Germany—2014)

The German government's Federal Office for Information Security (BSI) released their annual findings report and cited a malicious intrusion into a steel facility within their borders that resulted in a compromise of control systems and heavy physical damage. Along with the Baku–Tbilisi–Ceyhan pipeline in Turkey and the Stuxnet attacks in Iran, this is one of the few documented cases where heavy physical damage was a result of a cyber-attack. In similar fashion to the Dragonfly attacks, a spear phishing email was used to gain access to the corporate and plant networks which allowed a skilled operator of the specific industrial control systems in use to carry out the rest of the attack on the mill (R. M. Lee et al. 2014). As a consequence of the network intrusion, control components and entire production machines suffered

outages due to the attackers' actions. The outages prevented the plant from appropriately shutting down a blast furnace, leaving it in an undetermined state. This resulted in significant damage to the plant, BSI noted in its report (Kovacs 2014). Aside from this, there is not a lot of information regarding the technical details of the attack aside from independent speculation. The BSI described the attack as an APT, or an “advanced persistent threat.” An advanced persistent threat is a highly skilled and coordinated attack by an adversary with deep resources, likely a foreign government. By this definition, the aforementioned Dragonfly attacks would also qualify as an APT. It also makes sense that a foreign government was involved since the attacker displayed knowledge of industrial control systems. The specific knowledge and skills needed would have had to originate from the efforts of a lengthy reconnaissance phase.

There are many potential motivations behind this attack, and none of which are clear based on current research into the attack. A likely explanation would be industrial espionage and sabotage, simultaneously stealing intellectual property of the steel mill and setting back their operations (R. M. Lee et al. 2014). While in most espionage cases physical sabotage is a low probability consequence, it is still a risk event that needs to be responded to and planned for. This attack shares many characteristics with the previous two incidents that have been discussed, and provide many lessons that can be carried forward into critical infrastructure defense strategies.

Global Mechanisms for Protecting Critical Infrastructure

There are multiple strategies being used today by the public and private sectors to bolster their protection strategies for critical infrastructure. While they are imperfect (and most strategies are, otherwise there would be no security incidents occurring), they can provide a baseline of security that can reduce the occurrence of “low hanging fruit,” or giving attackers easy access to systems by not following sound best practices in cybersecurity. The bases for most cybersecurity programs are founded upon the principle of managing risk. Popular frameworks for cybersecurity are, for example, NIST SP 800-53 (NIST 2013), the ENISA Evaluation Framework for National Cyber Security Strategies (ENISA 2014), and the Robust ICS Planning and Evaluation framework (Langner 2014). They are all formatted in a way that identifies risk events in various areas of information technology or business processes, and gives recommended controls to implement and reduce the probability and impact of those events.

Another cornerstone of cybersecurity programs, while not as entrenched as risk assessment, would be information-sharing programs. Information sharing allows for the dissemination of the latest threat information between public and private parties (and among each sector themselves). The knowledge gained from information sharing combined with a cybersecurity program rooted in risk management methodologies is considered the standard for providing a decent security posture. Each of these areas carries much depth, and each have much room for improvement to meet the growing needs of cybersecurity.

Risk Management and Cyber Resilience

According to the NIST Special Publication 800-53, risk management is defined as the following (NIST 2013, p. 6):

[...] a comprehensive process that requires organizations to: (i) frame risk (i.e., establish the context for risk-based decision); (ii) assess risk; (iii) respond to risk once determined; and (iv) monitor risk on an ongoing basis using effective organizational communications and a feedback loop for continuous improvement in the risk-related activities of organizations.

Risks are events that are a potential hazard, having some probability of occurrence and an impact when they do occur (the impact can fall into a variety of categories such as financial, reputational harm, and more). In layman's terms, managing risk in the cybersecurity context means identifying cyber threats and planning controls to mitigate the effects of those threats, as well as planning responses should the corresponding events associated with those threats actually occur. In the context of the aforementioned security incidents, the risk that a control system is compromised via the network increases, resulting in a potential catastrophic explosion of infrastructure. Controls to mitigate that risk would focus on network security to prevent intrusions, access controls, and more.

The goal of using risk management in the cybersecurity of critical infrastructure is to provide cyber resiliency for those systems. As the name implies, and according to the USA's Presidential Policy Directive (PPD) 21, issued on February 12, 2013, cyber resilience is defined as "the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions. Resilience includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents" (Wallen 2015) Resiliency is important for critical infrastructure, because as the name implies, it is *critical*. That requires the infrastructure, whatever that may be, (refer to the various sectors of critical

infrastructure previously outlined) to possess high service availability and low susceptiblens to unplanned outages. To serve the ultimate goal of cyber resiliency and using risk management as a vehicle, there exist several frameworks to guide the implementation of security programs within organizations.

Existing Risk Management Frameworks for Cybersecurity

There are a wide array of frameworks to choose from when implementing a risk-based cybersecurity program, though many of them have similar controls and risk events. Some of the existing popular frameworks, that are often referenced, include:

- NIST Special Publication 800-53—Managing Information Security Risk,
- NIST Framework for Improving critical infrastructure cybersecurity,
- The RIPE Framework (not entirely risk-based, but has elements that translate to risk),
- ISO 27001, and
- COBIT 5.

An example of the layout of a framework can be seen in Tables 15.1 and 15.2, adapted from the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.0, February 12, 2014.

There are several categories of frameworks laid out to aid in organizational compliance and documentation of cybersecurity. These categories come with complete control descriptions and references to other, similar frameworks, should the organization be using a different framework. While it is important that governments and private owners/operators of critical infrastructure adopt these frameworks and the best practices within (both technical and business-oriented), it would be logical to ask, “Why do these catastrophic breaches keep occurring?”

There are several opinions on this matter (Langner and Pederson 2013). According to his paper *Bound to Fail*, Ralph Langner criticizes the use of IT risk management to govern cyber risks, citing that “business logic ultimately gives the private sector every reason to argue the always hypothetical risk away, rather than solving the factual problem of insanely vulnerable cyber systems that control the nation’s most critical installations.” While there may be some merit to that opinion, it is somewhat of an oversimplification. Like most things, the truth tends to lie somewhere between two extreme opinions.

Table 15.1 Sample of the framework core

DETECT(DE)	
Anomalies and events (DE.AE): Anomalous activity is detected in a timely manner and the potential impact of events is understood	Security continuous monitoring (DE.CM): The information system and assets are monitored at discrete intervals to identify cybersecurity events and verify the
DE.AE-1: A baseline of network operations and expected data flows for users and system is established and managed	DE.CM-1: The network is monitored to detect potential cybersecurity events
DE.AE-2: Detected events are analyzed to understand attack targets and methods	DE.CM-2: The physical environment is monitored to detect potential cybersecurity events
DE.AE-3: Event data are aggregated and correlated from multiple sources and sensors	DE.AE-5: Incident alert thresholds are established
DE.AE-4: Impact of events is determined	DE.AE-4: events is determined

Table 15.2 Sample of the framework core for improving critical infrastructure cybersecurity

Subcategory	Information reference	Detail
DE.AE-1	CCS CSC 14,16 NIST SP 800-53 Rev. 4 AC-4, AC-17, AC-18, CP-8, SC-7	Monitoring both audit logs and account Information flow enforcement Remote access and wireless access Telecommunication service Boundary protection
DE.AE-2	ISO/IEC 27001:2013 A.16.1.1, A.16.1.4 NIST SP 800-53 Rev. 4 AU-6, CA-7, IR-4, SI-4	Establish management responsibility and procedures Classifying information security incident Audit review, analysis and reporting Continuous monitoring and information system monitoring Incident handling
DE.AE-3	ISA 62443-3-3:2013 SR 6.1 NIST SP 800-53 Rev. 4 AU-6, CA-7, IR-4, IR-5, IR-8, SI-4	Providing access to audit log Audit review, analysis and reporting Continuous monitoring and information system monitoring Handling and monitoring incident Creating incident response plan
DE.AE-4	COBIT 5 APO12.06 NIST SP 800-53 Rev. 4 CP-2, IR-4, RA-3, SI -4	Transparency of IT cost, benefit and risk Contingency plan Incident handling Risk assessment
DE.AE-5	ISA 62443-2-1:2009 4.2.3.10 NIST SP 800-53 Rev. 4 IR-4, IR-5, IR-8	Information in shared resources Identify the reassessment frequency and triggering criteria Handling and monitoring incident Creating incident response plan
DE.CM-1	CCS CSC 14, 16 ISA 62443-3-3:2013 SR 6.2	Monitoring both audit logs and account Continuously monitoring all security mechanism performance
DE.CM-2	ISA 62443-2-1:2009 4.3.3.3.8	Establish procedures for monitoring and alarming

Risk management is to be used as a general guideline toward the creation of a sound security posture. It cannot stand-alone and act as a cure-all for cybersecurity. Common pitfalls around risk management programs include, but are not limited to: (1) not sufficiently updating risks to match the technology landscape of the organization and the known capability of attackers; (2) having a ‘piecemeal’ program that is not based around organizational standards to give a baseline method of communication to the organization; and also (3) not considering non-IT risks, such as reputation (M. Lee 2013). It follows that, while Langner claims businesses always accept or ignore risk,

the other side of the equation is that they do not have a fully mature and organizationally integrated risk program. The institution of risk management is not the problem; it is often the execution that is. Critical infrastructure cybersecurity is a relatively new area, and data will be hard to come by until more infrastructure operators adopt risk-based security programs and those programs are “tested in battle.” The issue with empirical evidence for the effectiveness of risk management programs is that it is somewhat difficult to come by. Much of the basis for assessing the effectiveness of a risk program is independently decided by each organization, due to the fact that risk plans are customized to an organization’s specific IT architecture and company risk appetite (and also risk tolerances).

Improving Risk Methodologies for Evolving Critical Infrastructure Threats

The cases analyzed previously provided many lessons that can be applied to most critical infrastructure sectors to help reduce the risk of similar attacks succeeding in the future. While the frameworks and risk methodologies mentioned include many controls covering areas that were exploited in these breaches, the following areas that are worth emphasizing: Security awareness, Network security monitoring, Trust relationships, and Know your systems.

Security Awareness

The attacks against critical infrastructure (the Dragonfly and German Steel Mill attacks in particular) were both facilitated by phishing attacks. While there are technical controls to help combat phishing (email filtering), the main line of defense against these attacks is the *users*. While security awareness programs, much like risk management, whose effectiveness are under scrutiny by extreme opinions on both sides, user education is one of the only ways to reduce the risk of falling for phishing schemes.

Network Security Monitoring

In the cases of all three attacks, having network traffic monitoring tools (and the personnel to analyze the resulting logs in a timely manner) may have aided in mitigating the damage of the resulting breaches. Egress monitoring is an extremely handy tool in security monitoring (R.M. Lee et al. 2014). What comes out of a network is just as important as what is going in! If any intellectual property were smuggled out of a control system network, egress

monitoring would have shown it. This is a detective control, meaning that it will only tell when a breach has already occurred.

Trust Relationships

The Dragonfly campaign was very telling with regard to access control issues, as malicious software was easily distributed to targets via the watering hole attack mentioned earlier. This is an abuse of a trust relationship between the software vendor and the control system software (and its operators). Trust relationships such as this one are a great attack vector for a technically capable adversary, since they are hard to monitor and are often forgotten in security management plans. It is not impossible to mitigate risks of abused trust relationships, however. A useful tool is to use network and protocol white listing versus software-specific white listing in firewall rule sets. This will ensure that software is only downloaded from trusted sources. If the trusted source is compromised, using perimeter defense such as DMZ's and virus walls will allow for malware detection and (if implemented) other tools such as heuristic-based intrusion detection, and so on. (MacKenzie 2014)

Know Your Systems

Above all the points already mentioned, the best way to develop and effective risk management plan for critical infrastructure is to *know what the IT architecture of the infrastructure looks like, and keep it up to date*. Using these data, such as in the Fig. 15.1, will allow for the creation of a plan that has an accurate and complete set of risks that can then be managed.

These recommendations for focus in risk plans are just a subset of what needs to be considered in a complete security assessment, but the existing frameworks and specifically the NIST framework for critical infrastructure protection cover several areas of security (see Fig. 15.1, Luallen 2011). Another key component of being adequately informed of the risks associated with an infrastructure sector's systems is *information sharing*.

Information Sharing

Information Sharing is an important function to ensure that the public sector and private owners and operators of critical infrastructure are “on the same page” regarding current threats, vulnerabilities, exploits, and recommended security practices. There are many mechanisms that currently exist for sharing

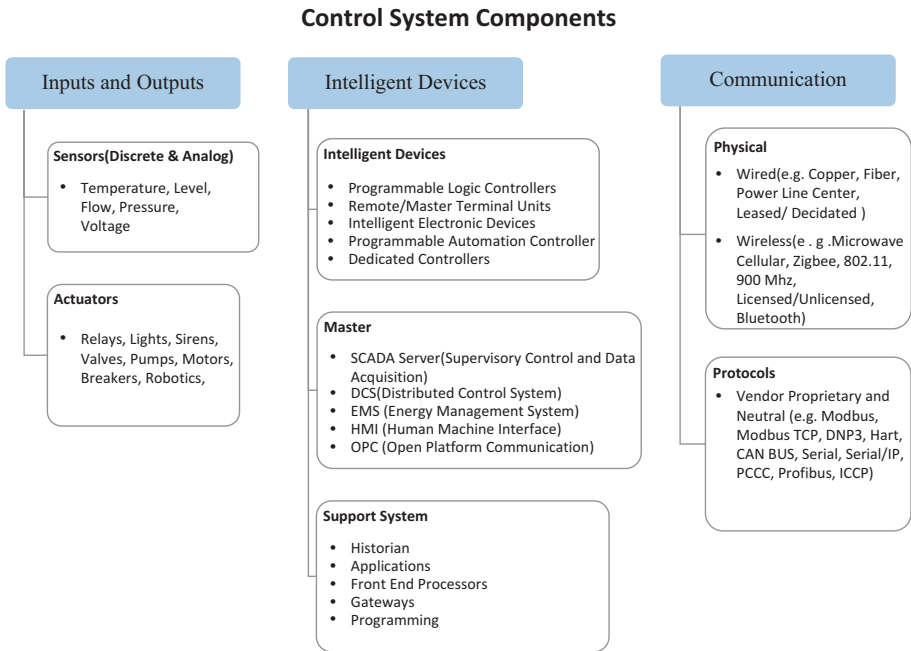


Fig. 15.1 Outline of control system components in critical infrastructure

information about cyber threats all over the world, both sponsored by governments and organized by private industry. While there has been some success in information sharing, there still exists much debate about the best ways to share information and which kinds of information should be shared. This is a hot button issue worldwide, with the focus of debate centering on privacy and liability protection.

In the USA, Presidential Executive Order No. 13636 was issued in February of 2013. This order called specifically for measures to enhance the protection of critical infrastructure and information assets from cyber-attacks. A distinct provision of the order called for information sharing to be streamlined between the public sector and private owners and operators of critical infrastructure. A program called the Enhanced Cybersecurity Services program was set up to expedite the sharing of relevant threat data to targeted entities as the information was discovered by the government. Also, a process was created to establish quick provisioning of security clearances so that participants in the program could access the data quickly. From 2013 until present day, other measures have been taken in this vein as well—with several concerns along the way. The Cybersecurity Information Sharing Act of 2014 was presented (but not yet passed) which called for internet traffic sharing from internet service providers, thus giving the government more direct access to

relevant data. Critics of this bill have widely panned it for acting as government surveillance by another name (Senator Ron Wyden of the US Senate, per Granick 2015).

Granick has outlined both good and bad principles of information sharing—and while the scope was focused on the US government, these principles apply to any cybersecurity information sharing worldwide. Good information-sharing shares information that is relevant to threats—“software flaws, virus signatures, threat signatures – stuff that system administrators need to know to check and protect their systems from attacks that others have identified or suffered” (Granick 2015). This information maintains privacy while yielding relevant details that can aid in defensive capabilities. Information that should not be shared (that the US government in particular is pushing for) is “evidence that my machines were attacked, evidence about who may have attacked me, government access to my network to help me catch the attacker” (Granick 2015). This difference in opinion over which information is relevant is holding up information sharing programs from being setup. If the latter (bad) data is shared, private industry members are concerned that it could be used against them (i.e. pinning liability for an attack on their company). The spirit of the bills appears to be potentially punitive in nature. The apprehension of the private sector has spurned a grassroots approach to information sharing, such as the creation of *ThreatExchange* by Facebook. They have several participants from the technology sector that are early adopters of the program, including social networking stalwarts Twitter and Yahoo among others (Vaas 2015).

It can be argued that the European Union (EU) has a more mature model for cyber threat information sharing. In 2010, ENISA worked with private industry to resolve concerns and tear down barriers to information sharing in the field of Critical Information Infrastructure Protection (CIIP) (ENISA 2010). The ENISA approach to information sharing, through Network Security Information Exchanges (NSIE) allows for voluntary participation that shares only the “good” data mentioned by Granick. Some of this information is “experience on threats, attacks, counter measures, response, (and) cooperation, advisory support in implementing protective measures, alert service on attacks and incidents” and much more (ENISA 2009, p. 27). It is explicitly mentioned that commercially sensitive issues that could harm the reputation of a business are handled with extreme caution and with privacy at the forefront. As stated by ENISA, “forcing detailed disclosure of such information, for instance, could seriously damage relationships.” This focus on privacy, combined with the already existing strict privacy landscape of the EU and its member nations, allows for an information-sharing program built on trust relationships between ENISA and the EU member states that participate in the program. It is impor-

tant to note that there are also information-sharing avenues through these NSIE's that include the USA and the UK as well—it is not exclusive to the EU.

As seen in the differences between these popular cybersecurity information-sharing systems, they need to be built on trust—providing privacy and liability insulation for private industry members to facilitate optimal participation. This will aid in timely reciprocation of good-quality data that is more likely to prevent attacks (or at least mitigate their damage). Information sharing is not a “cure all” approach to fixing cybersecurity, but it is a relatively easy first step to help get multiple parties to the same point in the maturity of their incident response programs.

Conclusion

The IT landscape of critical infrastructure is getting more dangerous over time, seemingly by the day. The breaches discussed in this chapter are likely just the beginning of a rise of destructive cyber-attacks against critical infrastructure as control system technologies continue to become more complex and automated (think “Internet of Things” protocols, where machines are talking to machines with less human oversight). This is startling combined with the state of the public and private sectors' underprepared security programs, many of which are still ad hoc and fledgling at best. A 2013 survey of control system operators yielded numbers that confirm this viewpoint (Luallen 2014):

- “The number of entities with identified or suspected security breaches increased to nearly 40 % from 28 % in our 2013...only 9 % say with surety that they haven't been breached.”
- “Respondents said the means to protect these systems has not improved, while the difficulty of detecting attacks and threats has not decreased.”
- “Many organizations do not or cannot collect data from some of the most critical SCADA and ICS assets, and many depend on trained staff, not tools, to detect issues. Almost 17 % have no process in place to detect vulnerabilities.”

The last point gives rise to even more issues with critical infrastructure security, namely the design of SCADA systems and associated protocols. Many of these systems and protocols are proprietary, horribly out of date, bug-ridden, and insecure (using unencrypted communications). This is a recipe for disaster, and an underlying cause of breaches that can sabotage even the best risk management and information-sharing programs.

While the statistics are not very favorable toward the defensive side of cybersecurity, the silver lining is that this problem is being taken much more

seriously by both the private and public sectors alike and has been for the past several years (Langner and Pederson 2013). It will be a trial and error process to see which methods actually provide more cybersecurity for critical infrastructure, and which only create new problems. The balance between defenders of these systems and attackers is often a tug of war, with each side gaining periodic victories and experiencing defeats. The use of sound risk management and information-sharing practices today is a good start toward bolstering the security posture of critical infrastructure on a global scale, and preventing the scary destructive incidents of yesterday—helping move one step at a time toward a safer tomorrow.

Acknowledgments The research of the second author has also been funded in part by NSF under grants #1523174, #1651060, #1419856, #1651475. The usual disclaimer applies. We would also like to thank the referees and the editors for comments that have improved this chapter, and Ruochen Liao and Mikayla Zhuo for their research assistance.

Bibliography

- ENISA. (2009). *Good practice guide on information sharing*. Retrieved May 14, 2015, from <https://www.enisa.europa.eu/activities/Resilience-and-CIIP/public-private-partnership/information-sharing-exchange/good-practice-guide>
- ENISA. (2010, May 14). *Incentives and challenges to information sharing*. Retrieved May 14, 2015, from <https://www.enisa.europa.eu/activities/Resilience-and-CIIP/public-private-partnership/information-sharing-exchange>
- ENISA. (2014). *An evaluation framework for national cyber security strategies*. Heraklion: European Union Agency for Network and Information Security.
- Granick, J. (2015). *The right way to share information and improve cybersecurity*. Retrieved May 14, 2015, from <https://www.justsecurity.org/21498/share-information-improve-cybersecurity/>
- IPREM. (2013). *Critical infrastructure assurance*. Retrieved May 14, 2015, from <http://www.iprem.ca/initiatives/Pages/Infrastructure.aspx>
- Kovacs, E. (2014). *Cyberattack on German steel plant caused significant damage*. Retrieved May 14, 2015, from <http://www.securityweek.com/cyberattack-german-steel-plant-causes-significant-damage-report>
- Langner, R. (2014). *The RIPE framework for ICS/SCADA cybersecurity: A process-driven approach towards effective and sustainable industrial control system security*. Retrieved February 12, 2014, from <http://www.langner.com/en/wp-content/uploads/2013/09/The-RIPE-Framework.pdf>
- Langner, R., & Pederson, P. (2013). *Bound to fail: Why cyber security risk cannot simply be “managed” away*. Washington, DC: Brookings.
- Lee, M. (2013). *Security risk management: Where companies fail and succeed*. Retrieved May 15, 2015, from <http://www.zdnet.com/article/security-risk-management-where-companies-fail-and-succeed/>

- Lee, R. M., Assante, M. J., & Conway, T. (2014). German steel mill cyber attack. *Industrial Control Systems*, 30.
- Luallen, M. (2011). *Critical control systems vulnerabilities demonstrated: And what to do about them*. November. Retrieved February 24, 2015, from <https://www.sans.org/reading-room/whitepapers/analyst/critical-control-system-vulnerabilities-demonstrated-about-35110>
- Luallen, M. (2014). *Breaches on the rise in control systems: A SANS survey*. Retrieved February 24, 2015, from <https://www.sans.org/reading-room/whitepapers/analyst/breaches-rise-control-systems-survey-34665>
- MacKenzie, H. (2014). *Defending against the dragonfly cyber security attacks*. Retrieved May 14, 2015, from <http://www.belden.com/blog/industrialsecurity/Defending-Against-the-Dragonfly-Cyber-Security-Attacks.cfm>
- NIST. (2013). *Security and privacy controls for federal information systems and organizations* (4th ed.). Gaithersburg: National Institute of Standards and Technology.
- NIST. (2014). *Framework for improving critical infrastructure cybersecurity*. Retrieved February 6, 2015, from <http://www.nist.gov/cyberframework/upload/cybersecurity-framework-021214-final.pdf?n=29669>
- RISI. (2015). *RISI online incident database*. Retrieved March 3, 2015, from <http://www.risidata.com/Database/>
- Robertson, J., & Reilly, M. (2014). *The map that shows why a pipeline explosion in Turkey matters to the U.S.* Retrieved May 14, 2015, from <http://www.bloomberg.com/news/2014-12-10/the-map-that-shows-why-a-pipeline-explosion-in-turkey-matters-to-the-u-s-.html>
- Symantec. (2014). *Dragonfly: Cyberespionage attacks against energy suppliers* (1.21 ed.). Mountain View: Symantec.
- TheWhiteHouse. (2013). *Executive order 13636—improving critical infrastructure cybersecurity* The White House. Retrieved from <https://www.gpo.gov/fdsys/pkg/FR-2013-02-19/pdf/2013-03915.pdf>
- Trend_Micro. (2015). *Report on cybersecurity and critical infrastructure in the Americas*. Retrieved May 10, 2015, from https://www.sites.oas.org/cyber/Certs_Web/OAS-Trend%20Micro%20Report%20on%20Cybersecurity%20and%20CIP%20in%20the%20Americas.pdf
- TSA. (2014). *Pipeline security*. Retrieved May 14, 2015, from <http://www.tsa.gov/stakeholders/pipeline-security>
- Tudor, Z., & Fabro, M. (2010). *What went wrong?* Paper presented at the A study of actual industrial cyber security incidents, presented at the Industrial Control Systems Joint Working Group Spring Conference. www.us-cert.gov/control_systems/icsjwg/presentations/spring2010/02%20-%20Zach%20Tudor.pdf
- Vaas, L. (2015). *Facebook's new ThreatExchange will rally companies to squash internet badness*. Retrieved May 14, 2015, from <https://nakedsecurity.sophos.com/2015/02/13/facebooks-new-threatexchange-will-rally-companies-to-squash-internet-badness/>
- Wallen, C. (Producer). (2015, February 10). *Cyber risk and threat management: A discussion of tools and techniques*.

16

Digital Change: How MOOCs Transform the Educational Landscape

Anna Kruse and Hans Pongratz

Ideas in Brief MOOCs are one of the most prominent topics to emerge in higher education in the past few years. Institutions that have launched successful MOOC initiatives have much to learn from each other, just as universities interested in evaluating the viability of a MOOC initiative at their institution may find lessons from others valuable for their decision-making process. This chapter explores the history and implications of MOOCs from the perspective of an institution that maintains active partnerships with multiple MOOC providers, producing numerous MOOCs every year. We outline a number of challenges, opportunities, and issues facing the adoption of MOOCs at an institution of higher education and provide recommendations for consideration. The chapter specifically addresses how MOOCs have transformed and can continue to transform the landscape of higher education, and how institutions of higher education can respond with agility to a rapidly changing landscape of tools and approaches. Based on the institutional experiences of the Technische Universität München (TUM) in developing and supporting a MOOC initiative, supported where relevant by current scholarship, we provide commentary and analysis on current public perception of MOOCs as well as a hypothesis, based on the Gartner Hype Cycle, about the future trajectory of MOOCs.

Keywords Blended learning • e-Learning • Flipped classroom • Higher education • MOOCs

A. Kruse • H. Pongratz (✉)
Technische Universität München (TUM), Munich, Germany
e-mail: pongratz@tum.de

Introduction

In 2012, massive open online courses (MOOCs) took the world by storm. Coverage was not limited to education interest groups; mainstream news sources picked up on the excitement, and commentary on the opportunities that MOOCs presented was wide-reaching. In the spring of 2012, Stanford University president John Hennessy made a comment in an interview with *New Yorker* reporter Ken Auletta that was to become at once both the warning and the mantra for MOOC supporters at institutions around the globe: “There’s a tsunami coming” (Auletta 2012). As the first university partners signed MOOC contracts with a handful of emerging market leaders, the *New York Times* dubbed 2012 “the year of the MOOC” (Pappano 2012), and other universities around the globe, including Technische Universität München (TUM), lined up to participate in the wave of innovation sweeping through higher education.

Conceptually, MOOCs are a product of a growing recognition that the way we work, interact, and even learn is changing as digital media reshapes our expectations for communication, and that higher education needs to respond productively to these changes. Institutions of higher education, like the rest of us, have been witness to the rapid diversification of credentials (including micro-degrees and digital badges) that are gaining a foothold as a viable alternative to a university education. These new methods of credentialing, many of which have real currency in the marketplace, offer a competitive challenge to traditional degrees. At the same time, the potential of MOOCs to bring access and opportunity to underserved populations further ignited enthusiasm for the movement to adopt MOOCs widely. Higher education institutions (HEIs) saw and continue to see MOOCs as an opportunity to meet the educational needs of wider audiences who are seeking learning opportunities from emerging educational providers and exploring new pathways for learning.

The excitement that accompanied the first MOOCs has taken a turn toward criticism and doubt as research on how global learners are using MOOCs suggests that many of MOOC proponents’ original goals, such as the democratization of learning, are not being met. While MOOC scholarship remains agnostic and exploratory, opinion pieces of late (mid-2015) have tended to speculate on the failure, or at least decline, of “the MOOC experiment.” These opinion pieces do not, however, necessarily take into account the mission-driven aspect of many institutions’ involvement in MOOCs and the de facto success of MOOCs in that respect. Many institutions, TUM included, have found their participation in the early wave of MOOC experimentation very fruitful, both from the perspective of MOOCs’ important

contributions to the advancement of the university's mission and from the fresh ideas that participating in MOOCs has inspired around the university. Ultimately, MOOCs offer universities the opportunity to publicly position themselves as open to thoughtful progress and experimentation. Embracing experimentation publicly underscores a university's possession of the qualities crucial for institutions of all varieties in the twenty-first century—agility, curiosity, empathy, and resilience.

MOOCs: A Definition

Since the term “MOOC” was coined in 2008 by David Cormier (Cormier 2008), the concept behind the term has been regularly revisited and reimagined. Early on, MOOCs were synonymous with democratization of learning, with their purpose being to provide more learning opportunities as well as to improve learning experiences around the globe. MOOCs have variously been called “a model of educational delivery” (ELI 2013), “not a thing ... [but] an idea” (Morris and Stommel 2012) and “a framework, not a platform” (Nielsen 2014). Many of these definitions abstract the term, emphasizing concept over product, and suggesting that the evolution of the term is still well underway. While the definition of MOOC continues to be negotiated, related terms have emerged, such as small private online courses (SPOCs), which use MOOC platforms to host courses online at a modest scale, and participatory open online courses (POOCs), which take on the challenges of dialogue and community in open online courses. MOOCs have quickly gained popularity, expanded, and evolved into different types (Haggard 2013, p. 87). If the lively continued metamorphosis of the original “MOOC” idea is any indication, it remains the catalyst of a creative, thriving family of approaches to online education.

While experiments in open education are nothing new, the potential reach of MOOCs was seen as something different, an energizing prospect for many institutions. MOOCs' history can be traced back to a course on Connectivism and Connective Knowledge (CCK08) with over 2200 students which was created by George Siemens and Stephen Downes in 2008 at the University of Manitoba, Canada (Downes 2011). It was the first “cMOOC,” or connectivist MOOC, before our current wave of xMOOCs arrived. Within cMOOCs, learning communities and connections are established and networked learning is facilitated. Learners are encouraged to interact and contribute actively. George Siemens describes the difference between cMOOCs and xMOOCs as follows: “cMOOCs focus on knowledge creation and generation whereas xMOOCs focus on knowledge duplication” (Siemens 2012). In comparison,

key aspects of an xMOOC, or “extension” MOOC, are videos, discussion forums, quizzes and surveys, and a structured navigation through the course elements. Different MOOC platforms offer different interactive elements, such as the opportunity for students to up-vote threads within the discussion forum to help the lecturer to answer the most urgent ones or captions and speed control for videos and video-embedded quizzes.

A SPOC refers to a version of a MOOC used locally with on-campus students in flipped-classroom/blended learning scenarios. The term was established by Professor Armando Fox, University of California, Berkeley, to refer to a localized instance of a MOOC course in 2013 (Fox 2013).

Visions and Challenges

As MOOCs continue to evolve, institutions are faced with the challenges of both the medium itself and its effect on institutional processes. As ambiguity and continually shifting parameters become the new normal, agility and resilience become critical dispositions to nurture in an organization, all the way from the on-the-ground level of MOOC production and project management through the institution’s strategic layer.

Challenges for MOOCs

As more universities experiment with MOOCs as a strategy for driving forward various institutional goals, significant challenges related to the medium have begun to coalesce. Challenges that we continue to face in relation to MOOCs are, among others, learner authentication, credentials and accreditation (Daniel 2012; Hyman 2012), revenue models (Daniel 2012; Dellarocas and Van Alstyne 2013), analytics (Moissa et al. 2015; Qu and Chen 2015), data protection issues (Daries et al. 2014), and low course completion rates (Anderson et al. 2014; Little 2013; Walsh 2015). Some of these challenges are even regionally diverse, such as those posed by the EU Directive 95/46/EC, which enacts restrictions “on the protection of individuals with regard to the processing of personal data and on the free movement of such data,” as well as state laws in European countries that provide rules for the handling of personal data. Special requirements apply, for example, if personal data is processed outside the European Economic Area (EEA). In the USA the Family Educational Rights and Privacy Act (FERPA) may apply.

The quality of online teaching and its many facets are crucial aspects to discuss, too, along with resources. MOOCs cost money and resources, with costs continuing long past production into implementation, evaluation, and possible future re-runs. But on the other hand, possible applications of MOOCs are many, from prep courses to flipped classrooms and blended learning to continuing education units. For TUM, MOOCs are an exciting supplement not only to our on-campus courses, something akin to both a digital business card and a textbook of the future—a new channel to our current students, but also to new audiences worldwide.

Knowledge Management

Another potential challenge for an institution producing MOOCs is knowledge management. Layers of knowledge in MOOC production are multiple—the content knowledge taught by the instructor, the pedagogical knowledge employed in designing the course, and the procedural and technical knowledge in translating the MOOC from concept to reality. Because the MOOC technology—and the pedagogical possibilities that accompany it—are continually under construction, codifying knowledge too strictly can lead to waste and quick obsolescence. Building capacity (developing procedures, producing documentation, and more) becomes challenging in these conditions. To avoid spending time on unprofitable directions, an institution can look toward techniques from agile management and startups to enhance its relationship with rapidly emerging and metamorphosing efforts such as MOOCs. One such technique for building capacity in an agile way is to identify a “north star,” or a set of values that serve as a navigational device during periods of decision and ambiguity. Creating a solid foundation, tending especially to how an institution’s goals and values align with digital initiatives, will help an institution keep the course through all types of digital change.

Opportunities

In terms of opportunities, MOOCs seem to offer excellent opportunities for learners around the world to begin or to further their education and access self-paced learning at any time and in any place. At the same time, universities find great value in enthusing potential future students. For the educational community at large, learning analytics deliver opportunities for us to better understand students’ learning habits and preferences as well as compare the relative effectiveness of different teaching methods and media elements.

Depending on the platform, a MOOC can offer access to thousands of learners, as well as a low entry barrier for the learner, the instructor, and the HEI. MOOCs are, in a sense, the logical next step in the evolution and diversification of the lecture format—from paper and books to transparencies and on to PowerPoints and interactive online content. Although MOOCs will inevitably continue to evolve conceptually, their very emergence as an alternative delivery model for education has had a profound impact on higher education by starting discussions on the development of new digital learning concepts.

In the USA, HEIs have begun experimenting with the possibility of offering credits to students who successfully complete courses that include a verified identity process. MOOC provider edX recently announced, for example, that it was partnering with Arizona State University to offer the Global Freshman Academy, a curated collection of credit-ready MOOCs pitched at potential college freshmen. At TUM, we have already run several pilot projects involving MOOCs-for-credit. Our Guided English Self-Study initiative, for example, allows students to receive foreign language European Credit Transfer System (ECTS) credits for successful completion of English-language MOOCs in relevant subject areas and passing scores on several on-campus assessments. We have also run a MOOC in parallel with its parent on-campus course, with students participating in the course and receiving credits for successful completion. Moreover, we are happy other universities included MOOCs by TUM into their curricula for ECTS credits; for example, the Leibniz Universität Hannover, Fakultät für Maschinenbau provides 1 credit for taking TUM's Autonomous Navigation for Flying Robots (AutonavX) MOOC.

What's Next for MOOCs

Given the volatility of public opinion that MOOCs have thus far experienced, what might we be able to expect next with MOOCs? The Gartner Hype Cycle (Gartner 1995), a graphical tool developed by the IT consultancy Gartner, suggests that each new idea or emerging technology goes through five development phases: (i) the Technology Trigger, (ii) the Peak of Inflated Expectations, (iii) the Trough of Disillusionment, (iv) the Slope of Enlightenment, and finally (v) the Plateau of Productivity.

If we look at MOOCs, the axes of innovation are now defined, market leaders are being copied, and key elements of the status quo are being emulated by newcomers. While it is not clear exactly where we are right now and if MOOCs will be going through the full hype cycle, current mood points

toward our being well on the way through the trough of disillusionment and looking forward to a steady climb up the other side. In a blog article, Jason Tapson (Tapson 2013) identifies late 2013 as “Peak of Inflated Expectations,” 2014 & 2015 as the “Trough of Disillusionment,” 2017–2023 as “Slope of Enlightenment,” and 2023 and beyond as the “Plateau of Productivity.” Gartner’s Hype Cycle for Education 2013 also sees MOOCs at the peak (Lowendahl 2013). We might conclude that MOOCs have already passed the transition from the Peak of Inflated Expectations to the Trough of Disillusionment and offer a great chance for further development throughout the next years.

Another measure for observing trends related to MOOCs and public perception is Google Trends (www.google.com/trends/), a tool for evaluating worldwide trends. Based on Google Search, the application monitors how often a search term is used in relation to the total search volume at Google. Applying various filters, users can make observations about the popularity of certain terms in search requests around the world. Figure 16.1 shows the Google Trends on the search term “MOOC” for the period January 2012 till July 2015 for the regions USA (dark line), Worldwide (light line), and Germany (mid-tone line).

This graph underlines how MOOCs reached their “hype” peak at different times across the world. In Germany the first significant search queries for

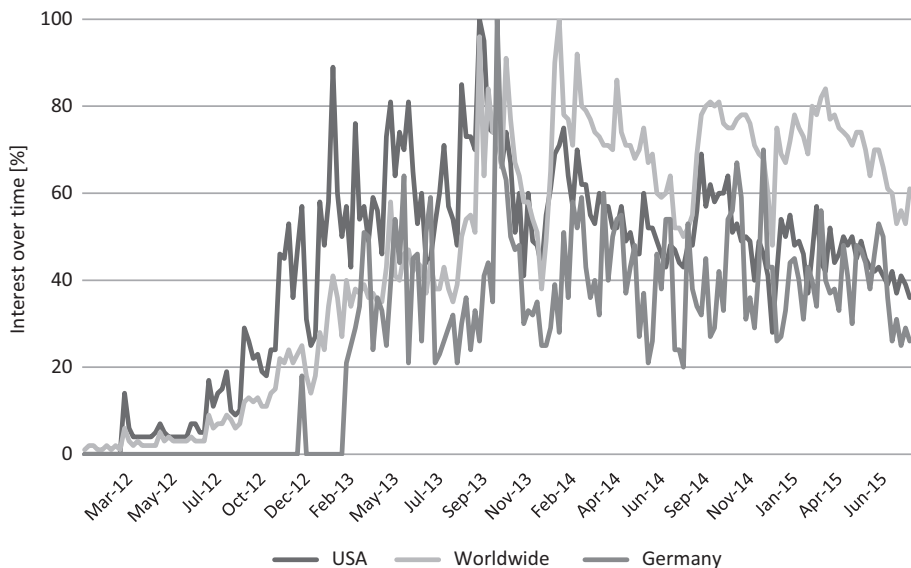


Fig. 16.1 Google trends on search-term “MOOC” (Source: TUM based on Google trends [www.google.com/trends/])

“MOOC” within Google started in December 2012, whereas in the USA and worldwide the trend started in spring 2012. Though only a loose indicator of national tendencies, the graph reinforces what we can also observe in other media formats, that global interest in MOOCs waxes and wanes depending on region and context.

To MOOC or Not to MOOC

We have assembled a SWOT analysis for institutions that are considering whether or not to launch a MOOC initiative, which was inspired by the MOOC SWOT analysis conducted by Dennen and Chauhan (Dennen and Chauhan 2013). It may also be of interest to those who are already involved in producing MOOCs but would like to take a step back and consider how to optimize their effort to reach their desired goals. Figure 16.2 outlines the strengths, weaknesses, opportunities, and threats (SWOT) that we see as key for HEIs interested in MOOCs to consider. The question of whether producing and supporting a MOOC is worth the effort for an institution has to be answered individually by analyzing the potential benefits and drawbacks of launching a MOOC initiative. Perhaps the most critical factors to

<p>Strengths</p>	<p>Contemporary technology</p> <p>Global outreach</p> <p>New channel to learners</p> <p>Reputation</p> <p>Scalability</p> <p>Self-paced learning for students</p> <p>Textbook of the future</p>	<p>Opportunities</p>	<p>First mover advantage</p> <p>Gain experience</p> <p>Occupy emerging topics</p> <p>Global audience</p> <p>Research</p> <p>Recruitment (students & staff)</p> <p>Reputation</p> <p>Revenue model</p>
<p>Weaknesses</p>	<p>Accreditation</p> <p>Need for resources (human, technological, financial)</p> <p>Student authentication & prerequisites</p> <p>Technology maturity</p>	<p>Threats</p>	<p>Course completion rate</p> <p>Reputation</p> <p>Revenue model</p> <p>Student & lecturer satisfaction</p>

Fig. 16.2 MOOC SWOT analysis: key aspects for HEIs

consider are the need for resources (human, technological, and financial) and the reputational risk, which could either lead to an outcome of strengthened or weakened public perception. Other key issues include motivation, faculty effort, available resources, and institutional support.

Based on our experiences, we recommend that institutions considering launching MOOCs at their institution review the elements of this SWOT analysis and address the following questions:

- What are the key benefits of MOOCs for your faculty, institution, students, and lectures?
- Do MOOCs fit into to your larger learning and technology strategy? If so, how?
- What, if any, business goals do you have for participating in MOOCs?
- What would you identify as your KPIs for measuring success?

Institutions should also address the following important questions on data security and data privacy, working if possible with the institution's data protection officer:

- Are the MOOCs optional or mandatory for students of your organization?
- Which data is stored, where is it stored, and who has access to it?
- Are the users informed about "their" stored data?
- Is data deleted after X months/years?
- Do you have a policy for data analytics?

Asking such questions early allows for the development of an integrated approach to building MOOCs—strategically, logistically, and pedagogically.

At TUM, having completed this exercise ourselves, we looked at how our strengths as a university could help us claim the opportunities that MOOCs afford. As a university, we look both nationally and internationally to recruit talented students, and we likewise deeply value our collaborations with institutions around Europe and the globe. We believe that this position has the potential to strengthen the success of MOOCs at TUM by helping us both reach and engage students around the world with high-quality learning materials that honor our reputation for excellence in training and instruction. We see "occupy emerging topics" as another opportunity that we can harness with our strengths, and indeed we have already served as vanguards in MOOC course catalogs with such emergent topics as autonomously navigated quadcopters and computer vision. We anticipate re-engaging with our SWOT grid every year to ensure that, as a strategic document, it represents the latest developments in the topic.

MOOCs at TUM

About TUM

The TUM, founded in 1868, is a leading European university specializing in technology and the sciences. It regularly ranks among the top 15 European universities according to the Shanghai Academic Ranking and among the top 15 universities worldwide in the Global Employability Survey Ranking and is committed to excellence in research and teaching, interdisciplinary education and the active promotion of promising young scientists. The university also forges strong links with companies and scientific institutions across the world and was one of the first universities in Germany to be awarded the title “University of Excellence.” In the international Shanghai Ranking (ARWU), TUM was rated the number one German university in 2011, 2012, and 2013. In 2015, TUM came in third after the Swiss Federal Institute of Technology Zurich and Imperial College London among European technical universities. Currently, TUM supports 37,300 enrolled students, 6000 academic staff (including university hospital) and 511 professors on three national campuses and an international campus abroad: TUM Asia in Singapore.

In 2013, TUM’s Board of Management decided to participate in MOOC experimentation, and set up the MOOCs@TUM project under the supervision of the Senior Vice President for IT-Systems and Services (Chief Information Officer) to launch TUM’s first MOOCs. TUM was the first German university to sign non-exclusive partnerships with the MOOC platform providers Coursera (www.coursera.org) and edX (www.edx.org), and the TUM Board of Management approved a budget of €250,000 for the production and implementation of five high-quality MOOCs. Following this announcement, TUM began developing a support infrastructure for MOOCs, including identifying a TUM staff member who would serve as the primary point of contact and coordinator for TUM’s MOOCs. As part of TUM’s early MOOC infrastructural development, TUM founded an editorial board that would, among other things, provide quality management for the university’s MOOCs. Members of the editorial board include the Senior Vice President for Academic Affairs and Students, the Senior Vice President for Diversity and Talent Management, and the Senior Vice President for IT-Systems and Services (CIO).

Building Capacity to Produce State-of-the-Art MOOCs

MOOCs, especially those produced to high-quality standards, can be remarkably time-consuming. When TUM joined edX and Coursera, one of the first steps was to organize a process for designing, developing, and implementing MOOCs. This step itself required the dedicated attention of a number of individuals, and the MOOC development process that emerged as a recommendation identified significant resource and personnel needs that went beyond those currently allocated for supporting digital initiatives in teaching. As a first step in building capacity for MOOC support, existing academic support centers at TUM were tapped to build up their infrastructure rapidly.

The Media Center (Medienzentrum), which provides TUM instructors with support and guidance, was tasked with supporting the development of MOOCs at TUM. Medienzentrum, a part of Corporate IT Systems and Services of TUM, is responsible for supporting teaching and learning with e-learning components of different tools as well as for maintaining and developing the university learning management system (LMS) Moodle on campus. Altogether, Medienzentrum supports faculty in enhancing about 2000 lectures per semester through the integration of digital tools and methods. Having gained significant experience supporting the university for many years, Medienzentrum has a diverse service portfolio that reaches from design (web, print, and corporate) to multimedia (video production, editing, lecture recording) and e-learning (pedagogical advice, tutorials, legal advice). One of the Center's service highlights is a special qualification program for lecturers, "eTeaching@TUM," which consists of 72 working units. When TUM announced that it would offer MOOCs, Medienzentrum responded by adapting and expanding its support structure to accommodate the specific needs of MOOCs. An expert for audio-visual media began advising lecturers on how to deliver filmed lectures and assisted them in recording their MOOC-material, and Medienzentrum built TUM's first MOOC studio (see Fig. 16.3), which features high-quality equipment such as a teleprompter, camera, tablet and spotlights. Further MOOC studios, one at each of TUM's three campuses, are planned in order to accommodate future MOOC lecturers based at any TUM campus.

ProLehre, the department for Teaching and Learning in Higher Education at TUM, supports lecturers in further developing their teaching approach and style through workshops, teaching consultations, and general advice. ProLehre joins Medienzentrum in helping lecturers to revise their lectures for digital teaching like MOOCs from a didactical point of view.



Fig. 16.3 MOOC studio at media center of TUM (Source: TUM/Andreas Heddergott)

The First MOOCs

Following the announcement that TUM would be offering five high-quality MOOCs through Coursera and edX as the first stage of its involvement with MOOCs, faculty members were invited to apply with a course concept that they were interested in developing as a MOOC. The criteria for selection were broad in order to attract as much interest as possible and to encourage innovative subjects to emerge. Among others, the editorial board decided to support the production of the following courses, which ran before or are running in August 2015:

- Einführung in Computer Vision (Introduction to Computer Vision) by Prof. Dr. Martin Kleinsteuber, Department of Electrical Engineering and Information Technology, offered on Coursera, taught in German, first run January 13, 2014 to April 24, 2014 and re-run January 19, 2015 to April 1, 2015.
- Autonomous Navigation for Flying Robots by Dr. Jürgen Sturm and Prof. Dr. Daniel Cremers, Department of Informatics, offered on edX, taught in English, first run May 1, 2014 to July 1, 2014 and re-run May 5, 2015 to June 30, 2015.

- Grundlagenkurs Unfallchirurgie (Basic Course in Trauma Surgery) by Prof. Dr. Peter Biberthaler, TUM School of Medicine, offered on Coursera, taught in German, run from June 20, 2014 to September 7, 2014.
- Quality Engineering and Management by Prof. Holly Ott and Prof. Martin Grunow, TUM School of Management, offered on edX, taught in English, running from July 1, 2015 to September 9, 2015.

MOOC #1: Einführung in Computer Vision

Prof. Dr. Martin Kleinsteuber (TUM Department of Electrical Engineering and Information) led TUM's first MOOC on Coursera, which offered an introduction to the field of Geometric Optimization and Machine Learning. This was the first course on Coursera offered in German and it ran from January 2014 through April 2014. In keeping with the nature of the topic, instructional content was highly visual, and we recommended that enrollees have a strong background in linear algebra. Kleinsteuber specifically designed the course, which was six weeks long with student effort estimated at 4–8 hours per week, for hybrid use, employing the course content in his TUM-on-site lecture at the same time the course was running on Coursera. The course consisted of 17 video lectures of about 20 minutes each, quizzes, and programming homework. A forum and a wiki, as well as German subtitles, were provided to support the learners. TUM offered this MOOC as a Coursera “Signature Track” course, which involves verifying students' identities through typing pattern recognition and a photo ID check via webcam. Students in the Signature Track who passed the final online exam received a Verified Certificate, while those who were not part of the Signature Track were still eligible for a Certificate of Accomplishment upon successful completion of the course. As is the case with many MOOCs, this course remained open for registration and non-facilitated participation after the course ended, and TUM ran the course again from January 2015 to April 2015.

Kleinsteuber's MOOC was, from our perspective, a highly successful first MOOC. Enrollment steadily increased (see Fig. 16.4), with 48 % of the registrants joining from Europe, 25 % from Asia, 17 % from North America, 5 % from South America, 3 % from Africa and 1 % from Oceania. While the course was live, enrollment numbers reached 12,000 participants, of whom approximately 5500 were active, and ultimately 129 took the final exam with 77 passing. These completion and exam numbers illustrate one of the great challenges for public opinion on MOOCs so far—that while they attract significant attention, real participation remains comparable to

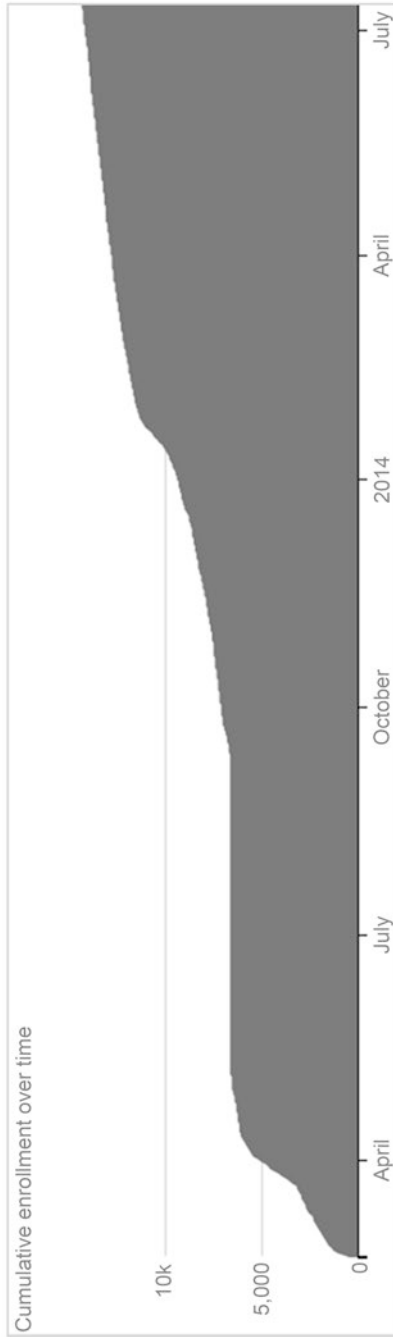


Fig. 16.4 Cumulative enrollment for "Einführung in Computer Vision" (Source: TUM)

on-site university classes and does not reflect the same “massive” scale as initial enrollments do. However, recent reports on student polls have reinforced the point that educators have been making for some time regarding MOOCs—that students come to MOOCs with different goals, and for many, simply browsing the content or watching a few videos on specific topics is all they intended to do in the first place. Engagement does not require participation in assessments, and completion rates ignore the subpopulation of learners whose engagement style simply does not see participation in assessments and ultimately certification as a critical goal. See Kizilcec’s, Piech’s, and Schneider’s article (Kizilcec et al. 2013) for more information on their analysis of engagement patterns in MOOCs. We may meet the personal educational goals of many more than completion numbers suggest. We learned valuable lessons from this first MOOC. First, we quickly recognized how important it is to provide professional support for the lecturer in setting up the recording infrastructure and getting comfortable in front of the camera, which presents a dynamic that differs significantly from that of a traditional classroom setting. A producer can provide support, feedback, and coaching. The TUM Media Center responded quickly to these early experiences, increasing support opportunities and building up an infrastructure for media production. As Kleinsteuber reported, the time and effort required to build a MOOC grows exponentially in relation to the quality of the MOOC, so we also suggest establishing early on a common framework for quality and a reasonable set of expectations around the time and effort required. We also learned that it is important to leave room for students to take initiative—we were gratified to see learners who did not speak German taking an active role in translating the video subtitle content via web translation tools and sharing it widely with other learners. Now that the course has been run twice, Martin Kleinsteuber is working on an English version of the MOOC and is preparing detailed analyses about the outcome of the course. Since the MOOC launched, the number of students within Kleinsteuber’s on-site lecture “Computer Vision” has doubled.

MOOC #2: Autonomous Navigation for Flying Robots

Dr. Jürgen Sturm (TUM Department of Informatics) and Prof. Dr. Daniel Cremers (TUM Department of Informatics) developed and launched TUM’s second MOOC, the first MOOC that TUM has offered through the edX platform. The course is taught in English and based on an award-winning on-site course taught at TUM: TUM’s TeachInf “Best Lecture” Award for

2012 and 2013. It was launched in May 2014, and was designed as an eight-week course. We recommended that students have a solid background in linear algebra and 3D geometry, as well as some basic Python knowledge for executing the programming exercises, which consisted of small code snippets. Students were expected to spend approximately four hours per week on coursework, which consisted of 25 video lectures of about 17 minutes each, as well as quizzes and programming homework. The primary video format used was a combination of lecture slides and video footage of the instructor (see Fig. 16.5). A discussion board and a wiki were provided to support the learners. Homework assignments asked students to apply what they had learned regarding the implementation of control and navigation algorithms. In order to best support the instructional content, we built an interactive browser-based quadrotor simulator for students to use in testing their implementations. For this course, students were also able to sign up for a Verified Certificate through edX. With edX, the identity verification process involves a series of webcam-based photos of the learner and the learner's government-provided ID. The course ran from May 6, 2014 to July 1, 2014, and once the course had ended, we ensured that the course was still available on edX as an “archived course” for those interested in registering and exploring course

Fig. 16.5 Screenshot of MOOC “Autonomous Navigation for Flying Robots” (Source: TUM)

content. As an archived course, Professors Sturm and Cremers were no longer monitoring student participation, but students could still watch the course videos and try their hand at the course exercises.

We found the course to be a success, with impressive enrollment and participation numbers. Through July 2014, more than 20,500 participants registered for the course, with enrollment at the time of the live course run reaching 19,950 registrants. Of those registrants, 1393 passed the course successfully, achieving or surpassing the passing grade of 60 % of all possible points in the homework exercises. As a point of comparison, Sturm's and Cremers' past on-campus seminars averaged 15 participants per semester, illustrating the extraordinary growth in reach that this course represented for TUM. Over 800 learners participated in the post-course evaluation and provided valuable feedback. In the survey, students provided valuable and frank feedback, with some even asking for more difficult homework assignments. We received a number of inquiries about the availability of formal academic this course, so we plan to directly address questions like this in the course description in the future.

Credits for MOOCs at TUM

While TUM does not offer formal academic credit for Coursera and edX coursework and does not certify that MOOC students have met the same requirements as matriculated students taking the on-site course on which the MOOC is based, we have begun experimenting with ways to bridge students' MOOC engagement and on-site engagement with carefully validated benefits. In one experiment at TUM, students matriculated at TUM who took Jürgen Sturm's MOOC on Autonomous Navigation for Flying Robots class were able to take an on-site test at the course's conclusion and receive TUM credits for the course. This effort was one of our early efforts to meet the challenge of learner authentication and the awarding of credentials. It allowed us to find a comfortable balance between awarding no credits and awarding credits too liberally. With credits being such an important representation of students' time and accomplishment in a course, we want to continue to award them with the same care as we do in our on-campus courses.

As another way to bridge MOOCs and the on-campus experience at TUM, TUM's Language Center launched a "Guided English Self-Study" module as pilot project for students, who complete 60 hours of supplementary language

work in English using open courseware or MOOCs. The courses that students choose for their studies must be related to their regular coursework and will be graded on a pass/fail basis, with two ECTS credits granted upon successful completion of the course. Integrating students' acquisition of content knowledge and language skills offers students the opportunity to focus on language issues in the context of their regular course work as well as to develop vocabulary and accuracy in spoken and written English around specified topic areas. Students who score in the upper B2 level or higher (as evidenced by a score over 50 % on the placement test at TUM via a test on TUM's learning management system) are eligible to apply for credits, and those whose plans are approved are expected to follow a careful study plan that includes mentorship meetings (both in-person and online) with Language Center staff as well as regular deliverables. Within the first month of the 2013 summer term, six students registered to take part in this "Guided English Self-Study" module. Three of the students' proposed projects were approved, and all of the approved projects met their requisite 60 hours of language-related work. In the 2014 summer term, the project offering was divided into two levels (C1 and C2) in order to reflect students' academic performance more accurately. Now, around 60–70 students enroll in the "Guided English Self-Study" module at TUM each term.

Strategic Cooperation on MOOCs

The opportunities presented by MOOCs inspire not only cooperation within TUM, but also within and across our networks. For example, within our existing alliance with a number of technical universities across Europe, the EuroTech Universities Alliance, we are planning a MOOC-based continuous education program with online and on-site components. The EuroTech Alliance brings TUM together with three other leading European technical universities: Danmarks Tekniske Universitet (DTU), Technische Universiteit Eindhoven (TU/e), and École Polytechnique Fédérale de Lausanne (EPFL).

Other opportunities for collaboration and cooperation presented by MOOCs have arisen. The presidents of the TU9 universities have formalized a plan to develop MOOCs in the field of engineering and natural sciences. TU9 is the alliance of leading Institutes of Technology in Germany: RWTH Aachen University, TU Berlin, TU Braunschweig, TU Darmstadt, TU Dresden, Leibniz Universität Hannover, Karlsruhe Institute of Technology, TUM, and Universität Stuttgart. In October 2014, the TU9 launched a cMOOC with the slogan "Discover Excellence in Engineering and the Natural Sciences—Made in Germany." For further information on

the TU9 MOOC project, see www.tu9.de/mooc. The goal of the MOOC, which was broadcast synchronously through Google Hangouts Live and archived on a platform specifically designed for the MOOC, was to introduce worldwide learners, especially those interested in studying engineering, to renowned TU9 professors and present those learners with an overview of recent scientific developments. Students could join for the full sequence of weekly course topics, or choose to join for topics of particular interest. The MOOC, offered in English, lasted nine weeks, and included such topics as the Start Up, Mechanics, Digital Engineering, Machines for the World, Future Material, Future Cities, Mobility, Robotics, and Aerospace.

Conclusion

Our first experiences with MOOCs, blended learning, and flipped classroom concepts were very encouraging for the lecturers and TUM, and we plan to multiply the blended learning experiences on campus. Despite how vocally the challenges MOOCs face are being propagated, we are optimistic about the future of MOOCs. We see them, among other things, as a catalyst for important conversations in the field of higher education, and an inspiration for diversifying our repertoire of teaching methods on campus and beyond. While MOOCs are by no means a Nuremberg Funnel, a metaphor for a rote style of teaching that “funnels” information into a student, channeling knowledge toward receptive students through mere “coverage” of material, they are already a life-changing boon for motivated students and will continue to mature.

While neither we nor the MOOC community in general has solved the challenges we outlined at the beginning of this chapter, pilots based locally at different universities, including ours, allow us all to share early results of different interventions with each other. For example, learner authentication, which is closely coupled with the question of credentials due to the importance of awarding credentials to the actual learner, has become taken up by MOOC providers, several of whom have developed their own identity verification software or secured partnerships with virtual proctoring vendors. Our MOOC platform providers and we are working on MOOC analytics to analyze learner’s data to understand their needs and to help lecturers to optimize their learning and testing material. Furthermore, MOOC providers continue to explore how to incentivize students to enroll in MOOCs on paid tracks. Students on paid tracks might receive supplementary material, one-on-one interactions with the instructors, or a special certificate that verifies their accomplishments in the course.

Internally, we continue to develop our MOOC capacity with an eye toward agility. In order to support both intentionality and speed in the growth of TUM's involvement with MOOCs, we have hired a learning specialist dedicated exclusively to MOOC coordination, management, and strategy. We are accelerating the pace at which we articulate and communicate goals and opportunities around MOOCs, produce guidelines for faculty building MOOCs, and share our work more widely. We have run workshops for faculty interested in building MOOCs, and we will grow the ways we support instructors, aiming to find an optimal balance between scalability and personalized attention. We are working on guidelines to address some of the major challenges facing MOOCs, such as engaging a global audience (deadlines for different time zones, language issues, diversity, cultural differences) and finding confluences between on-campus instruction and MOOC instruction. As we follow our "north star" toward the horizon, we see exciting opportunities for MOOCs continuing to emerge.

Bibliography

- Anderson, A., Huttenlocher, D., Kleinberg, J., & Leskovec, J. (2014). *Engaging with massive online courses*. In Proceedings of the 23rd international conference on World wide web (WWW '14). ACM, New York, NY, USA, pp. 687–698.
- Auletta, D. (2012). Get Rich U. *New Yorker* (Spring 2012 Issue). Retrieved November 15, 2015, from <http://www.newyorker.com/magazine/2012/04/30/get-rich-u>
- Cormier, D. (2008). The CCK08 MOOC—Connectivism Course, 1/4 Way. *Dave's Educational Blog* (October 2, 2008). Retrieved November 15, 2015, from <http://davecormier.com/edblog/2008/10/02/the-cck08-mooc-connectivism-course-14-way/>
- Daniel, J. (2012). Making sense of MOOCs: Musings in a maze of myth, paradox and possibility. *Journal of Interactive Media in Education*, 2012(3), p. Art 18.
- Daries, J. P., Reich, J., Waldo, J., Young, E. M., Whittinghill, J., Dean Ho, A., Seaton, D. T., & Chuang, I. (2014). Privacy, anonymity, and big data in the social sciences. *Communications of the ACM*, 57(9), 56–63.
- Dellarocas, C., & Van Alstyne, M. (2013). Money models for MOOCs. *Communications of the ACM*, 56(8), 25–28.
- Dennen, V., & Chauhan, A. (2013). Shall we MOOC? A SWOT analysis at the program level. *MOOCs Forum*, 1(P), 17–21.
- Downes, S. (2011). The MOOC guide: CCK08—The distributed course. Retrieved November 15, 2015, from <https://sites.google.com/site/themoocguide/3-cck08---the-distributed-course>
- ELI. (2013). 7 things you should know about MOOCs. *EDUCAUSE Learning Initiative (ELI)*. Retrieved November 15, 2015, from <http://www.educause.edu/library/resources/7-things-you-should-know-about-moocs-ii>

- Fox, A. (2013). From MOOCs to SPOCs. *Communications of the ACM*, 56(12), 38–40.
- Gartner, I. (1995). Gartner hype cycle. Retrieved November 15, 2015, from <http://www.gartner.com/technology/research/methodologies/hype-cycle.jsp>
- Haggard, S. (2013). The maturing of the MOOC: Literature review of massive open online courses and other forms of online distance learning (BIS RESEARCH PAPER No. 130). London. Retrieved November 15, 2015, from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/240193/13-1173-maturing-of-the-mooc.pdf
- Hyman, P. (2012). In the year of disruptive education. *Communications of the ACM*, 55(12), 20–22.
- Kizilcec, R., Piech, C. & Scheider, E. (2013). *Deconstructing disengagement: Analyzing learner subpopulations in massive open online courses*. LAK '13 proceedings of the third international conference on learning analytics and knowledge.
- Little, B. (2013). You MOOC, iMOOC. Retrieved November 15, 2015, from <https://www.trainingjournal.com/articles/feature/you-mooc-imooc>
- Lowendahl, J.-M. (2013). Hype cycle for education. Retrieved November 15, 2015, from <https://www.gartner.com/doc/2559615>
- Moissa, B., Gasparini, I., & Kemczinski, A. (2015). A systematic mapping on the learning analytics field and its analysis in the massive open online courses context. *International Journal of Distance Education Technologies (IJDET)*, 13(3), 1–24.
- Morris, S. & Stommel, J. (2012). A MOOC is not a thing: Emergence, disruption, and higher education. *Hybrid Pedagogy Blog*. Retrieved November 15, 2015, from <http://www.hybridpedagogy.com/journal/a-mooc-is-not-a-thing-emergence-disruption-and-higher-education/>
- Nielsen, B. (2014). What a MOOC is and what it isn't. *Your Training Edge Blog*. Retrieved November 15, 2015, from <http://www.yourtrainingedge.com/what-a-mooc-is-and-what-it-isnt/>
- Pappano, L. (2012). The year of the MOOC. Retrieved November 15, 2015, from http://www.nytimes.com/2012/11/04/education/edlife/massive-open-online-courses-are-multiplying-at-a-rapid-pace.html?_r=0
- Tapson, J. (2013). MOOCs and the Gartner Hype Cycle: A very slow tsunami. Retrieved November 15, 2015, from <http://pando.com/2013/09/13/moocs-and-the-gartner-hype-cycle-a-very-slow-tsunami/>
- Qu, H., & Chen, Q. (2015). Visual analytics for MOOC data. *IEEE Computer Graphics & Applications*, 35(6), 69–75.
- Siemens, G. (2012). MOOCs are really a platform. Retrieved November 15, 2015, from <http://www.elearnspace.org/blog/2012/07/25/moocs-are-really-a-platform/>
- Walsh, L. (2015). Bringing MOOCs back to life. *Chief Learning Officer*, 14(2), 26–47.

17

E-Leadership for SMEs in the Digital Age

Weizi Li, Kecheng Liu, Yinshan Tang, and Maksim Belitski

Ideas in Brief Small and medium enterprises (SMEs) are the backbone of economy for many countries. With a business climate currently being transformed by digital technologies, an economy driven by SMEs can be an ideal catalyst to make the most of the potential of digital technologies. One of the main challenges that the leaders of SMEs face today is how business and information technology can be aligned in an optimal manner in their organizations to fully leverage the potential of digital technologies, where e-leadership plays an essential role. This chapter provides an insight into how e-leadership drives the successful alignment between business and IT by drawing organizational semiotics and business-IT alignment theory. This chapter provides a broad perspective on how SMEs can leverage technological potentials to maximize business competitiveness and growth. Furthermore empirical evidences from SMEs across Europe gathered on the basis of the theoretical model will also provide an insight on how SME decision makers perform effective e-leadership in driving effective business and IT alignment toward sustained competitiveness.

Keywords Business and IT alignment • E-Leadership • Organizational semiotics • Small and medium enterprises (SMEs)

W. Li (✉) • K. Liu • Y. Tang • M. Belitski
Henley Business School, University of Reading, Reading, UK
e-mail: weizi.li@henley.ac.uk; k.liu@henley.ac.uk; y.tang@henley.ac.uk;
m.belitski@reading.ac.uk

© The Editor(s) (if applicable) and The Author(s) 2017
H. Ellermann et al. (eds.), *The Palgrave Handbook of Managing Continuous Business Transformation*, DOI 10.1057/978-1-137-60228-2_17

375

Introduction

E-leadership is commonly defined as a social process focused on changing attitudes, feelings, thinking, behavior, and/or performance of individuals, groups, or organizations mediated by advanced information technology (IT). We aim to fill this gap not least because the dawn of digital age is dramatically changing the rules of the game. Digital age is characterized by rapid technological change putting firm's capability to manage and manipulate information at the heart of firm's ability to survive and prosper (Cohen and Schmidt 2013). Key technologies with the potential to change the basic tenant of competition and reshape traditional industries include cloud computing, social media, internet of things, mobile computing, and big data analytic (LEAD 2014). Such technological developments will speed up and improve the way new innovative products and services are conceived, developed, produced, and accessed (Yoo et al. 2010). The digital age offers huge opportunities for SMEs to develop entirely new high-value products and services, add value to existing products and services, reduce costs, develop new export markets, and add value to existing activities (e.g. cloud computing, internet of things). Therefore, with a business environment currently being transformed by digital technologies—both disrupting existing businesses and opening opportunities for new companies and industries—an economy driven by SMEs could be the ideal catalyst to make the most of the huge potential of digital technologies in Europe (Deloitte 2013).

One of the main challenges that SME leaders face today is how to optimally integrate business and IT systems in their organizations to fully leverage the potential of digital technologies (Ferneley and Bell 2006). Not surprisingly, leaders capable of effectively aligning business and IT strategy of SMEs are more likely to succeed (Sun et al. 2014). However, to the best of our knowledge, there is little research examining how e-leadership drives the successful alignment, within SMEs, between business needs and technology innovation in pursuit of enhanced competitiveness. The alignment thinking is important for effective e-leadership and the successful implementation of IT projects (Avolio et al. 2001, 2014).

Given the rather limited theoretical body of knowledge on e-leadership, we adopt organizational semiotics (OS) and strategic alignment as the theoretical underpinning to address the above mentioned research gap. OS provides a theoretical insight into how organizational culture, business norms, and technical system work together as an integral social information system (IS). On the other hand, strategic alignment model illustrate the dynamic alignment between businesses and IS, emphasizing both strategic and structural

alignment. In this chapter, we develop a number of theoretical propositions, drawing on and combining these two lenses, and proceed by testing them through qualitative-explorative research. We have conducted interviews exploring how SMEs access and foster e-leadership and how does it work in successful SMEs. By combining empirical findings with theoretical propositions, we provide an e-leadership diagnostic model on how leadership leverage business and IT alignment to unleash the potential of technologies in business.

This research is to contribute to the progress of theory and practice of e-leadership in SMEs. We constructed a theoretical underpinning for e-leadership by combining research on e-leadership with OS and strategic alignment. A comprehensive e-leadership conceptualization is developed with new empirical findings illustrating what makes e-leadership successful and how it contributes to SMEs' success. From practical point of view, our research allows SME leaders to diagnose the effectiveness of their e-leadership. This helps to exam SME's level of business-IT alignment including strategy, infrastructure, innovation, skills and roles, communication and marketing. The e-leaders will be able to adjust their strategy and way of management according to the diagnostic model. This also provides an end-to-end perspective on how SMEs can maximize technological potentials to improve business competitiveness and growth at different stage of their life cycle.

This chapter is structured as follows: section "E-leadership: An Emerging Profession" reviews the leadership development with the evolution of enterprise social systems. Section "A Theoretical Examination of E-leadership in Business and IT Alignment" introduces OS and strategic alignment theories in examining e-leadership concept, followed by our theoretical proposition in section "An E-leadership Model for Small and Medium Enterprise". The data collection process is illustrated in section "Data Collection". Then section "Empirical Findings" presents our empirical findings. We synthesize our findings into an integrative e-leadership diagnostic model to illustrate how different factors contribute to business and IT alignment. Finally, section "The Integrative E-leadership Diagnostic Model" summarizes and discusses our results, contribution, and future study.

E-leadership: An Emerging Profession

Leadership is about the leader's ability to mobilize followers toward a particular goal. Based on behavioral types, leaders are divided into two categories: transactional or transformational (Ke and Wei 2008). Transactional leaders are sensitive to the needs of others, who follow them in return for the

satisfaction of these needs (Jung and Avolio 1999; Waldman et al. 2001). By contrast, transformational leaders are those who are capable of having profound and extraordinary effects on followers by the force of their personal abilities (House 1971). Based on followers' emotion, transformational leaders motivate their followers to efforts that "go above and beyond" the instrumental returns promised/delivered by transactional leaders (Klein and House 1995; Podsakoff et al. 1997).

The emergences of enterprise systems and social technology have changed the rules of the game to the point where the leadership needs to co-evolve with the development of the organization. The enterprise system has brought changes of transaction data sharing and the organization-wide business process integration. The recent enterprise social system aims to deliver boundaryless organizational structures and collaborative business environment. Leadership plays an important role in the successful adoption of enterprise systems and social technologies. The following sections offer an overview of enterprise systems and enterprise social systems, with the focus on the role of leadership. The e-leadership concept will be then introduced as the result of co-evolution with the organizational change of brought about by digital technologies. These form the basis for our theoretical propositions and empirical investigation.

Leadership in the digital age has morphed into "e-leadership" where a key leadership capability is concerned with effective use of informatics and digital technology. E-leadership is commonly defined as a social influence process mediated by advanced IT to produce a change in attitudes, feelings, thinking, behavior, and/or performance of individuals, groups, or organizations (Avolio et al. 2001). E-leadership takes shape in a virtual context where collaboration and leader-follower interaction are mediated by ICTs, and it aims to create and distribute the organizational vision, glue corporations or individuals together, as well as direct and supervise the execution of the plans (Avolio and Kahai 2003). It is not just extensions of traditional leadership but a fundamental change in the way leaders and followers relate to each other within organizations and between organizations. In general, e-leadership requires leaders to respond to competition rules of the digital age by creating a burning change platform and bridging the gap between what is stated and what is practiced (Annunzio 2001). The e-leadership requires an integration of a range of new knowledge and technologies into the business. Successful e-leadership is dependent on many facets, for example, knowledge, planning, finance, communications, agile response, and effective leadership (Liu et al. 2014). In this research, we scope e-leadership as the subset of the broad leadership definition. The following discussion on leadership in this chapter will focuses on the "e" part of the leadership—e-leadership.

Despite e-leadership's importance, the focus of the extant literature is distant communication with virtual teams and communication skills in the technology-mediated environment (Avolio et al. 2009; Malhotra et al. 2007; Gurr 2004). There is a paucity of research examining e-leadership characteristics that enhance competitiveness in the digital age. The concept of e-leadership remains vague as most researchers mistakenly regard it as the "virtual leadership". E-leadership is most studied as the management of distributed working teams whose members predominantly communicate and coordinate their work through the electronic media (Kerfoot 2010). Leaders' behavior in the geographic distance is also studied to see if the traditional core set of leadership behaviors is effective in the distributed working environment and how those behaviors impact the team's performance (Watson 2007). Erroneously, it is also assumed that e-leadership and virtual leadership are predominately relevant for international large companies, but in reality e-leadership essential for almost any business that strives to grow and expand, especially for small and medium enterprises (Shriberg 2009). The major gap in e-leadership research lies in the alignment thinking between business and IT.

To address this gap, the aim of this chapter is to develop an e-leadership diagnostic model focusing on how leadership in SMEs leverage business and IT alignment to unleash the potential capabilities of the business. Given a rather limited theoretical foundation for e-leadership, we adopt OS as the theoretical foundation of our diagnostic model. A new theoretical insight into how e-leadership affects the business system and technical system in SMEs will be proposed based on the semiotics theory. The business and IT alignment model is also used to illustrate the morphology of the alignment in different stage of SMEs' growth. We adopt a design and qualitative research methods to address these challenges. A preliminary theoretical model for e-leadership is proposed. Furthermore, we conduct interviews with 41 SMEs in five European countries across different industries (including ICT and non-ICT SMEs) as a part of the LEAD project (LEAD 2014). The project targets start-ups and fast growing SMEs to provide them with relevant e-leadership skills and qualifications for entrepreneurs, managers, and advanced ICT users that are transnationally recognized. Along with our international partners, we have analyzed and interpreted the data that we collected by applying an in-depth analysis, and integrated our empirical findings with prior theoretical models within a novel diagnostic e-leadership model with the focus on business and IT alignment.

A Theoretical Examination of E-leadership in Business and IT Alignment

Understanding of E-leadership in Enterprise Social Systems from Organizational Semiotics

Little has been found as a theoretical foundation for the emerging e-leadership concept, especially for how e-leadership manages the relationship between business and technology in an organization. Avolio et al. (2001) employ an adaptive structuration theory to study how technology and organizations could influence each other. Although it forms a basis of co-evolution of e-leadership and technology in organizations, it fails to explicitly provide an insight as how business and technology can be aligned through e-leadership. This poses a real challenge to developing a comprehensive conceptualization of e-leadership to improve business competitiveness. From the practical point of view, there is a lack of normative theory guiding SMEs' to success in the digital age.

OS is the study of organizations using the concepts and methods of semiotics. OS is based on the fundamental observation that all organized behavior is affected through the communication and interpretation of signs by people, individually and in groups. OS provides new and insightful ways of analyzing, describing, and explaining organizational structure and behavior, including e-leadership, an emerging phenomenon.

From the perspective of OS, an organization is IS where information is created, transmitted, processed, and utilized to perform business. The organization is also a social system in which people behave in an organized manner by following certain norms. The organization is able to provide services and perform functions that are determined by the organization's capability (i.e. affordance). Most of these service capabilities and functions are explicitly defined and described to characterize the organization externally to potential customers and markets. These service capabilities, functions, and behaviors are regulated or governed by explicit norms (e.g. business rules), and are formalized activity or behavior. Within the whole range of formalized organizational behaviors, some services and functions are mechanistic and can be automated by computer-based systems. In such cases, technical solutions or automatic systems can be employed to perform these functions instead of humans. A semiotic approach suggests that the IT system is an element of the formal part of the organization; the formal part is, in turn, part of the total organization (Liu 2000; Stamper 1973). In this way, IT is seen as part of the

entire organization and should be subject to the formal and informal aspects of the organization. The organizational morphology can be described by the organizational onion (Stamper 1973) as shown in Fig. 17.1.

The Informal IS From the perspective of informal system, the whole organization is a social system where organizational culture, customs, and values are reflected as beliefs, habits, and patterns of behavior of each individual member. The informal system has an overall influence on the whole organization. First, it is the foundation where organizational vision and objectives are formed. These derive a framework of reference which guides the beliefs, habits, and patterns of behavior of each individual member. A healthy organization would possess a cohesive culture and personal beliefs. The informal IS is a sub-culture where meanings are agreed, intentions are understood and beliefs are formed. Commitments with responsibilities are made, altered, and discharged in this context through negotiation, discussions, and physical actions. The informal IS in SME forms culture, personal beliefs, and patterns of behavior across the organization. The coherence between personal values and believes with the organizational vision, goal, and strategies is necessary for the success of an SME.

The Formal IS Inside the informal system, there is the layer of the formal part of the organization (i.e. the formal IS) where formalized bureaucracy plays a dominant role. Rules and procedures are created to replace meanings and intentions. The rules, procedures, and business processes specify how the work should be conducted. The formal subsystem in SMEs shape the organizational structure, business processes, formally defined roles and responsibility within the organization.

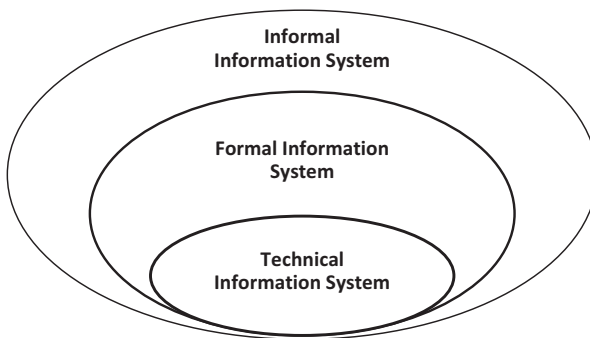


Fig. 17.1 The organizational onion model

The Technical IS The technical system, mostly a computer system or ICT technology, is placed inside the formal system layer. The technical system can be programmed according to rules. It automates some of the functions and procedures; and therefore the computer applications in fact replace human functions and capabilities, hopefully as originally intended and designed. The technical subsystems of SMEs, especially in the digital age, are critically important because they are the key to improved productivity and efficiency. The automated system also improves the quality of the product and services, and hence is critical for an SME's strategic competitiveness.

In a summary, the technical system pre-supposes a formal subsystem, just as a formal system relies on an informal system. Therefore, the informal system, the social and cultural aspect of an organization, will have an overall impact on the formal and informal subsystems in an organization. The success of the organization rely on the strategic alignment between technology (technical) and business function (formal), where e-leadership is essential for the alignment of these two subsystems.

Strategic Alignment of Business and Information Systems

Alignment between business and IS strategies is essential in realizing the value from IS investment (Henderson and Venkatraman 1993), especially for SMEs maximizing business competitiveness and growth in the digital age. The notion of strategic alignment, builds on three central arguments (Hirschheim and Sabherwal 2001; Peppard and Breu 2003). First, organizational performance depends on structures and capabilities that support the successful realization of strategic decisions; second, alignment is a two-way process, where business and IS strategies can act as mutual drivers; third, strategic IS alignment "is not an event but a process of continuous adaptation and change" (Henderson and Venkatraman 1993).

Henderson and Venkatraman (1989a, b, 1993) propose a model that represents the dynamic alignment between the business and IS strategies, stressing the importance of both strategic and structural alignment. The aim of this model is to explicitly identify the range of strategic choices in an organization and their interrelationships. In particular, the strategic and infrastructure integration on both business and IS aspects constitutes key domains of this model. They argue that alignment should at least involve four domains of strategic choice (i.e. business strategy, organizational infrastructure and processes, IS strategy, and IS infrastructure and processes) and that effective management requires a balance among the choices made across all four domains, as illustrated in Fig. 17.2. There is evidence to suggest strategic planning and alignment enhances SMEs competitiveness (O'Regan and Ghobadian 2002).

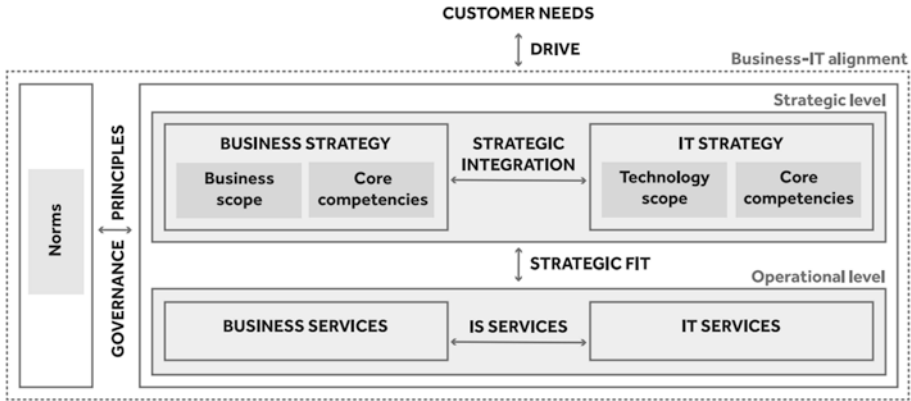


Fig. 17.2 Strategic alignment model

We selected the strategic IS alignment model as our starting point because its focus on the dynamic environment and process of adaptation offers a good fit with the current dynamic digital environment. On the other hand, we apply the organizational onion (see Fig. 17.1) to treat the organization as an integral social system. Therefore instead of a distinctive separation between business and IS, our work will propose a holistic strategic alignment model toward e-leadership.

An E-leadership Model for Small and Medium Enterprise

SMEs as the Integral and Aligned Social, Business and Technical Systems

The semiotic view of an organization as informal, formal, and technical systems allows a comprehensive analysis of how SMEs operate and transform using digital technology as an integral enterprise social system.

According to definition of e-leadership and organizational onion (Fig. 17.1), the influence of e-leadership on the whole SME usually starts from informal IS of the organization. E-leadership does exert a significant influence on organization's attitude, behavior, and value with regard to ISs. Therefore, e-leadership constitutes the prerequisite for the effectiveness across the entire SME including culture, business processes and technical systems. The changes of culture and strategy induced by the e-leadership in the new digital age lead to the corresponding adaption and innovation of services and processes as well as

the roles and responsibilities. The formal system further offer possible functions that the technical system can perform in order to support daily operations as well as improve business competitiveness. In turn, the introduction of new technologies, hardware, software as well as advanced infrastructures (e.g. cloud computing) will stimulate new initiatives (e.g. new services and procedure) to improve business process and innovative services in the formal system. Therefore, such organizational morphology promotes an organic interaction amongst the leadership (informal), business (formal), and IT system (automated system) where the strategic alignment between business and IT is effectively achieved through e-leadership by promoting culture and IS strategy for decision making, changing behavior and thinking (individual and groups) toward better performance and competitiveness in the digital age.

Applying the OS organizational morphology and adopting the alignment modes (i.e. business-IT strategy alignment and mechanism alignment, Fig. 17.2), a set of recommended features for e-leadership in SMEs are put forward.

Business Strategy and Informal Part of the Organization as Social System (Shown in Table 17.1) The organizational strategy and values must be understood and shared in the company. E-leadership must be able to bring the business strategy and informal part of the organization on board when making decisions such as product-market offering and the strategic differentiation of the firm from its competitors, as well as decisions of insourcing versus outsourcing (or make-versus-buy), selection of partnerships, and alliances.

Organizational Infrastructure and Formal Subsystem (Shown in Table 17.2) This part mainly defines the organizational structure and governance, and the rationale for the design and redesign of critical business processes (product delivery, product development, customer service, total quality), as well as the acquisition and development of the human resources skills necessary for achieving the required organizational competencies.

Table 17.1 Business strategy and informal subsystem

Business scope	Deals with choices pertaining to product-market offering in the output market
Business competence and differentiation	Attributes of strategy (pricing, quality, value added service, superior distribution channels) that contribute to a distinctive, comparative advantage to a firm over its competitors
Marketing and partnership	Make versus buy choices in business strategy. Such choices cover a complex array of inter firm relationships such as strategic alliances, joint ventures, marketing exchange, and technology licensing

Formal and Technical Subsystems (Shown in Tables 17.3 and 17.4) A subset of the formally defined part of the organization can be replaced by automated IT system. In this part, e-leadership is important in the formation and implementation of IT strategy and infrastructure.

A Diagnostic Model of E-leadership for SMEs

SMEs tend to be organic in the development of informal strategic thinking and leadership, and the management structure is often built around a small management team (Nguyen 2009; Hutchinson et al. 2006) and the IT systems. E-leadership is usually held informally by one of the directors in the team without an explicit definition. Therefore, a focus on strategic IS alignment thinking in SMEs is more appropriate than concentrating only on IT requirements.

Table 17.2 Organizational infrastructure and formal subsystem

Business structure and governance	Deal with roles, responsibilities, and authority structures
Organizational processes	Business processes design/redesign to support and shape the ability of the firm to execute business strategy
Functions and skills	Functions and skills required within the business domain to execute strategies, and offer products and services

Table 17.3 IT strategy and formal subsystem

Information technology scope	Specific information technologies, for example, cloud computing that support current business strategy initiatives or could shape new business initiatives
Systemic competencies	The attribute of IT strategy (e.g. connectivity of IOT, analytics from big data) that could contribute positively to the creation of new business strategies or better support of existing business strategy
IT governance	Mechanism (e.g. joint ventures with vendors, strategic alliances, joint research, and development for new IT capabilities) for obtaining the required IT competences

Table 17.4 IT infrastructure and technical subsystem

IT architecture	The portfolio of applications, the configuration of hardware, software, and communication, and data architecture that collectively define the technical infrastructure
IT processes	Computerized processes that can support business processes; the work processes central to the operations of the IS infrastructure such as system development, maintenance, and monitoring and control
IT skills	The acquisition, training, and development of the knowledge and capabilities of the individuals required to effectively manage and operate the IS infrastructure within the organization

SMEs are generally regarded as flexible organizations that can respond quickly to customers' requirements and to the changing environment in the digital age. However, such flexibility does not naturally extend to IS adoption (Levy and Powell 1998, 2000; Cartman and Salazar 2011; Scholz et al. 2010); and neither does it to the innovation capable of improving business competitiveness. Therefore, SMEs that fail to consider alignment between business needs and IT are unlikely to gain full business benefits (Levy et al. 1998; Cartman and Salazar 2011). Another reason is the failure to recognize the need for change in business services, organizational and management structures after IT adoption and innovation. Hence, the e-leadership needs to take a more strategic IS alignment view in managing changes in SMEs.

We therefore propose a diagnostic e-leadership model based on the organizational onion and IS strategic alignment theory. The diagnostic model identifies e-leadership factors and their relationship across informal, formal and technical systems in SME. The focus of this model lies in how these factors drive the business and IT alignment. Four theoretical propositions are provided as the basis for the subsequent empirical study in section "Data Collection". The rationale for proffering these propositions are made clear in section "Data Collection".

Proposition 1 The e-leadership should be able to execute the business strategy in organizational infrastructure with the supporting IS infrastructure—effective strategy execution (show in Fig. 17.3).

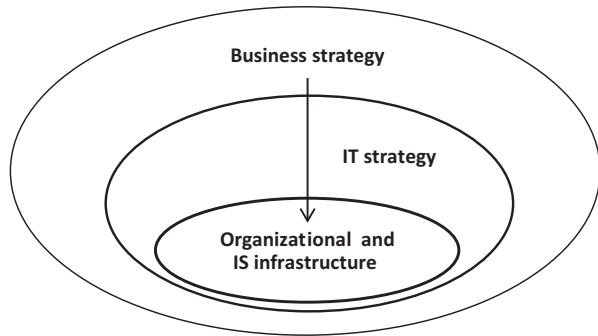
Specifically, management leaders (CEO) in SME should play the leading role of strategy formulator to articulate the logics and choices in organizational infrastructure pertaining to business strategy. The e-leader should play the role of strategy implementer who designs and implements the required IS infrastructure and processes that support the chosen organizational infrastructure (formal) and business strategy (informal) (Ghobadian and Gallear 2001).

Proposition 2 The e-leadership should deliver effective impact of business strategy on IT strategy and the corresponding implications for IS infrastructure and processes—technology transformation to support strategy (show in Fig. 17.3).

This is related to the capability to identify the best possible IT strategy and competence, and accordingly the IT infrastructure. The management leaders are responsible for business strategy while the technology leader can act as the technology architect to lead the design and implementation of the required IS infrastructure (e.g. scope, competencies, and governance). This e-leadership is to ensure the ability of SMEs to move quickly to acquire technology and achieve the competencies necessary for the realization of the strategy.

Proposition 3 The e-leadership should exploit the merging IT capabilities and IT strategy to impact competitive business strategy and lead to proper changes in organizational infrastructure—competitive potential and innovation (show in Fig. 17.4).

Proposition 1:
Business strategy to manage organisational infrastructure



Proposition 2:
Business strategy for technology transformation

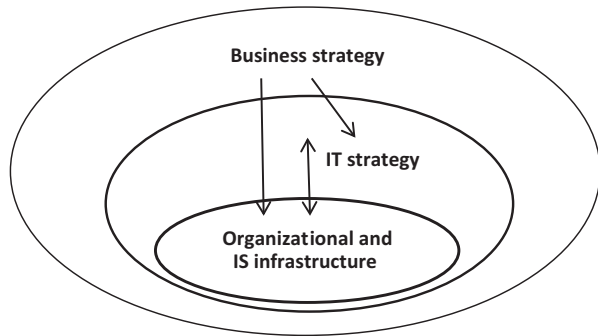


Fig. 17.3 E-leadership of strategy execution and technology transformation

Proposition 3: & 4
E-leadership as a tool of winning a competitive advantage and exploit in efficient operations

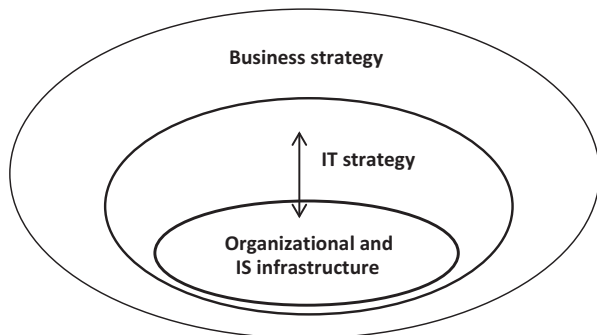


Fig. 17.4 E-leadership of competitive potential and service innovation

Specifically the impact on competitive potential in business strategy includes innovative products and services and the changes involve the new form of business governance. The e-leadership should drive the adaptation of business strategy via emerging IT capabilities and identify the best set of strategic options and the corresponding set of decision pertaining organizational infrastructure and processes.

To make SME succeed, the leaders should have business vision—the ability to articulate the relationship between the emerging IT capability and business practice in view of the set business strategy. On the other hand, they should provide the leadership to identify and interpret the trends in the IT environment to assist the business managers to understand the potential opportunities and threats from an IT perspective.

Proposition 4 The e-leadership should ensure IS strategy brings about effective changes of IS infrastructure and processes in order to support the operations of core capabilities of the organization—efficient operation (show in Fig. 17.4).

The leaders need to be able to identify how best to allocate the scarce resources both within the organization and the market place according to customer requirements. They should also identify the specific structure and governance to ascertain the internal services function effectively within the organizational infrastructure (Buchwald et al. 2014) (e.g. the fit between organizational structure and business processes on the one hand and the IS such as ERP, CRM, and SCM on the other hand).

Summing up, the diagnostic e-leadership model based on the organizational onion and IS alignment theory offers guidelines for defining effective e-leadership and its impact on business competitiveness. However, these diagnostic factors and their relationship in SMEs have rarely been empirically analyzed and tested. Thus, we believe that this model and propositions could be validated and refined by a broader and more in-depth exploration which we have conducted in this study with SMEs in different sectors (e.g. ICT and non-ICT) in Europe.

Data Collection

Research Approach

An exploratory approach through interviews with SMEs leaders is adopted in this study. The aim of the data collection is to look for empirical evidence on how e-leadership drives SMEs to success. The selection of SEMs for interviews

is based on several criteria: (1) Size of SMEs: firm with 10–250 FTEs employees as well as micro enterprises (<10 employees it is exceptional, e.g. innovative business model and potential market) (2) Types of SMEs: for sufficient variation across the industry domains and IT/business structure and to avoid any bias, we have SMEs from both ICT and non-ICT sector. (3) Maturity stage of SMEs-gazelles (OECD 2010): “enterprises which have been employers for a period of up to 5 years, with average annualized growth in employees (or in turnover) greater than 20 % a year over a three-year period and with ten or more employees at the beginning of the observation period”. (4) Successful SMEs can be gazelles or be recognized by a well-regarded third party as successful (e.g. Thames valley 100 best SME unveiled in Business Magazine in UK). These four criteria were approved by the Academic Consortium and the European Commission who have sponsored this research. The reason we focus on successful SMEs is that we aim to explore the best practices when building the diagnostic e-leadership model with the successful companies that are aware of e-leadership and use it in their business to contribute to their business competitiveness and growth.

Data Collection

Forty-one EU SMEs were identified initially as potential candidates for the study, but 32 companies met the criteria and therefore were included in the study. These SMEs are from four EU countries: UK (12), Spain (9), Netherlands (6), and Denmark (5). We excluded nine SMEs in Bulgaria from the analysis due to poor data quality and vague understanding of e-leadership. We aimed to interview the top managers (CIO, CTO and CEO, IT directors, deputy CEO), since they are responsible for the IT and digitalization strategy. However, drawing on the concept of theoretical replication (Yin 2009; Buchwald et al. 2013), we tried to achieve sufficient variation across the organizations with respect to industry, size, IT/business structure, and IT/business strategy to avoid bias in this regard. We have one IT SME out of five SMEs in Denmark, one out of six in the Netherlands, five out of nine in Spain, five out of twelve UK, and three out of nine in Bulgaria. These companies range from different fields and industries (details in the Appendix B).

Forty-one interviews were conducted between February and May 2014. The interview protocol consisted of five main parts: background and overview of the successful SME, demand for e-skilled professionals, overview of a significant innovation from the past-year, future demand for e-leaders and engagements with educational institutions, resulted in 24 questions (as seen in Appendix A). We pre-tested the interview protocol by having extensive discussions within the Academic Consortium. Before the interviews,

pilot interviews were conducted in February 2014 with both IT and non-IT companies to test the understanding of and relevance of questions and e-leadership model. We conveyed the length of the interview (i.e. 1.5 hour) to the interviewees beforehand, thus addressing their time constraints and increasing the likelihood of cooperation. During the interviews, we compared the interviewee's understanding with our initial e-leadership definition and steered the conversation in the right direction in the protocol.

Empirical Findings

In the next four sections, we draw on interviewees' responses to delve more fully into our four propositions of e-leadership with respect to:

1. Effective strategy implementations,
2. Innovation and competitiveness,
3. Strategy alignment, and
4. Efficient process operation.

Ten major findings are discussed to support the propositions.

E-leadership Toward Effective Strategy Implementation: Proposition One

Finding 1: E-leaders should foresee and drive the readiness of organizational and IS infrastructure for SMEs in order to have the agility to implement business strategy and changes (e-readiness).

From the interviews, in a successful SME, e-leader was expected to play an important role in strategy implementation. In particular the ability to proactively ready the organization to take full advantage of digitization was cited by most of the interviewees. E-leaders should be proactive and foresee the changes of organizational infrastructure toward e-readiness for business strategy implementation. Preparing organizational and IT infrastructure, including processes reengineering, architecture development, and development of employee skills, may take place in the SME even before the technologies come out and the business strategy is developed. E-leaders play an important role in driving this readiness.

Equipping employees with skills required by the future strategic direction was considered important to success by interviewees. For example, a software firm alluded to the importance of investing in training and development

preparing and equipping staff to take advantage of future technologies. The firm supported and encouraged IT staff to attend international conferences and in-house training (seminars) to equip them with the necessary IT and marketing skills with regard to forthcoming technology and strategy. This investment in people is seen as important in maximizing the value in the future especially when related IS strategy is implemented. Foreseeing and designing IS infrastructure including IT skills, architecture, function, and processes are another focus of e-leaders to make SME ready for change. For example, one SME proactively works in association with a number of freelancers to develop the design of the IS infrastructure for them. Although these efforts for e-readiness increase the workload prior to the implementation of business and strategy, it leverages the contingencies and enables effective execution of business and IS strategy well in advance.

Finding 2: E-leaders should identify proper IT governance mechanism to acquire IT skill/knowledge and build up IS infrastructure for SMEs.

A robust IS infrastructure is recognized as an important aspect in SME while a proper IT governance mechanism will help to gain knowledge that needed to build up IT infrastructure. Alliance or joint venture where SMEs and collaborators jointly develop IS infrastructure appears to be an effective IS governance approach helping SMEs to support business strategy and competitiveness. For example, an IT SME that specialized in cloud computing, data analytics, and social media, exchange shared IS infrastructure with a knowledge service provider through a joint venture. They complement each other's capabilities in building up a robust IS structure where the joint venture produce more value than a single SME with limited resources.

It is also important to obtain IT skills for SMEs especially in the digital age. How to obtain it efficiently and fit for the purpose of business strategy becomes a common question especially for SMEs. IT governance has been mentioned by interviewees when it comes to SME's skill acquisition.

First, strategic alliance with academics offers an effective governance route for SMEs enabling them to obtain IT and organizational knowledge and skills. Many SMEs have ties to universities and actively are engaged in knowledge transfer partnerships, student placement, and joint R&D. For example, a CEO from SMEs formed a strategic alliance that enables marketing and semantic technology exchange via knowledge transfer partnership with a University. This proved to be effective IT governance approach for this SEMs enabling to overcome its resource constraint and effectively acquire the necessary know-how.

Second, purchasing or employing people with the required competencies are an alternative strategy to acquiring know-how. Some e-leaders, particularly those working in SMEs, prefer to buy IT skills by employing highly qualified

staff with Masters or PhD, or cooperate with professional bodies (e.g. BCS in UK). Third, another way for SMEs to obtain IT know-how is training. The interviews suggest that SMEs use both in-house and external forms of training. SMEs in ICT Services cite ICT Management as the type of training they would most be willing to invest in over the next two years. ICT management trainings that were found most useful include Enterprise Architecture, ICT governance, and ICT Management. In contrast, SMEs from other sectors would most be willing to invest in training on business development, sales, and marketing.

With regard to constraints in participating in training, content, time, costs, and scheduling are the top four constraints cited by ICT service enterprises, whereas cost and content are top factors constraining enterprises not in ICT Services from investing in training offered by local educational institutions.

Finding 3: Technological leadership with an architectural view will enhance decision making on partnership and marketing to support the business strategy.

The majority of SMEs formed alliances with external partners, especially where enterprise architectural issues were considered important. IT architectural view was considered by many e-leaders (either in IT or non-IT sector) as an effective way to build up business governance. The combination of IT architecture (technologies, functions, hardware, data communications) and organizational infrastructure (organizational structure and processes on top of the IT architecture) will inform what is needed and how they work together to support business strategy.

Therefore, IT architecture delivers an architectural view in helping SMEs to forge a value network. A number of applications in areas such as production, supply management, sales, and customer management and data management (engineering, entitlements, supply management, contract enforcement, supply, and data management) cover an array of complex inter- and intra-firm relationships. E-leaders' architectural view will guide the formation of each relationship within and outside SMEs. For example, an SME in software governs their business through project developers (project sponsor) plus an IT team working together both within SMEs and outreaching external partners. The e-leader, working with CEO, created an architectural portfolio including business applications, data architecture and technical infrastructure, and personnel-related to the project. The way of governance is according to the architectural view of the projects on what is needed and how the internal team and external partners work together.

Finding 4: E-leaders should foresee the shift of roles/skills of technological leaders toward more management.

The interviewees pointed out that more of the IT staff could become e-leaders provided they possessed the capacity to understand the business problem and clients' needs, and the ability to transform this request using solution expertise. Helping customers to identify a problem and solve it using technological creativity and experience is more and more important. Therefore, the distinction between managerial leaders and IT leaders is likely to disappear over time. Managers regardless of speciality—general or IT—in both IT need to understand the problems that customers face and offer appropriate solution in terms of new or modified products, services, or processes. Therefore, managers need to be able to not only approach people with flexible and good communication skills, but also work closely with product developers. For example, a CIO from a SME in financial service mentioned that: “There could be a conflict of interest with middle managers and chief analysts. The chief analyst’s role is changing from pure data mining to confronting and comparing the data from various sources according to customer’s requirements. Most of the time, analysts could be faster than business middle managers to deliver solutions by working with customers with a better technological knowledge”. Therefore technical leaders with organizational and IT skills could work more broadly so that they offer wider solution choices for clients on how they want the solutions/products to be designed, monitored, and controlled. “Compiling data, technology application and analysis, writing up a report is secondary, but formulation and negotiating a strategy to articulate logically the best business choices becomes primary”, the CIO concludes.

Finding 5: Hybrid management, market, ICT and industry specific skills are essential for e-leaders.

The e-leaders are not necessarily an expert in technology with hands-on skills in technology or business, but they must be an independent learner and thinker with hybrid skills. The combination of management, market, ICT, and industry-specific skills are seen to be essential for “hybrid e-leaders” who could take more responsibly, be ready to lead organizational change and practices. It is about both knowledge and personality that requires e-leaders to keep learning and to lead the change.

A CEO from a SME in software says, “effective e-leaders get creative at work, find solutions, expertise, knowledge, be alert at all times, thinking who can they talk to as customers”. “This is something as ‘magic dust’ – a combination of skills, experience and team work that enables innovation and creative solutions”, a CEO of a SEM in IT solution adds. E-leaders need to solve problems from different prospective including technology, its application to market needs, and new opportunities. In these problem-solving processes, creativity plays a bigger role in current environment that equipped with various IT technologies.

Training toward e-leaders is recognized important for most of SMEs and trainings for hybrid skills are most needed. An interviewee from an SME in IT solution says: “Arranging a training program that would cover various fields is important. For example it should start with simple things such as corporation tax, then you find out more on that and then you realize it is HR policies; lots of areas you need pulled together in one e-leader”. E-leadership training could start from junior level of IT, general knowledge skills, and even communication skills. This could also include how to meet and where to meet customers, diversity in cultures, how to ensure customers understanding, ability to speak the language (language courses), understanding a culture of the client where they work and be able to follow the culture. A CEO from SME in software confirms: “We get training on the internet of things, mobile app development, and data analytics but we are now more focus on training to mid-level IT managers to think bigger and more strategically. The training covers not only entrepreneurship and data analytics but also courses such as SWOT analysis, and business skills for technologists”. The hybrid skills with different specialization and fields could enable better adaptation of e-leaders to the newly changing digital age.

E-leadership to Align Business and IS Strategy: Proposition Two

Finding 6: E-leaders should have a good technology vision on how the technology competence best support business competences.

Strategic use of technology competence to enhance business competitiveness becomes first priority for most of SMEs in the digital age. An interviewee from SME in e-health emphasized that IT strategy must be closely embedded with business competence. The strategic use of IT enables the transition from manual functions to the integrated e-enterprise that equips SMEs with stronger competitiveness. A deputy CEO from SME in filming, broadcast, and photography says: “IT is strategically used in product development, design, setting up distribution channels round the world, licensing product distribution and control overseas. The use of IT needs to evolve with the development of technological competence as well as to be closely related to business strategy and marketing team in order to have a common understanding for SME’s competitiveness”. This is an important evidence to see how IT strategy could be aligned with and business strategies and embedded with SME’s competitiveness.

It is fully recognized that an IT strategy is the backbone of SME and it is IT director's (CIO) responsibility to align business and the IT strategy together and get it implemented. A CIO from an SME in aerospace and defense mentions: "Our business competitiveness is to provide right data at a right point to provide right decision support for customers. Our business competence closely relies on the combination of software and data analytics technologies that support customers' business processes." This SME aggregates large set of Boeing airlines data that can reach wider market information than airlines themselves. They provide this information to their customer (airlines) as the service to facilitate customers' supply management and contracts with high efficiency and lower cost. In this case, IT competences and their orchestration (architecture) collectively provide a powerful support for their business scope and competence. The CIO says: "we hold a unique position in the industry and are regularly getting acknowledged in the press from the customers (e.g. Air Canada, Air France, Bombardier, Cathay Pacific, Southwest Airlines). To maintain this position, we continuously need to update our technology competence and refine IT strategy to support business strategy, especially in the information-rich digital age". This shows e-leaders must have good technology vision on how the technology competence could best support business competences.

E-leadership to Drive Innovation in Business Competitiveness: Proposition Three

To survive in the competitive environment, e-leaders need to make full use of IT competence to introduce product/service innovation to improve business competitiveness. Innovation for SMEs in the digital age will come both with existing clients and conquer new markets.

Finding 7: E-leader should be able to identify new markets through effective use of technology competence (e.g. data analytics).

The effective use of market information is recognized as the first priority for e-leaders to identify and quickly conquer the new markets in the digital age. ICT could be used to create new products by relating it to potential niches in the markets. Data analytics and social media on the market and customers data are recognized by interviewees as the most important technology competence to identify new markets. In this way, large sets of data can be collected, processed, and analyzed to support the decision on marketing strategy. An SME in business intelligence identifies the innovation to build up business competence using data analytics. It builds up mobile app to access

the quality performance of automotive for car dealers all over the world. By utilizing existing big data analysis including data from Facebook, twitter, and other social media, it assists the business managers to understand the potential opportunities and threats in the automotive market. Another example is from an SME in fashion and beauty. They introduce social media technology, demand, and screen scraping techniques to build up a Beauty Blog that enables market research toward creative new and improved products. They have found a major gap in the market that has been ignored by the industry which becomes their major business competence as the innovative product. An SME in finance use cloud computing to develop innovative products such as an intuitive self-service website that enables users to view and pay their charges online in an integrated billing environment. This enabled them to enter small country markets such as Iceland, South Africa, and further expanding to Saudi while more operations turn digital.

It is recognized from interviews that e-leaders should act as the lean innovation manager who will be able to identify customer's value and value creating flow using ICT competences. The deputy CEO from an SME in lighting technology and systems states: "The best way to sell believed by our e-leaders is the word of mouth, especially with social media who can advertise and connect to customers. These are digital marketing techniques that engage with companies individually, find key influences to endorse, reduce price, look for someone to tweet, contact them and ask if they want to endorse a product". This is a vivid example of using ICT smartly for lean innovation.

In order to identify customers' value, e-leaders need to jointly work with existing and potential customers with effective communications. A CEO from an SME in software states: "our development managers start with market research and product design through speaking with customers and map ideas together. Joint work includes product developers, operations and maintenance OPS managers and sales team. The innovations are based on mobile technology, cloud computing and data analytics. We work closely with clients to define how to sell our product and deliver it to clients and we call it "Wow moment". Although lean innovation is a team work with customers, e-leaders should take the initiative on deciding who will be in the innovation team and what ICT capacity is to be used.

Finding 8: E-leaders should have the product leadership through integrate existing technology competence into innovative solutions to expand business competences.

Apart from making full use of the merging technology, the innovative orchestrations of existing technologies are recognized as another powerful way for SMEs to improve business competence. The CIO from an SME in air space highlights the future incorporation in the IT strategy of mobile technology, applications, internet of things with existing technology competences.

The combination of technologies and the role of product leadership in the business strategy are highlighted by the deputy CEO of an SME in broadcast. He says: “Product leadership and innovation may include up to 75–80 % of the total budget. This cost splits across application development, operations, maintenance, and customer intimacy technologies involved in the innovation cycle”. The same strategy has also been highlighted by other CIO and CEO from SMEs both in IT and non-IT industry.

This kind of innovation requires e-leaders to have the industry-specific architectural view to orchestrate technologies toward complex situation and provide customized solution. An SME in software has put the existing web technology together with cloud computing and mobile technology into an innovative solution to improve social care services for disable people. This innovative orchestration has pushed this SME as a leading company in the business area.

E-leadership for Optimizing Operations: Proposition Four

Apart from the strategic use of IT in e-leadership, e-leaders should also be able to use IT to enhance internal and external processes supporting SME’s operations and core capabilities across the whole value chain.

Finding 9: E-leaders should be able to utilize the technological competence to optimize internal processes for core operational activities.

One of the basic requirements for e-leadership has been highlighted as the effective use of technology to optimize organizational and IS infrastructure. The aim is to enhance the daily operation of SMEs. A CIO from SME in finance information highlights: “IT is used to increase production and to improve operation excellence. It improves the core processes for production through computerized processes. IT also enhances the connection with customers, increases the quality of customer service with better responsiveness (e.g. Facebook, Twitter and Salesforce software to exchange experiences, receive and respond to comments)”. This is how the IS infrastructure optimize the production process and “speak” to customers. Another example is a financial service SME who applies computerized processes of e-billing that can support business processes for their clients. As the CEO highlights: “IT is strategically used to increase efficiency and reliability, operations and administration processes in the enterprise and for clients. It increases flexibility and responsiveness, contact with customers in order to support the operations for core capabilities of our organization. All members of our company are using their IT and business expertise to deliver 100 % service in time through our IS infrastructure – this is how we optimize our operation in this digital age”.

It is highlighted by interviewees that e-leaders should identify the specific tasks of making the internal services succeed within the operating guidelines. A CIO from SME in business intelligence mentioned that: “On travelling we use desktop remote software and it helps us to manage business effectively and comply with a set of IT management standards. The identification of this specific improvement significantly improves the efficiency of business processes”. E-leaders also need to use IT infrastructure to allocate the scarce resource for business activities. CIO of an SME in education says: “Our IS infrastructure increase efficiency of education platform through enabling faster and more simplistic communication between lecturers, students and other learners who interact through attending virtual class”. In this way IT infrastructure bridges new features of sharing operational functions and improve the allocation of scarce time resources both within the organization and the customers.

Finding 10: E-leaders should know how to utilize technology to communicate better with customers.

In social marketing, the art of utilizing advanced IT technology to have better conversation with customers is recognized as a task for e-leaders to optimize business activities. The deputy CEO of SME in broadcast states: “Globally all e-leaders gravitate in this question: how do I have effective conversations, proper communication with customers in this digital age? How leaders use technology and multiple communication channels to support business activities? As e-leaders we aim to communicate and utilize technology to effectively improve business profile of our company. Future e-leaders need to understand how technologies help them to have a better conversation with customers (including digital tech skills and organizational skills), capture the marketing that customers via technology such as social media, webinars, and digital online feedback”. A good example from SME in education is the utilization of IT in customer intimacy/CRM through a “share-point” for information in a form of a dashboard, blackboard, and video conference. This will enable to reduce costs of operation processes and shape the ability of the firm to execute its business strategy.

The Integrative E-leadership Diagnostic Model

In this section, we synthesize the empirical findings from the 41 interviews based on the theoretical propositions of e-leadership. We define the diagnostic model by describing how the identified constructs are interrelated to each other and how they contribute to effective e-leadership for successful SMEs. The diagnostic model is built up with four aspects: strategy implementation,

technology transformation, innovation, and potential competitiveness as well as the efficient operation. The integrative e-leadership diagnostic model is shown in Fig. 17.5.

First, the e-leadership should proactively drive the alignment between business strategy, organizational infrastructure, and IT infrastructure (strategy implementation). This proactiveness means instead of passively adapting to organization and IT infrastructure, according to the given business strategies, the e-leaders should foresee the changes of environment and organization and ensure SMEs' readiness for the future. This can be diagnosed through the following perspectives:

1. Could the e-leader drive SME's e-readiness on both human (organizational infrastructure) and IT systems (IT infrastructure), including processes reengineering, architecture development, and development employee skills? (Finding 1)
2. Has the employees been prepared with knowledge and skills for the future strategy, or are there any plan/investment for related IT and organizational skills (Finding 1)

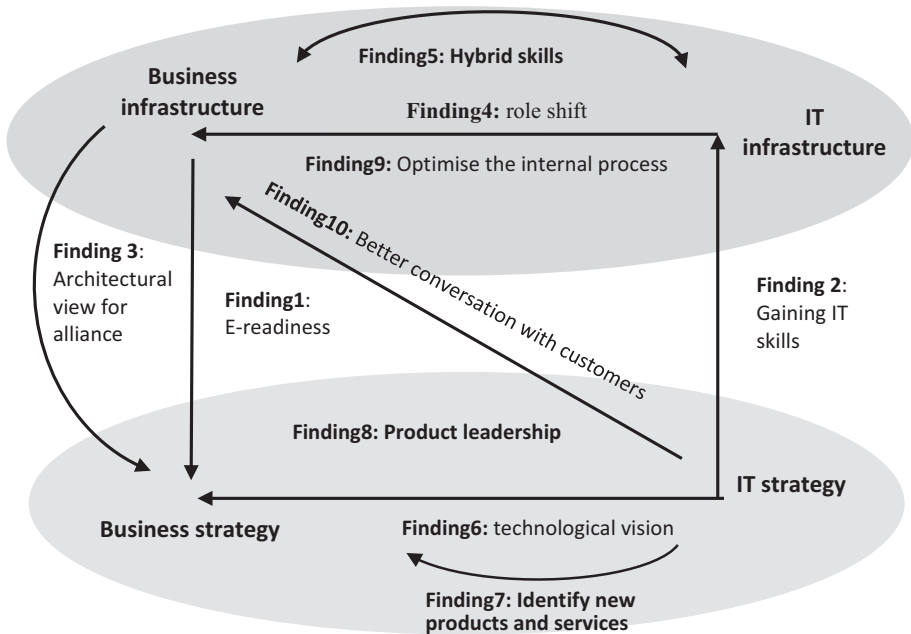


Fig. 17.5 The diagnostic model of e-leadership for SMEs

3. Has the leaders prepared themselves with hybrid skills (Finding 5)? Specifically it involves:
- Management and marketing skills: Analysis and understanding the technology potentials to meet new customer/business needed or building the vision to redesigning business and marketing strategies; management of relationship with external partners (e.g. IT infrastructure provider); management of data protection/privacy issues
 - ICT skills: understanding opportunities in technologies such as cloud computing, data analytics, social media, internet of things and mobile technology
 - Industry-specific skills: creativity in designing new products and services based on technologies
4. E-leaders should expect the shift of roles and skills of technology leaders with more business and management role. E-leaders should encourage staff (especially mid-level staff) to have business and IT combined skills that help customers to identify a problem and solve it using technological expertise (Finding 4).

Furthermore, the agile preparation of IT infrastructure is essential for SMEs to proactively react to the digital climate. Considering the resource constraints which challenges most of the SMEs, the e-leaders should be able to identify the proper IT governance mechanism to build up both human and IT infrastructure (Finding 2). The following perspective can be considered:

1. Jointly developing IT infrastructure through alliance and joint venture to compliment with partners for optimal technological capabilities.
2. Buy, hire, or train? E-leaders need to either rely on external service providers or hire new resources or train existing staff.

In addition, e-leadership needs to ensure an architectural view in building up strategic partnerships. An architectural view (both enterprise architecture and IT architecture) will help e-leaders identify a proper way to forge the inter- and intra-firm relationship by informing what is needed and how they work together to implement the business strategy (Finding 3).

Second, e-leadership should be able to identify the best possible technological competencies that could transform IT infrastructure to support the distinctive business competence (technology transformation). The e-leaders, especially for CIOs should have technology vision to ensure SMEs to move quickly to acquire technology and achieve the competencies that make differences with other competitors (Finding 6).

Third, the e-leaders should be innovation sensitive—making full use of IT competence to introduce product/service innovation to improve business competitiveness (innovation and potential competitiveness). This requires e-leaders not only be able to identify new market but also create new products by relating it to potential niches through effective use of the information (Finding 7). Specifically, this can be achieved through the following aspects:

1. The e-leaders should be able to identify the gaps of the markets in terms of both scale (e.g. undiscovered location) and the requirements (e.g. new product). Business analytics and social media is a major technique that can be used to discover these gaps.
2. The e-leaders should act as the lean innovation manager who will be able to identify customer's value and value creating flow using ICT competences. Digital marketing using social media is important in achieving this
3. Co-designing innovative product and marketing strategies with customers in order to identify customers' value. Effective communications with customers is important for e-leaders to define how to sell products and deliver it to clients.

Furthermore, e-leaders should possess product leadership through integrating existing technology capabilities into innovative solutions to expand business competences (Finding 8). This innovative orchestration requires e-leaders to have the industry-specific architectural view to orchestrate technologies in order to solve complex problem or provide customized solution.

Finally, the e-leaders need to ensure that IT infrastructure could enhance internal and external processes supporting SME's operations and core capabilities across the whole value chain (efficient operation). E-leaders should be able to utilize the technological competence and IT infrastructure to optimize internal processes for core operational activities. Specifically, the e-leaders should consider the following:

- Identifying specific tasks of making the internal services to optimize the operation process and succeed within the operating guidelines through IT infrastructure (ERP, CRM, and SCM).
- Using IT infrastructure to identify how best to allocate the scarce resources to meet customers' requirements through bridging new features of sharing operational functions
- Knowing how to utilize technological change to have better conversation with customers in social marketing.

Conclusions and Future Work

This chapter presents an insight into e-leadership for SMEs both from theoretical and practical perspective. While there are existing studies on e-leadership, none of them have provided theoretical insight into how e-leadership drives the successful alignment between business and IT, which is a challenge that most SMEs face in the digital age. We adopted OS and strategic alignment theories to construct the theoretical framework to examine how e-leadership impacts the organization as an integral social system. This advances the current theoretical understanding of e-leadership from the business-IT alignment perspective. Combining the theoretical and empirical findings, successful e-leadership of SMEs requires: (1) the capability of foreseeing the strategic changes and making sure SME's are e-ready in terms of organizational and IT infrastructure; (2) the capability of aligning business strategy with best technological competencies that could transform the IT infrastructure to support the distinctive business competence; (3) the creativity of exploiting IT competences to introduce product/service innovation, new ways of conducting business and establish new business (4) the capability of using IT infrastructure to make sure the efficient internal and external organizational process; (5) the capability of acquiring related skills and expertise in an agile way.

From practical point of view, we found that although SMEs try to develop in-house skills many of them rely heavily on outsourcing for ICT needs. They usually outsource their ICT expertise requirement to consultancies and other partner enterprises in the value chain. The training on the hybrid skills is most needed by SMEs.

Second, out of the five popular technologies we mentioned in the early part (cloud computing, internet of things, big data/analytics, social technology, and mobile computing); cloud computing, big data/analytics, and mobile apps development were most often identified as desirable. Moreover, the ICT management trainings that were found most useful include enterprise architecture, ICT governance, and ICT project management. Other skills mentioned included: communication skills, an understanding of customers and the markets, as well as change management and project management, business development, and sales and marketing.

Third, the e-leaders must have strategic management skills to develop the roadmap for business evolution and transformation. This involves strategic management of business and contractual relationships with partners (e.g. IT suppliers, subcontractor, and clients) over value chain/ecosystems, as well as

internal interaction between leaders (e.g. CIO) and business line managers. They also need an in-depth understanding of IT outsourcing issues and cost-benefits balance to make informed choices.

Fourth, e-leaders should have hybrid business and IT skills that involves strategic management of SME information and data flows. This requires the combination of business analytics skills (data scientist skills) with industry-specific skills, where data protection/privacy issues also need to be considered.

Finally the e-leaders should have an in-depth understanding of industry-specific business development opportunities driven by IT innovation. It may also require the combination of business analytics skills with industry-specific skills and understanding of IT innovation implications for business processes. The ability to use IT for customer-centered apps and services within specific industry will facilitate the innovation process.

All in all, our research will help e-leaders to assess the leadership and management in the digital age. Practitioners such as entrepreneurs and SME leaders will benefit from this model by diagnosing and guiding their leadership toward business competitiveness. The empirical findings gathered on the basis on e-leadership underpinning provide more comprehensive view of e-leadership in SMEs. Future research involves testing and further exploration of the e-leadership model with more details with regard to e-leadership morphologies in different maturity stages of organizations by means of a large-scale qualitative study (e.g. at least 1000 surveys). The large scale data collection and analysis will produce a deeper understanding of how the various factors relate to one and another in an integrated model with a dynamically evolving perspective of the organization.

Interview Protocol

Background and Overview of the Successful SME (About 1 Page)

Please note, *before the interview*, the interviewer may be able to gather much of the data for this section from the participating SME. In fact, it is strongly recommended collecting this data as soon as possible, as these data are important for selecting the best candidates.

- When and by whom was the SME founded?
- Where is the SME headquartered? Does it have units elsewhere? (if so, when were they established?)

- How many employees are there in the firm (for last three years)?
- What are the core products/services of the SME?
- In what sector does the SME provide those products/services?
- Who are the customers of the SME?
- Who would say you are successful and why (name the “well regarded third party”)?
- Has the SME’s growth in either employees or in turnover increased by 20 + % per annum for three years? (please note: it is OK if the SME has not experienced such growth and the SME is well regarded by others as successful)

Demand for E-skilled Professionals (1–2 Pages)

Overall uses of ICT

- Overall, how is ICT used strategically in your organization and who is responsible for those uses? Please consider processes related to the following strategic objectives
 1. Production/Operational excellence (e.g. using ICT to increase efficiency and reliability, low cost of operational and administrative processes)
 2. Customer intimacy (e.g. using ICT to increase flexibility and responsiveness, customer service, marketplace management)
 3. Product leadership/innovation (e.g. using ICT to create new products/ services, enter new markets)
- Is there an equivalent to a Chief Information Officer—that is, someone who is responsible for orchestrating application development, operation, and maintenance? Does your organization have an informal or formal ICT or Digitization strategy? If so, what is it and how was it developed?
- How is total spending (capital plus operations excluding depreciation) on ICT distributed across these three areas (in terms of percentages)?

Overall investments in ICT

- Overall, during the past year, what percentage of the ICT budget was spent on any of the following ICT and uses of ICT? For each ICT that you relied on, please briefly explain for what purposes your organization relied on it.

1. Mobility and Mobile Apps Development
2. Cloud Computing
3. Data Analytics (e.g. “Big Data”)
4. Social Media Technologies
5. The Internet of Things (IoT) (incl. Wearable Computing)

Roles and responsibilities

- Overall demand
 1. How many FTEs or organizations does your organization rely on for developing ICT applications? How many are long-term hires? Contracted for a specific period of time? External service providers?
 2. How many FTEs or organizations does your organization rely on for operating and maintaining ICT applications and infrastructure? How many are long-term hires? Contracted for a specific period of time? External service providers?
 3. How many FTEs or organizations does your organization rely on for using data to enhance operations, increase sales and/or improve the customer experience? How many are long-term hires? Contracted for a specific period of time? External service providers?
- Which skills were the most difficult to find? Why? Please consider the following technologies.
 1. Mobility and Mobile Apps Development
 2. Cloud Computing
 3. Data Analytics (e.g. “Big Data”)
 4. Social Media Technologies
 5. The Internet of Things (IoT) (incl. Wearable Computing)

Overview of a Significant Innovation from the Past Year (1–2 Pages)

- What was the most significant innovation that was realized during the last year? (please note, it could have started several years ago, however it needs to have been completed during the last year) How did it add value to the SME? (e.g. enhance competitively customer service; significantly reduce operational costs.)

- What was the process by which the innovation was developed?
- What role(s) did ICT have in the process? Did the innovation rely on any of the following ICT? If so, please explain, including the selection process.

1. Mobility and Mobile Apps Development
2. Cloud Computing
3. Data Analytics (e.g. “Big Data”)
4. Social Media Technologies
5. The Internet of Things (IoT) (incl. Wearable Computing)

- Who were the key leaders involved in the innovation process responsible for managing uses of ICT? What did they do during the process?
- How did your firm obtain advanced ICT skills for using any of the aforementioned technologies? Was it difficult to find any advanced ICT skills? (if so, please explain)
- Did you rely on partners, consulting services, or other external service providers to access the ICT skills needed for the innovation? (if so, please explain)

Future demand for e-Leaders

- Over the next two years, what kinds of leaders does your organization anticipate needing, with regard to using ICT to enhance its competitiveness?

Engagements with educational institutions

- Over the next two years, what kinds of training or education programs would you wish for you and your staff?
- Has the firm engaged with any education institutions to address skills gaps?

1. Do you use Executive Education?
2. Do you use Higher Education (academic)?
3. Do you use Professional Courses?

- In the future, would you invest in training to develop e-leaders? (please explain)

List of Companies Included in This Study

Country	Core products/services	Sector	Employees	Interview role
UK, Zaptext	Software system and web-based software platforms. Training and consultancy for software solutions	Software	5.00	CEO
UK, ebpSource	Consolidated electronic billing and payments, software solutions, consultancy, and e-billing support	Finance	25 (10 in UK and 15 overseas)	CEO, CIO, deputy CEO
UK Skillweb	Houndit core modules, smart task for care, delivery, security, and health; training and consulting	IT	30	CEO
UK, Urban Science	Software (market intelligence solutions; Service smart; Business management intelligence)	Software	50 (750 in 19 other countries)	IT director, CIO
UK, Eltoria secrets	Advertisement, packages for SMEs advertising blogs, and so on, and an online shop	Beauty and fashion	2	CEO
UK, System associates	Development technology for the central and local government (application for social care)	Software	16	Deputy CEO, CTO
UK, Blikbook	Educational platforms that enable faster communication in education	e-education	9	CEO
UK, Aspect Enterprise solutions	Data support and information solutions for trading; trade data analysis and producing analytical reports	Finance	100	CIO
UK, Virtually Free	Mobile apps to treat anxiety and spider phobia	e-health	3	CEO

(Continued)

(continued)

Country	Core products/services	Sector	Employees	Interview role
UK Apple world	Advanced LED lighting technology and systems	film broadcast	7	Deputy CEO, CIO
UK, Assuria	Configure operation system to enforce policy; log management SIEM; configuration assurance	IT	20	CIO
UK, Airinmar	Wide portfolio of services designed to deliver results in parallel to existing repair processes and systems	Airspace and defense	120	CTO
Spain 1	Management Consulting and Information Systems (Oracle)	IT Consulting	32	CIO
Spain 2	SAP technology consulting business	IT Consulting	215	CIO
Spain 3	Digital marketing	Marketing services	10	CEO
Spain 4	Technology consulting services, systems integration and managed service providers	IT Consulting	20	CIO
Spain 5	Security Area: Data Recovery Services	IT Consulting	12	Informatics director
Spain 6	Language training	Training	30	CEO
Spain 7	Provision of computers, electronic and telecommunication services	High tech	97	CIO
Spain 8	Settlement of industrial assets through an online auction portal and reverse logistics	Service	17	Development director
Spain 9	Platform of sale and purchase of tickets (events and performances)	Service	250	Product director

(Continued)

Country	Core products/services	Sector	Employees	Interview role
Netherlands (NL) 1	Learning solutions, areas of learning, (personal) development and communication	Training services and education	45	CIO
NL 2	Business consultancy	Business consultancy	<250	IT manager
NL 3	Nursery of trees: ground nursery (mostly for projects) container nursery (mostly to garden centers in Russia and Asia)	Environment	49	Managing director
NL 4	Facility management and real estate	Real estate	–	Management director
NL 5	A graphical company that provides a complete communication service to customers	Communication and IT	230	Executive manager
NL 6	Security solutions/ services	Security services	23	CIO
Denmark(DK) 1	Innovative Lighting Solutions	Non-ICT	18	CEO
DK 2	Sportswear, Sport-lifestyle	Non-ICT	130	CEO
DK 3	Stevedoring, Logistics	Non-ICT	49	CEO
DK 4	Online platform for apartment rental	Non-ICT	–	CIO
DK 5	Software development	ICT	86	CTO
Bulgaria(BG) Komfo	Service provider, market research, delivery solutions for social media marketing at scale	ICT	6	CTO
BG, Sirma ITT	Enterprise Management Platform for semantic data integration with content management	ICT	40	CIO
BG, Bul SI	Development of software systems, based on open source applications and tools	ICT	10	Technology director

(Continued)

(continued)

Country	Core products/services	Sector	Employees	Interview role
BG, XS Software	development, publishing and distribution of browser-based online games	ICT	10–50	CEO
BG, Nemetschek Bulgaria	software development and consulting services, IT marketing, customization	ICT	200	IT director
BG, ABC Design	web design and development agency	ICT	16	General manager
BG, eStat	Monitoring, impact assessment, developing and testing concepts and politics in society, business	Research	10	Technology director
BG, IntelDay Solution	Healthcare PR, Social Cause PR, Corporate PR, Public Affairs, Lobbying, Heritage Management	Public relations	11–50	Exec director
BG, GfK ROC Bulgaria	Survey data collection processing, formatting and presenting	Services	6	Director

Note: Companies in Netherlands (NL), Denmark (DK) and Spain are not disclosed
Source: European Commission e-Leadership Skills for Small and Medium Sized Enterprises (LEAD) project interviews

Bibliography

- ACCA. (2012). High-growth SMEs: Understanding the leaders of the recovery. <http://www.accaglobal.com/content/dam/accaglobal/PDF-technical/small-business/pol-tp-hgs.pdf>. Accessed Nov 2014.
- Akkermans, H., & van Helden, K. (2002). Vicious and virtuous cycles in ERP implementation: A case study of interrelations between critical success factors. *European Journal of Information Systems*, 11(1), 35–46.
- Al-Mashari, M., Al-Mudimigh, A., & Zairi, M. (2001). *Realizing IT value: The case of enterprise resource planning*. In: Proceedings of IRMA_2001.
- Al-Mudimigh, A., Zairi, M., & Al-Mashari, M. (2001). ERP software implementation: An integrative framework. *European Journal of Information Systems*, 10(4), 216–226.

- Annual report on small and medium-sized enterprises in the EU. (2011/12). http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/supporting-documents/2012/annual-report_en.pdf. Accessed 15 July 2014.
- Annunzio, S. (2001). *e-Leadership: Proven techniques for creating an environment of speed and flexibility in the digital economy*. New York: Free Press.
- Anyadike-Danes, M., Bonner, K., & Hart, M. (2011). Job creation and job destruction in the UK 1998–2010. Business innovation and skills department report. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/32244. Accessed 15 July 2014.
- Anyadike-Danes, M., Hart, M., & Du, J. (2013). *Firm dynamics and job creation in the UK: Taking stock and developing new perspectives* (No. 0006). University of Warwick, Warwick Business School, Enterprise Research Centre.
- Arham, A. F., Boucher, C., & Muenjohn, N. (2013). Leadership and entrepreneurial success: A study of SMEs in Malaysia. *World*, 3(5).
- Armstrong, C. P., & Sambamurthy, V. (1999). Information technology assimilation in firms: The influence of senior leadership and IT infrastructures. *Information systems research*, 10(4), 304–327.
- Avolio, B. J., & Kahai, S. S. (2003). Adding the “E” to E-leadership. *Organizational Dynamics*, 31, 325–338.
- Avolio, B. J., Kahai, S., & Dodge, G. E. (2001). E-leadership: Implications for theory, research, and practice. *The Leadership Quarterly*, 11(4), 615–668.
- Avolio, B. J., Sosik, J. J., Kahai, S. S., & Baker, B. (2014). E-leadership: Re-examining transformations in leadership source and transmission. *The Leadership Quarterly*, 25(1), 105–131.
- Avolio, B. J., Walumbwa, F. O., & Weber, T. J. (2009). Leadership: Current theories, research, and future directions. *Annual Review of Psychology*, 60(1), 421–449.
- Bardi, E., Raghunathan, T. S., & Bagchi, P. K. (1994). Logistics information systems: The strategic role of top management. *Journal of Business Logistics*, 15(1), 71–85.
- Bingi, P., Sharma, M. K., & Godla, J. K. (1999). Critical issues affecting an ERP implementation. *IS Management*, 16(3), 7–14.
- Bloch, M., Blumberg, S., & Laartz, J. (2012). Delivering large-scale IT projects on time, on budget, and on value. *Mckinsey insight & publications*. http://www.mckinsey.com/insights/business_technology/delivering_large-scale_it_projects_on_time_on_budget_and_on_value. Accessed 13 Nov 2014.
- Boynton, A. C., Zmud, R. W., & Jacobs, G. C. (1994). The influence of IT management practice on IT use in large organizations. *Mis Quarterly*, 299–318.
- Bruque-Cá'mara, S., Vargas-Sa'nchez, A., & Herná'ndez-Ortiz, M. J. (2004). Organizational determinants of IT adoption in the pharmaceutical distribution sector. *European Journal of Information Systems*, 13(2), 133–146.
- Buchwald, A., Urbach, N., & Ahlemann, F. (2014). Business value through controlled IT: Toward an integrated model of IT governance success and its impact. *Journal of Information Technology*, 29(2), 128–147.

- Cartman, C., & Salazar, A. (2011). The influence of organizational size, internal IT capabilities, and competitive and vendor pressures on ERP adoption in SMEs. *International Journal of Enterprise Information Systems (IJEIS)*, 7(3), 68–92.
- Cohen, J., & Schmidt, E. (2013). *The new digital age: Reshaping the future of people, nations and business*. Hachette.
- Davenport, T. H. (1998). Putting the enterprise into the enterprise systems. *Harvard Business Review*, 76(4), 121–131.
- Deloitte. (2012). DG enterprise—Doing business in the digital age: The impact of new ICT developments in the global business landscape market analysis & foresight scenarios report. http://www.iabeurope.eu/files/5313/6852/1955/2012-12_06_eu20study_market_analysis_and_foresight_scenarios_report_final_3.pdf. Accessed 15 July 2014.
- Deloitte. (2013). Doing business in the digital age: The impact of new ICT developments in the global business landscape Europe's vision and action plan to foster digital entrepreneurship. European Commission. DG Enterprise and Industry. <http://ec.europa.eu/digitalagenda/futurium/sites/futurium/files/futurium/library/Europe's%20vision%20and%20action%20plan%20to%20foster%20digital%20entrepreneurship.pdf>. Accessed 15 July 2014.
- Department for business and innovation & skills. (2013). Business population estimates for the UK and regions 2013. Statistical release. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/254552/13-92-business-population-estimates-2013-stats-release-4.pdf. Accessed 15 July 2014.
- Dong, L., Neufeld, D., & Higgins, C. (2009). Top management support of enterprise systems implementations. *Journal of Information Technology*, 24(1), 55–80.
- Ferneley, E., & Bell, F. (2006). Using bricolage to integrate business and information technology innovation in SMEs. *Technovation*, 26(2), 232–241.
- Fidelman, M. (2013). The rise of enterprise social networks. Microsoft white paper. <http://news.microsoft.com/download/presskits/enterprisesocial/docs/riseenterprisesocialwp.pdf>. Accessed 20 Oct 2014.
- Fox, S., & Amichai-Hamburger, Y. (2001). The power of emotional appeals in promoting organizational change programs. *Academy of Management Executive*, 15(4), 84–95.
- Gartner. (2010). Gartner reveals five social software predictions for 2010 and beyond. Analysts share best practices for embracing social networking at Gartner portals, content and collaboration summit 2010, 9–11 March in Baltimore and 15–16 September in London. <http://www.gartner.com/newsroom/id/1293114>. Accessed 20 Oct 2014.
- Ghobadian, A., & Gallea, D. (2001). TQM implementation: An empirical examination and proposed generic model. *Omega*, 29(4), 343–359.
- Ghobadian, A., & O'Regan, N. (2002). The link between culture, strategy and performance in manufacturing SMEs. *Journal of General Management*, 28(1), 16–35.
- Guimaraes, T., & Igbaria, M. (1997). Client/server system success: Exploring the human side. *Decision Sciences*, 28(4), 851–876.

- Gupta, M., & Cawthorn, G. (1996). Managerial implications of flexible manufacturing for SMEs, elsevier advanced technology. *Technovation*, 16(2), 77–83.
- Gurr, D. (2004). ICT, leadership in education and e-leadership. *Discourse*, 25(1), 113–124.
- Henderson, J. C., & Venkatraman, N. (1989a). Strategic alignment: A framework for Strategic Information Technology Management, working paper no. 190. Cambridge, MA: Center for Information Systems Research, Massachusetts Institute of Technology.
- Henderson, J. C., & Venkatraman, N. (1989b). *Strategic alignment: A framework for strategic information technology management*. Cambridge, MA: Center for Information Systems Research, Sloan School of Management, Massachusetts Institute of Technology.
- Henderson, J. C., & Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal*, 32(1), 4–16.
- Hirschheim, R., & Sabherwal, R. (2001). Detours in the path toward strategic information systems alignment. *California Management Review*, 44(1), 87–108.
- House, R. J. (1971). A path goal theory of leader effectiveness. *Administrative science quarterly*, 321–339.
- Hutchinson, K., Quinn, B., & Alexander, N. (2006). The role of management characteristics in the internationalisation of SMEs: Evidence from the UK retail sector. *Journal of Small Business and Enterprise Development*, 13(4), 513–534.
- Igbaria, M., Zinatelli, N., Cragg, P., & Cavaye, A. L. M. (1997). Personal computing acceptance factors in small firms: A structural equation model. *MIS Quarterly*, 21(3), 279–305.
- Jung, D. I., & Avolio, B. J. (1999). Effects of leadership style and followers' cultural orientation on performance in group and individual task conditions. *Academy of management journal*, 42(2), 208–218.
- Ke, W., & Wei, K. K. (2008). Organizational culture and leadership in ERP implementation. *Decision Support Systems*, 45(2), 208–218.
- Kerfoot, K. M. (2010). Listening to see: The key to virtual leadership. *Nursing Economics*, 28(2), 114–115.
- Klein, K. J., & House, R. J. (1995). On fire: Charismatic leadership and levels of analysis. *The Leadership Quarterly*, 6(2), 183–198.
- LEAD. (2014). E-Leadership skills for small and medium sized enterprises project. European commission, Directorate-General for enterprise and industry. <http://eskills-guide.eu/news/single-view/article/lead-e-leadership-skills-for-small-and-medium-sized-enterprises/>. Accessed 15 July 2014.
- Lee, G. G., & Bai, R. J. (2003). Organizational mechanisms for successful IS/IT strategic planning in the digital era. *Management Decision*, 41(1), 32–42.
- Levy, M., & Powell, P. (1998). SME flexibility and the role of information systems. *Small Business Economics*, 11, 183–196.

- Levy, M., & Powell, P. (2000). Information systems strategy for small and medium sized enterprises: An organizational perspective. *The Journal of Strategic Information Systems*, 9(1), 63–84.
- Levy, M., Powell, P., Yetton, P. (1998). SMEs and the gains from IS: From cost reduction to value added. In: T. Larsen, L. Levine, & J. DeGross (Eds.), *Information systems: Current issues and future changes*, IFIP 8.2/8.6, Helsinki, Finland, December.
- Liu, K. (2000). *Semiotics in information systems engineering*. Cambridge: Cambridge University Press.
- Liu, K., & Li, W. (2014). Organizational semiotics and business informatics. To appear in December 2014, Routledge.
- Liu, K., Belitski, M., & Li, W. (2014). Leading your company to high performance growth. E-Leadership strategies for SMEs driving innovation and competitive edge in digital integration. The Henley Accelerator High Growth Accelerator, Executive programme, 2014. http://www.henley.ac.uk/executiveeducation/cl-openedp/henley-accelerator/high-growth-accelerator/high_growth_accelerator_2013.pdf. Accessed 15 July 2014
- Loonam, J., & McDonagh, J. (2004). Principles, foundations, and issues in enterprise systems. In L. K. Lau (Ed.), *Managing business with SAP: Planning, implementation, and evaluation* (pp. 1–32). London: Idea Group Publishing.
- Lukács, E. (2005). The economic role of SMEs in world economy, especially in Europe. *European Integration Studies (European Integration Studies)*, 1(4), 312.
- Malhotra, A., Majchrzak, A., & Rosen, B. (2007). Leading virtual teams. *Academy Of Management Perspective*, 21, 60–70.
- Markus, L. M., & Tanis, C. (2000). The enterprise systems experience from adoption to success. In R. W. Zmud & M. F. Price (Eds.), *Framing the domains of IT management: Projecting the future through the past* (pp. 173–209). Ohio: Pinnaflex Educational Resources Inc.
- McKenney, J. L., Mason, R. O., & Copeland, D. G. (1997). Bank of America: The crest and trough of technological leadership. *MIS Quarterly*, 21(3), 321–353.
- McKinsey Global Institute. (2012). The social economy: Unlocking value and productivity through social technologies. McKinsey Report. http://www.mckinsey.com/insights/high_tech_telecoms_internet/the_social_economy. Accessed 20 Oct 2014.
- Naylor, J., & Williams, J. (1994). The successful use of IT in SMEs on Merseyside. *European Journal of Information Systems*, 3(1), 48–56.
- Nguyen, T. H. (2009). Information technology adoption in SMEs: An integrated framework. *International Journal of Entrepreneurial Behaviour & Research*, 15(2), 162–186.
- O'Regan, N., & Ghobadian, A. (2004). Leadership and strategy: Making it happen. *Journal of General Management*, 29(4), 76–92.

- O'Regan, N., & Ghobadian, A. (2005a). Strategic planning – A comparison of high and low technology manufacturing small firms. *Technovation*, 25(10), 1107–1117.
- O'Regan, N., & Ghobadian, A. (2005b). Innovation in SMEs: The impact of strategic orientation and environmental perceptions. *International Journal of Productivity and Performance Management*, 54(2), 81–97.
- OECD. (2010). High-Growth enterprises: What governments can do to make a difference, OECD studies on SMEs and entrepreneurship, OECD Publishing. <http://dx.doi.org/10.1787/9789264048782-en>. Accessed 15 July 2014.
- Orlikowski, W. J. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science*, 3(3), 398–427.
- Peppard, J., & Breu, K. (2003). Beyond alignment: A co-evolutionary view of the information systems strategy process. In twenty-fourth international conference on Information Systems.
- Podsakoff, P. M., Ahearne, M., & MacKenzie, S. B. (1997). Organizational citizenship behavior and the quantity and quality of work group performance. *Journal of Applied Psychology*, 82(2), 262.
- Purvis, R. L., Sambamurthy, V., & Zmud, R. W. (2001). The assimilation of knowledge platforms in organizations: An empirical investigation. *Organization Science*, 12(2), 117–135.
- Ramamurthy, K., & Premkumar, G. (1995). Determinants and outcomes of electronic data interchange diffusion. *IEEE Transactions on Engineering Management*, 42(4), 332–351.
- Roberts, B., Jarvenpaa, S. L., & Baxley, C. (2003). Evolving at the speed of change: Mastering change readiness at Motorola's semiconductor products sector. *MIS Quarterly Executive*, 2(2), 58–73.
- Sarker, S., & Lee, A. S. (2003). Using a case study to test the role of three key social enablers in ERP implementation. *Information & Management*, 40(8), 813–829.
- Scholz, P., Schieder, C., Kurze, C., Gluchowski, P., & Böhringer, M. (2010). Benefits and challenges of business intelligence adoption in small and medium-sized enterprises.
- Shriberg, A. (2009). Effectively leading and managing a virtual team. *The Business Review*, 12(2).
- Stamper, R. K. (1973). *Information in business and administrative systems*. New York: Wiley.
- Sun, L., Liu, K., Jambarid, D., & Michell, V. (2014, to appear). Evaluating business value of IT towards optimisation of application portfolio. *Journal of Enterprise Information Systems*. http://www.tandfonline.com/doi/full/10.1080/VARlu_mwL90
- The Standish Group International Inc. (2006). The standish group 2006 chaos report.
- Umble, E. J., Haft, R. R., & Umble, M. M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research*, 146(2), 241–257.

- Urbach, N., Buchwald, A., & Ahlemann, F. (2013). Understanding IT governance success and its impact: Results from an interview study. Proceeding of the 21st European conference on Information Systems (ECIS 2013), Utrecht, Netherlands. http://www.horvath_partners.com/fileadmin/horvath_partners.com/assets/05_Publikationen/PDFs/deutsch/E_European_Conference_2013_Understanding_IT_Governance_Buchwald_Urbach_eng.pdf. Accessed 16 July 2014.
- Vera, D., & Crossan, M. (2004). Strategic leadership and organizational learning. *Academy of Management Review*, 29(2), 222–240.
- Vmware. (2013). IT: Time to take the lead in creating business value with enterprise social networks. White paper. <https://www.vmware.com/files/pdf/socialcast/vmw-enterprise-social-network-value-whitepaper.pdf>. Accessed 20 Oct 2014.
- Waldman, D. A., Ramirez, G. G., House, R. J., & Puranam, P. (2001). Does leadership matter? CEO leadership attributes and profitability under conditions of perceived environmental uncertainty. *Academy of Management Journal*, 44(1), 134–143.
- Watson, K. D. (2007). Remote management: Traditional leadership behaviors in a contemporary work environment. (Unpublished doctoral dissertation). Manhattan: Kansas State University.
- Welsum, D., & Lanvin, B. (2012). E-Leadership skills vision report. Report to European commission. <http://eskills-vision.eu/fileadmin/eSkillsVision/documents/Vision%20report.pdf>. Accessed 15 July 2014.
- Willcocks, L. P., & Sykes, R. (2000). Enterprise resource planning: The role of the CIO and its function in ERP. *Communications of the ACM*, 43(4), 32–38.
- Wymenga, P., Spanikova, V., Barker, A., Konings, J., & Canton, E. (2012). EU SMEs in 2012: At the crossroads.
- Yin, R. K. (2009). *Case study research – Design and methods*. Thousand Oaks: Sage.
- Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). Research commentary-The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research*, 21(4), 724–735.

18

Digital Transformation of a Swiss Ski Destination

Nils T. Kohle

Ideas in Brief Digitalization is having an increasing impact on companies everywhere, and none more so than those in the travel industry. For example, according to travel industry experts, it is directly affecting hotels and other tourist accommodation that need to attract guests. The rise of digitalization raises many questions for the travel industry. This chapter focuses on the impact of digitalization on a ski resort and asks the following questions: what are the effects of digitalization on a skiing destination? How would such a destination cope with digitalization? And what would the ideal strategy look like? In a tourist center, every accommodation proprietor would very probably like to keep up with the changes in digitalization, as part of their marketing response. They can pursue this aim individually or with others. Objectively it would make more sense and give everyone more chance of success if they worked together under a single roof, that of the Destination Management Organization (DMO). The DMO would be the driver of the change process itself. The following case study demonstrates that a DMO has to think of a different marketing process compared with what it has had in previous decades, when it is faced with its industry's digitalization. Considering the changes that will have to be made within such organizations to cope with the trends in digitalization over the next few years, there are numerous challenges for destinations and accommodation properties alike.

Keywords Communication • Digital transformation • Disruption • Travel industry

N.T. Kohle (✉)

Prantos digital GmbH, Hamburg, Germany

e-mail: ntk@prantos.com

© The Editor(s) (if applicable) and The Author(s) 2017

H. Ellermann et al. (eds.), *The Palgrave Handbook of Managing Continuous Business Transformation*, DOI 10.1057/978-1-137-60228-2_18

417

Introduction

Over the last few years, potential accommodation guests for holiday destinations have become more and more digitally savvy. At first, they started using travel and accommodation portals as part of their desktop search, but now they are more likely to use their mobile phone when booking their next travel (Guggenheim et al. 2014). Owners of accommodation in tourist locations have become increasingly more dependent on global booking platforms, which have eroded their profit margins and additionally created new customer purchasing habits. At the same time, accommodation proprietors are unlikely to have sufficient knowledge, nor the financial resources for their websites to compete against the global booking platforms.

Therefore one could well argue that Destination Management Organizations (DMO) are losing their function as the prime vehicle for attracting guests, and that their success rates are going to reduce over time. This chapter discusses how a travel destination can define and successfully pursue a strategy to cope with this challenge. It takes the Swiss ski destination Saas-Fee in the Saastal region as an example.

Digital Business Transformation of a Swiss ski Destination

This case study is about the digital transformation of the Swiss ski destination Saas-Fee (Saastal Marketing AG 2015). It does not refer to a single company, but a conglomerate of multiple mid-sized companies in one destination, headed by the local tourist office. The ski destination Saas-Fee is part of the Saastal, situated in the southern part of Switzerland, close to the Italian border. The Saastal comprises four small villages in close proximity, which joined forces two years ago to collaborate on their marketing, rather than compete directly against each other. The Saastal is not very well known outside Switzerland, with mostly middle-aged people in German-speaking countries as its prime source of visitors. The Saas-Fee village was very trendy in the 1980s and early 1990s, when the number of visitors to the village was high.

To visit the Saastal from abroad, you have to fly to Zurich and then travel by train and bus for approximately three hours. This is regarded as a reliable and convenient form of travel by Swiss people, but evidence suggests that most foreigners are not prepared to travel for such a long time, and therefore they are reluctant to book accommodation. Travel by car is an option, but the distance

is still considerable because the car has to travel part of the way via a mid-mountain railway. An alternative route is via Milan, but this adds an hour to the travel time, and drivers have commented that during winter, the roads in the high mountain passes can be difficult to drive through. In summary, two factors influence potential visitors in their decision-making process: the first is how do they get to the Saastal which in itself can be a deterrent, while the second is that none of the well-known larger hotel chains have a presence in the Saastal. Currently, there are only mid-sized, family-owned accommodation properties, which, according to customers, provide good service and value for money.

The Saastal had more than 1 million overnight stays in the years 2006–2009, according to official Swiss statistics, but between 2011 and 2014 the number decreased by 22.3 percent. This trend is not unique to the Saastal region, it has also occurred in many other parts of Switzerland; Fig. 18.1 shows the trend in overnight stays in the winter season in the Alpine Region (Abrahamsen et al. 2015).

It is clear from several studies from the University of St. Gallen (Schögel 2014) and the University HES-SO in Wallis (Schegg P. R. 2015a) that travelers now have a tendency to book nearer the time of their vacation, with advance bookings being not as common as they were in the past. The internet allows a traveler to easily find last-minute accommodation, when they search via the global booking platforms, such as booking.com or Expedia. Traditionally, guests booked skiing holidays at least ten months in advance, in order to be sure that they would have accommodation before it was sold out. If a traveler

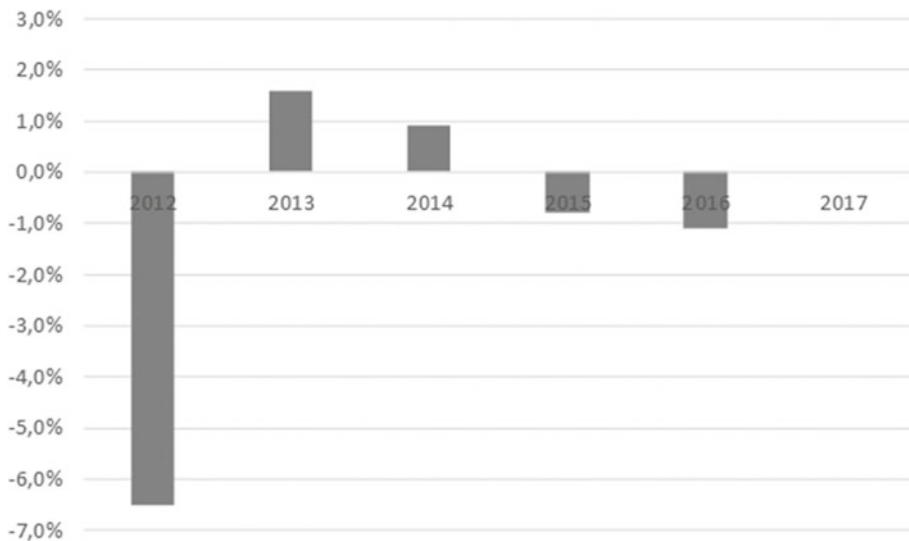
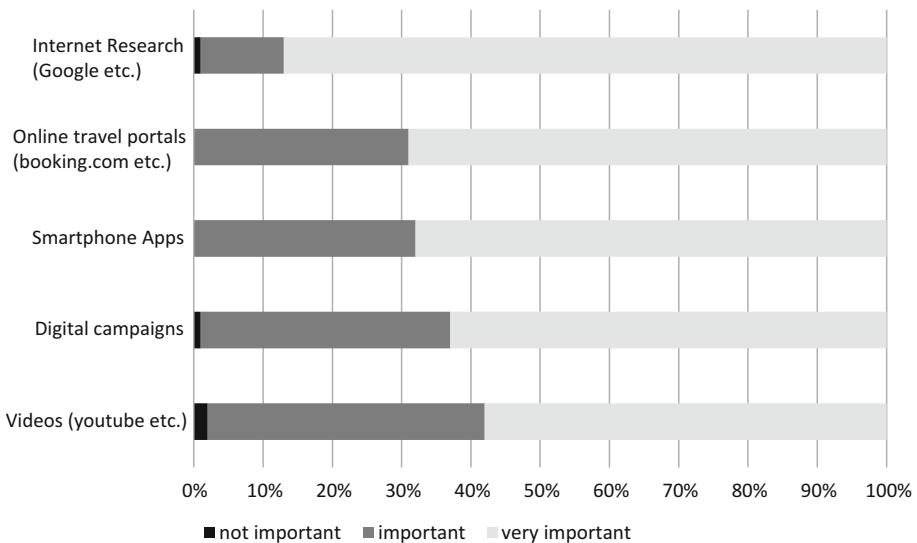


Fig. 18.1 Trend in overnight stays in winter season in Alpine regions

wanted to make a last-minute booking, there was no internet to help them see what was available. They would have to call hotels directly and ask what was available. That was a tremendous task.

The tourist environment has changed in many ways over the last few years. Guests are booking more immediately before their intended stay every year, they are coming more often (at least from within Switzerland) and they have a tendency to stay for shorter periods (Schegg P.R. 2015a). Tourists have greater choice; they can research different destinations and book hotels based on pricing. They can also use the web-based booking platforms to find recommendations about accommodation and destinations from other users.

Figure 18.2 shows the most important ‘touchpoints’ for travelers seeking accommodation in the Alps (Schögel 2014). In a survey of proprietors of accommodation, they were asked how important were particular ‘touchpoints’ in attracting new travelers to the Alps today and in the future. The survey showed that search (i.e. Google) has by far the biggest influence within the decision-making process. Looking at the marketing costs of these channels, the most expensive ones from the proprietors’ perspective (Google Adwords and booking fees on accommodation portals) are the most important. The channel with the lowest advertising costs today, Youtube, is getting much more attraction from would-be travelers. In 2014, it ranked in fifth place for people searching for places to visit or stay, but since then it has rapidly increased its importance so much so that by the beginning of 2017 it could well be ranked in first place.



Question (n=276): Due to worldwide globalization, competition is growing. How important are the following touchpoints considering the acquisition of new travellers to the Alps today and in the future?

Fig. 18.2 Important touchpoints to reach travelers to the Alps

Current research indicates that the travel industry is the one that has been the most disrupted by the internet during the last few years and that this will continue, according to the findings of a recent study by the IMD Lausanne-based Global Centre for Digital Business Transformation (Wade P. M. 2015c). Senior managers in various industries were asked how many of the top ten players were likely to be displaced within the next five years due to disruptive circumstances. Across all industries, managers said that on average they expected that 3.7 companies would lose their place among the top ten in their industry, but managers in the travel industry estimated that 4.3 companies would no longer be among the top ten in their industry.

This finding suggests that the environment for the travel industry is currently extremely disruptive, and that the digital disruption is a threat to companies and to destinations offering their services in fierce competition with each other.

Figure 18.3 shows the study’s results about disruptions in the travel industry (Wade P.M. 2015b) and it illustrates that the travel industry is much more at risk of being disrupted than all other industries. If one compares Figure 3.7—regarding the likelihood of being displaced from the top ten industry companies—for industries as a whole, with the comparable Figure 4.3 for the

Survey Question: In your industry, how many companies will lose their place in the top 10 due to digital disruption (over the next 5 years)?

Survey Question: Respondents who say the risk of being put out of business increases „somewhat“ or „significantly“ as a result of digital disruption.

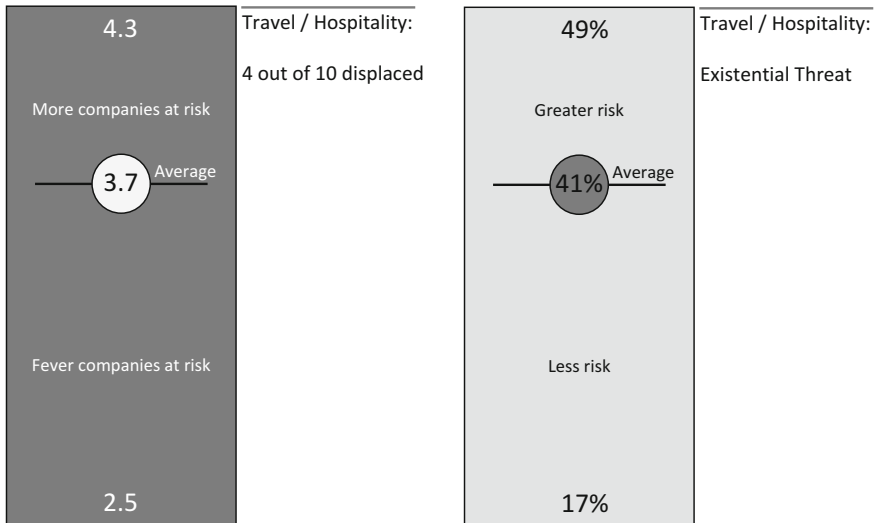


Fig. 18.3 Results about disruptions in different industries

travel industry, then it is clear that disruption in the travel industry is roughly 15–20 percent higher than it is for industries in general.

The Global Center for Digital Transformation also set up a digital vortex, which displayed the dynamics of digital disruption in ten different industry sectors, and showed how fast the disruption will develop within those industries. It demonstrated that the travel industry is one of the industries experiencing the fastest transformation (Wade P.M. 2015b).

The Center's research showed that hotel and apartment property owners have the following concerns:

- Guests no longer book far in advance, so it is much harder for the owners of accommodation to plan different seasons' occupancy rates.
- Repeated visits to a hotel or apartment are more difficult to maintain as guests are much more likely to make comparisons between one property and another via travel platforms before making a booking.
- 27.2 percent of bookings (Schegg P. R. 2015a) generating more than 1bn CHF in revenues are made via booking platforms instead of calling the hotel or booking on its website. In the USA, about 80–90 percent of all hotel bookings are done via one of the big portals rather than on the hotel website (FAZ 2015). One of the reasons why the big global hotel chains are buying other hotel brands is in order to strengthen their power versus the search engines and the booking platforms.
- In 2014, hotels in Switzerland were paying between 90 and 130 million CHF, (on average 30,000 CHF per hotel per year or about 700 CHF per room per year; Schegg P. R. 2015a) in commissions to online travel agents (OTAs). This is much more than their average marketing and sales expenditure in previous years.
- Recommendations on web-based platforms are increasingly influencing the attractiveness of a hotel to new potential guests. Therefore, every type of accommodation needs to be digitally active and attractive.

Although the digital channels only have a market share of 27.2 percent when it comes to bookings, their relevance has been growing every year. This can be seen in Fig. 18.4, which shows the share in sales for Swiss ski destinations for 2014 broken down by the different distribution channels (Schegg P. R. 2015a).

Sample: n=257		Market Share (%)	Share of Channel (%)
Direct	Phone	49.1	57.4
	Mail / Fax		
	Walk-in (Persons without reservation)		
	Contact from own website (without availability check)		
	E-Mail		
	Real-time booking over own website with availability check	8.3	
Tourism Organization	Destination Marketing Organization (DMO) / Trade associations	2.6	4.1
	National Tourism Organization (NTO)	1.5	
3rd Party	Tour Operator / Travel Agency	5.3	10.7
	Hotel Chains and Cooperations with CRS	0.8	
	Wholesaler (e.g. Hotelbeds, Tourico, Gulliver, etc.)	2.1	
	Event and Congress Organizer	2.5	
Digital	Online Booking Agency (OTA)	24.2	27.2
	Global Distribution Systems (GDS)	2.8	
	Social Media Channels	0.2	
Other	Other distribution Channels	0.7	0.7

Institute of Tourism, HES-SO Valais, Sierre, Switzerland, February 2015

Fig. 18.4 Distribution channels in Swiss ski destinations (year 2014)

The Challenge: Avoiding the Doom Loop

This study demonstrates the difficulties that accommodation proprietors have been experiencing. Historically, accommodation proprietors invested large amounts of money in rebuilding and refurbishing their properties, but building statistics show that over the last few years their investment in new building and refurbishment has decreased. The general opinion among proprietors confirms that a combination of fewer guests and higher charges by hotel reservation platforms have eroded their profit margins. (Payments made to such platforms represented approximately 15 percent to 22 percent of proprietors' turnover). As mentioned before, these costs are roughly about 30,000 CHF per hotel per year (Schegg P. R. 2015a). Therefore, proprietors have much less money to spend on improving the accommodation.

Proprietors are thus caught in a vicious circle or what the industry calls, a *doom loop*. The accommodation proprietors say that they feel under pressure to use booking platforms in order to get bookings because travelers are using platforms to make purchases rather than contact a property direct. In order to get bookings on these platforms, a property needs to be very attractive, that is, it needs to have very good recommendations, nice looking pictures, and competitive offerings. In order to be competitive, proprietors lower their prices, but the end result is that repeat guests assume that the lower market price is the standard market price. Evidence suggests that this is what makes a property's profit fall dramatically: the proprietor does not get the higher rates of

occupancy that they had expected and yet at the same time they have to pay a lot of commission to the third-party booking platforms on the revenues made.

This creates a series of no-win processes: accommodation proprietors lower their costs, which in many documented cases, means lower quality standards, and the so-called doom loop wheel starts rolling (Roosevelt Institute 2010). Lower standards result in lower prices, but not necessarily new clients if competitors are also lowering their prices. For example, one can see in the Saastal, some four-star hotels now compete in pricing with the three-star hotels, in an attempt to attract new guests. In most cases, the proprietor's lower price is part of their self-determined pricing calculations and strategy. Trying to exit from this doom loop is complex, takes time, and is expensive. Popular opinion is that it is much better to avoid this from the beginning, which is difficult to do if a proprietor does not even realize that such a loop exists, nor has a strategy to escape it.

Realizing the Extent of the Threat

The four villages realized that the competition within the valley between all accommodation properties was getting more difficult every day as they were competing against each other. Eventually they decided to address the problem and align their marketing efforts. They therefore founded a new company, which they named Saastal Marketing AG (SMAG) to combine the marketing and destination management for all four villages under one roof. Pascal Schär, the CEO of the newly founded company talked about this in a recent interview in a leading Swiss newspaper in which he said that tourism is no longer possible without social media anymore (Schär 2015). The creation of SMAG was the starting point for a 15-month digital transformation project that started in August 2014. The aim was to create a strategy and the accompanying tools to steer the valley into the digital future.

The Digital Transformation Project

The advisory board of SMAG had a vision that they would create a complete strategy and implement it within one year. The strategic idea for the digital transformation of Saas-Fee/Saastal was very simple: as everybody was fighting against each other within the destination at that time, the first objective was to have a common goal. This was defined as getting potential guests interested into the destination, focusing SMAG's effort into getting them thinking

'I want to go skiing in Saas-Fee/Saastal', and use the joint strength of its 700 service partners, that is, the proprietors, to work together to reach this goal.

Having persuaded guests to visit Saas-Fee instead of a different ski destination in the area, the guests would then decide where to make their final booking within the destination and at that point, the competition between the different accommodations would come into play again. This would help the whole destination, as every proprietor would be able to save a lot on their marketing of their region and instead focus on becoming the number one accommodation property within the destination. That would be an easier and less expensive goal for a family-owned business to aim for.

Information Gathering and Process Definition

With these objectives in mind, a two-step strategic project was devised. The first step was to gather vital information about the destination, its problems and challenges, as well as the 'political' structures of the destination, that is, the communication channels, because it was realized that communication always plays a key role when transforming a company or group of companies.

In a second step, the team identified all the relevant processes that needed to be redefined—if they were already in place—and the new ones that had to be put in place, which would support the destination and its service partners to handle everything in a very efficient way.

Some examples of the new processes are:

- Renew the process by which information is distributed automatically to the proprietors. Up until then, this had been done manually by sending out emails, whereas now it is integrated into the new internal message board where information is centralized and speedily available.
- Set up a process on how to react to actual communication needs, and how to support this with ad-hoc campaigns. An example is: 'first snow in Saas-Fee – all slopes are open.' The question then is: how would the destination get this information out to the public, and how would the allocation of budget to this be made in a very fast and efficient way?
- Set up a communication process to monitor how service partners are taking part in digital destination campaigns so that the DMO can react quickly, use the marketing budget informing proprietors automatically, and get additional budget from them, which will be distributed accordingly.

All these processes were designed as part of the new strategy and are used by the employees. Having done that at the very start, the team prioritized the internal communication process, as it was perceived that this would be the lynchpin to making the project, and rollout, successful.

Internal Communication Strategy in a Transformation Process

There is an argument that says that the key to a successful digital transformation of a company or a destination is in the strategy, not in the technology, and a big part of strategy is to have the internal communication set up in the right way (Kane et al. 2015). What they mean by internal communication is the communication between the employees. In the case of SMAG, the internal communication included the proprietors that were necessary to get the new strategy working. It is a common belief that digital business transformation projects require top management attention and begin at board level, and that they require a strong person as a lynchpin at board level to drive the change forward and support the work. It is also a common belief that most companies will have some employees who do not like the change. They are the ones who need to be given full information in order to persuade them to see the project in a favorable way.

It became clear in the project that many employees' first and foremost thought would be that a digital business transformation would threaten their job security. Even though this was a possible scenario, the project managers did not want to lose highly skilled personnel, so the project morphed into one that was more about transforming the employees and finding ways to integrate them into the schemes and processes than about the processes themselves.

Having said that, transparency in communication at all stages had been a very relevant part. Managers needed to communicate potential threats and risks openly, for example, when there would be reductions in headcount. Classic change management protocol suggests that it is best to address issues directly rather than let speculation, about what might happen, seep into company culture.

To get a broader internal support for the project, it was essential for the destination to identify the employees within the company that supported the new strategy from the start, that is, that were open to major changes within the company. These were not only the younger employees, but in most cases, they were the seasoned professionals who had often been in the company for

several years, who wanted to see a new spirit in the company. Documents show that the project managers thought that in order to address the future challenges for the company strongly enough, it was important to get the analytically thinking people on board as well.

Having done that it was important to set up a strong team that worked together in support of the project to communicate its message and its goals. The project managers found this particularly challenging because the message had to be communicated easily enough to be understood both personally and by third parties who would spread the word.

The goal was to get all internal people to fully embrace the new strategy; therefore, a critical mass of supporters was necessary who were convinced that this was the right thing to do. One can liken this change process to a wave that builds up slowly: *when it breaks, everybody will be swept along with it.*

There are two things that need to be done in order to break the wave:

- Involve external parties, for example, the media, in that strategy. The more openly this is done, the stronger the pressure on the remaining opponents within the company or destination to release their resistance to change.
- Deliver results—even small steps—in a very short time span, and then communicate the progressive steps and walk the talk. In other words, demonstrate that the change is already happening.

Finally, once there is a majority behind the project, the breaking wave will take with it those who have been opposing the project. It is much better and more effective if one does not need to convince people directly, but rather let colleagues and external parties be the convincing influence.

In this project, the internal communication strategy worked very well. However, there was no media involvement in the project which meant that there was no external input. This made it more difficult to achieve whole-hearted support for the project.

Detailed Transformation Strategy and Technical Aspects

The major concern of the project managers' part was to fully communicate the goal of the project in a way that would be easy for everyone to understand. Their aim was to convince everyone that the strategy that had been set out was exactly the right one. So they gave the following background information:

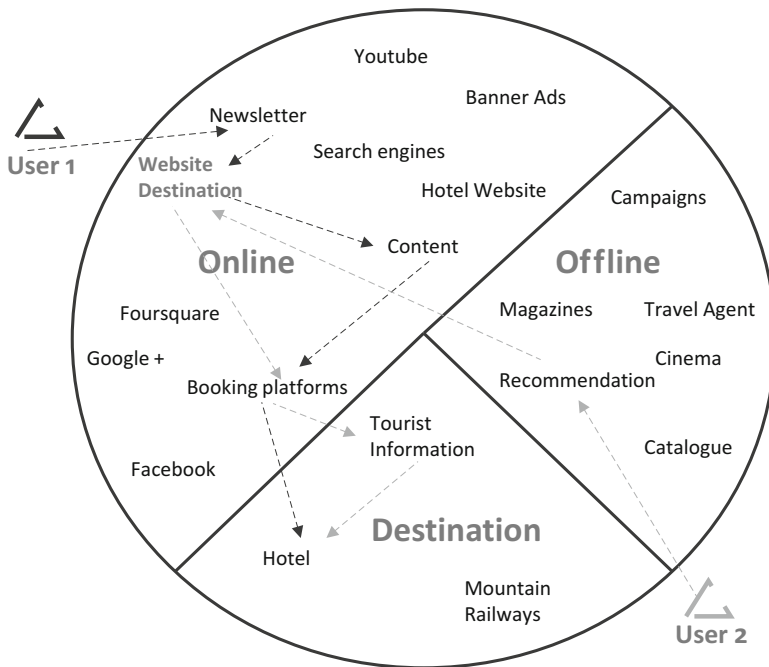


Fig. 18.5 User-driven way to book a hotel room from two example users

- In general, more and more people are booking their holidays online. In 2014, 67 percent were doing so (Schegg R. 2015b); this trend is confirmed by many other studies.
- These potential guests are not only looking at destinations where they have been before or for which they have seen some advertising, they are also looking at platforms in general, searching interesting destinations, using recommendations from other users and then choosing a destination and accommodation that best fits what they need (see Fig. 18.5, Kohle 2014).
- All accommodation properties in the Saastal are small and competing with each other; they are also competing with other ski destinations round the corner, for example, Zermatt.
- Bookings are done on platforms like [booking.com](http://www.booking.com), which had a 70 percent market share in Switzerland in 2014 (Schegg R. 2015b). Such platforms cost roughly 15 percent in commission, reducing proprietors' margins to a very low one-digit figure. These platforms will use the commissions to increase their online marketing and in that way will grow stronger every day thus making accommodation properties even more dependent on them.

- If accommodation proprietors do their own online marketing campaigns, they will be competing with each other using keywords like ‘hotel name + destination’, and that in turn will make their online marketing more expensive. In any case, most proprietors have never done any digital campaigns, so there is a massive lack of knowledge.

Based on these fundamental points, the Saas-Fee/Saastal strategy was to build up its own e-commerce booking platform with lower fees than the global booking platforms. Documents from briefings show that an additional goal was to strengthen the marketing by pooling the budgets of all proprietors and linking them to the central platform. This was supported by a strong content publishing strategy for social media plus blogging. Furthermore, digital tools for proprietors were bought collectively and therefore at a much lower price, in order to help the proprietors digitalize more cost effectively.

After a number of meetings, the strategy became clear to most proprietors. Initially they had been very skeptical, because the project team still had to create the technology for the strategy to be in place for the next season. This did happen and it happened on time. The project team made the following technical initiatives:

- A new website with landing pages for all accommodation properties in order to support their digital marketing activities.
- A new purchasing system optimized for search engines giving the destination the opportunity to do price-based campaigns and multiple packages.
- Integrated digital tools for all proprietors, that is, a customer relationship management (CRM) system including newsletter, social media hubs to distribute messages to all relevant social platforms, and a central app that can be adapted to accommodation properties’ needs, but which is maintained by the destination in order to cut costs.
- A new internal communication platform to facilitate support and interaction with SMAG.
- A video distribution and channel system to share all existing content on multiple platforms.

From a technical point of view, these initiatives were not that complex. However, there were several factors which made achieving these technical milestones difficult. First, the Saastal is approximately a three-hour train journey from Zurich and it does not have that many web service companies and digital agencies that have state-of-the-art capability. Second, the project team

found it hard to attract skilled personnel largely because such expertise is difficult to acquire outside the larger cities. Third, the properties' websites were characterized by minimal digital activity to begin with, so the proprietors needed training in using the new systems.

In order to make all this happen the project team searched for technical partners across mainland Europe to support the new systems. They eventually interviewed three potential partners who presented their products and strategies. The project kicked-off six weeks later. The platform structure that was created is displayed in Fig. 18.6 (Kohle 2014). It shows the different channels that potential guests can use and how they connect to the main platform, that is, the website and the CRM tools bring together all the relevant data.

It took four months for the whole project to become live—a very fast implementation process. The new system uses mainly standard software with very well built interfaces in order to connect the different parts to a unified communication platform for SMAG and all the proprietors.

Education and Training

As mentioned earlier, training and education are among the most important elements in creating a digital business transformation. From day one it was clear that the proprietors, who had to be integrated into the overall strategy as important partners, usually had no digital strategy, no idea what they needed with respect to digital marketing budgets, and a very low level of digital marketing skills within their organizations. This was because most accommodation properties are heavily dependent on the owner, and they used to say that they had more pressing issues than thinking about a digital strategy. The project managers were told that some proprietors had given this task to their employees. However, this caused problems of continuity, because in the hospitality sector staff turnover is relatively high, so that every time there was a change in personnel, some properties had to start training people again. Proprietors tended not to recognize or admit that they had a problem with digital skills and strategy, indeed one could even say that they were not willing to learn.

In order to provide the proprietors with the necessary skills, a training and education program was set up to get them closer to what digital marketing should look like. This training program was delivered by a very experienced Swiss instructor using video tutorials, that is, 30-minute online sessions, on-site training, plus regular newsletters. Also, official Swiss platforms for digital education in the travel industry were used, such as Ritzy Weiterbildung

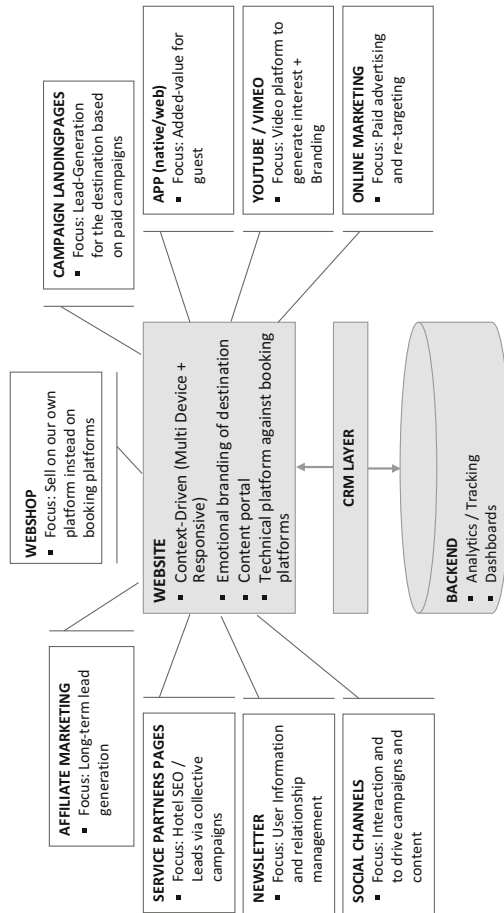


Fig. 18.6 Destinations digital platform structure

(2015). In addition, a support platform was set up based on the Zendesk solution in order to facilitate a smooth process to help partners with their urgent problems and answer their questions within a short response time.

At the time of writing, the process of training is still ongoing, and it will take several months to complete. However, it is already clear that in order to facilitate the digitalization of the destination in the long run, training and education has been extremely relevant and continues to be so.

Launch, Ongoing Processes, and Outlook

Today, more than one year from the project start, the first results look very promising. Most proprietors have been trained to a certain degree; most of them have lost their resistance and are trying to get closer to the digital world, supporting the DMO with this step. On the other hand some proprietors are still critical, trying to rely on SMAG's help and support services, and sometimes unwilling to change the most relevant items, for example, putting good photographs on their website in order to get more people to book there.

With the launch of the new platform in May 2015 and the start of the first combined marketing campaign, the positive results led to higher traffic on the destination's website and booking platform. This traffic was then distributed among the different accommodation properties and seemed to result in better online bookings avoiding the global platforms, thus saving the proprietors having to pay commissions. By the end of 2015, there was an average traffic increase of more than 25 percent and the online bookings on the platform are rising by a double-digit percentage every month too, according to data gathered by different tools such as Google Analytics and Sistrix (Sistrix GmbH 2016).

Internal politics are still a factor and have to be taken into account when considering whether Saastal could pursue its strategy faster than it has. (There are 700 accommodation providers in the region, and they do not all move at the same pace.) On the other hand, the ongoing discussions are creating a common understanding which is supporting the transformation of the destination.

The next part of the digital business transformation strategy is to collect more data from a variety of sources. These include data from website visitors, such as occupancy rates and bookings, data about weather patterns and also data extracted from its online marketing key performance indicators. Based on all this data the next step is to develop an algorithm that helps to forecast the utilization of the accommodation properties for the next four weeks. If the projected utilization of the accommodation properties is lower than the target

figure, the system will automatically suggest a digital campaign to generate bookings, based on the data that has been collected in previous seasons and campaigns.

Conclusion

Based on project experience with the digital business transformation of a Swiss ski destination, one can now confidently say that it is possible to have a travel destination transform itself into a digitally adapted player. The first results show that a very positive effect began about six months after the booking platform went live.

The path is long and costly. There are many barriers one has to overcome during the transformation process. The most important thing one has to do is to communicate to everyone why the new strategy is needed, and then get them all on board and enable them to completely understand both the strategy and how it will be implemented. Training and education play a vital role in this enduring process. One needs to lift the skills of the service partners and of the DMO itself, too. That in turn means choosing the right strategy and implementation partner so that the project takes place smoothly.

What would the prospects for the destination look like if it had not changed itself?

It would face disaster in the near future because other destinations are also trying to keep pace with digitalization, so the competition for guests for the next winter is getting tougher every year.

Saastal's digitalization has had many beneficial consequences apart from those already mentioned. The proprietors have developed a much more sophisticated pricing strategy for the different platforms, they are spending more on search engines and on display advertising, and they are reacting faster to the new data as it comes in. In total, they are spending more than in previous years, but their bookings have increased significantly. So one could say that the digitalization project has led to a new mind-set and therefore a new future.

Bibliography

Abrahamsen, Y., Hälgl, F., Simpson-Süer, D. B., & Sturm, P. D.-E. (2015, October). *Swiss Economic Institute (KOF)*. Retrieved February 8, 2016, from http://www.kof.ethz.ch/static_media/filer_public/2015/10/23/no_68_tourismus_2015_10_en.pdf

- FAZ. (2015, December 13). Ibis mit Luxushotels aus aller World unter einem Dach. *Frankfurter Allgemeine Zeitung*, p. 23. Retrieved December 11, 2015.
- Guggenheim, J., Kremser, S., Jhunjhunwala, P., McCaleb, T., Garcia-Mon, A. A., & McCabe, L. (2014, June 19). *BCG perspectives*. (B. C. Group, Ed.) Retrieved February 6, 2016, from Travel goes mobile: https://www.bcgperspectives.com/content/articles/transportation_travel_tourism_digital_economy_travel_goes_mobile/
- Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2015, July 14). *MIT Sloan management review*. Retrieved February 4, 2016, from Strategy, not technology, drives digital transformation: <http://sloanreview.mit.edu/projects/strategy-drives-digital-transformation/>
- Kohle, N. T. (2014). Transformation des Saastals. Saas-Fee: Prantos digital GmbH. Retrieved December 2014.
- Ritzly Weiterbildung. (2015). *Ritzly.ch*. Retrieved February 5, 2016, from <http://ritzly.ch/de>
- Roosevelt Institute. (2010, October 8). *Roosevelt Institute*. Retrieved January 31, 2016, from Roosevelt Institute: <http://rooseveltinstitute.org/doom-cycle/>
- Saastal Marketing AG. (2015, Mai 15). Saas-Fee. Retrieved from Saastal Marketing AG: www.saas-fee.ch
- Schär, P. (2015, December 14). Tourismus wäre heute ohne Social Media nicht mehr denkbar. (NZZ, Interviewer, & N. Z. NZZ, Editor) Retrieved January 15, 2016, from <http://news.jobs.nzz.ch/2015/12/14/33-fragen-an-pascal-schaer-geschaefstsfuehrer-saastal-marketing-ag-tourismus-waere-heute-ohne-social-media-nicht-mehr-denkbar/>
- Schegg, P. R. (2015a). *Swiss hotel distribution study: Are OTAs winning*. Institute of Tourism, HES-SO Valais. Sierre, Valais: Institute of Tourism, HES-SO Valais. Retrieved February 2015.
- Schegg, R. (2015b, November 5). *eTourism monitor Switzerland*. (H.-S. W. Institut für Tourismus, Ed.) Retrieved February 6, 2016, from http://etourism-monitor.ch/sites/default/files/downloads/schegg_2015_e-tourismus_-_schluessel_zum_erfolg_von_destinationen.pdf
- Schögel, P. D. (2014). *Successful channel and touchpoint management for the tourism destination „die Alpen“*. St. Gallen: Universität St. Gallen. Retrieved September 17, 2014.
- Sistrix GmbH. (2016, February 6). *Sistrix*. Retrieved from www.sistrix.de
- Wade, M. (2015a). *Digital vortex – How digital disruption is redefining industries*. IMD Lausanne. Lausanne: IMD – Global Center for Digital Business Transformation. Retrieved June 2015.
- Wade, P. M. (2015b, June 20). *The digital Vortex*. (I. G. Transformation, Editor) Retrieved December 30, 2015, from The digital Vortex: <http://global-center-digital-business-transformation.imd.org/en/research/overview/>
- Wade, P. M. (2015c). *IMD Global Centre for Digital Business Transformation*. Retrieved February 02, 2016, from <http://global-center-digital-business-transformation.imd.org/en/research/overview/>

19

Internet of Things: Legal Implications for Every Business

Ulrich Bäumer, Sabine von Oelffen, and Miriam Keil

Ideas in Brief Internet-related technology has been of high importance for businesses since the internet emerged. With the Internet of Things, a new (and probably lasting) era of internet-related business operations has just begun. Complex embedded IT-systems that are continuously connected to the internet enable modern products to operate themselves autonomously. This not only opens up new markets, but also creates legal challenges, which will be detailed in this chapter. Connected products collect a huge number of data; this does not only heavily touch on core principles of (European) data protection law, but is also a potential source of liability risks. This chapter illustrates both aspects using various examples. Businesses deploying the Internet of Things are subject of a variety of legal obligations that are, due to their rigidity, contrary to the nature of the Internet of Things. Being obliged to ask individuals whose data are processed for *informed consent* and the need to implement security mechanisms that comply with all data security requirements but are nevertheless cost-effective are not the only challenges for businesses. As there is no uniform legal framework concerning liability in Europe, businesses face liability under numerous and equally diverse national laws.

U. Bäumer (✉) • S. von Oelffen (✉)
Osborne Clarke, Cologne, Germany
e-mail: ulrich.baeumer@osborneclarke.com; sabine.vonoelffen@osborneclarke.com

M. Keil (✉)
Local Court, Aachen, Germany
e-mail: miriam.keil@web.de

This raises the question whether the current national regulatory framework is still adequate given the fact that the Internet of Things, with its approach to connect things globally via the internet, blurs boundaries.

Keywords Autonomous operation • Data protection • Industry 4.0 • Internet of Things • Liability

Introduction

The world of business has been profoundly impacted by modern communication technologies that are transforming the nature of products. Until the end of the twentieth century, products were not more than human-operated physical devices. In the last decade, things have evolved considerably; objects that formerly qualified as simple basic commodities have become highly developed smart products.

A first major shift in the evolution of modern products took place in the late twentieth century with the emergence of the internet that empowered human beings to operate and control objects and production processes remotely through a global network. The Internet of Things (IoT) goes one step further. It tends to provide products with an intelligence of their own, enabling them to function without the help of a human being. In the concept of the IoT, things become *active* participants in business (Vermesan et al. 2009, p. 6). Although the IoT is a relatively new technology, businesses have already developed a huge variety of autonomous products. Considering how fast the IoT-related industry has been growing in the past couple of years, it seems likely that the IoT is not a temporary phenomenon, but another industrial revolution.

Capabilities, which enable smart connected products (in the following referred to as *IoT devices*) to act autonomously at least to a certain extent (Porter and Heppelmann 2014, p. 9), build on each other:

First, IoT devices are capable to *monitor* their condition, operation and usage, and the external environment. Monitoring data can alert users or others to changes in circumstances and performance, or allow companies and customers to track a product's operating characteristics and history in order to better understand how a product is used. Second, more and more intelligent devices are able to *control* themselves through remote commands or algorithms built into the device or residing in the product cloud. They are able to respond to specified changes in their condition or environment (e.g. "if temperature gets too high, shut off"). Based on the monitoring data collected and their

incorporated control system, some products are even capable to *optimize* the product operation and use in order to enhance the product performance and allow predictive diagnostics, service, and repair. Third, combining monitoring, control, and optimization allows products to *operate* themselves autonomously and coordinate themselves with other products and systems without any human intervention. A fully developed IoT device is capable to enhance itself autonomously, adapt itself to its user's personal needs, and identify and repair gaps autonomously.

Products have been progressively provided with those capabilities thanks to new enabling technologies such as sensor networks, RFID, M2 M, mobile internet, semantic data integration, semantic search or IPv6, which can be grouped into three categories (Friess and Vermesan 2013, p. 10):

- Technologies enabling things to acquire contextual information,
- Technologies enabling things to process contextual information, and
- Technologies to improve security and privacy.

Whereas the first two categories are functional building blocks required to impart intelligence to things, the third category is rather a de facto requirement, without which the success of IoT would be significantly reduced. The IoT has the potential to positively impact on businesses in at least two regards: first of all, it enables businesses to optimize internal business processes and to increase productivity. Examples for applications of the IoT within the business are:

- Smart manufacturing and retail (supply chain control, smart product management),
- Smart workplace (e.g. intelligent elevators with person recognition),
- Smart energy and metering (smart grids, smart wind turbines, tank level monitoring),
- Smart marketing, interactive customer and sales information systems (e.g. smart mirrors that enable customers to virtually try on clothes).

In addition, the IoT offers great opportunities to open up new markets. Whereas in 2009, 0.9 billion IoT units installed (excluding PCs, tablets, and smartphones) were counted, a study carried out by Gartner Inc. estimates that this number will grow to 26 billion by 2020. Gartner (2013) expects the IoT product and service suppliers to generate incremental revenue exceeding \$300 billion, mostly in services, in 2020, and to result in \$1.9 trillion in global

economic value-add through sales into diverse end markets. Examples for end markets of the IoT are:

- Domestic and home automation (smart energy and water use, remote control systems, intrusion detection systems),
- e-Health (fall detection, medical fridges, patients surveillance, ambient-assisted living),
- Smart transportation and mobility (self-driving cars),
- Wearable computing (smart sports equipment, etc.).

Not only businesses but also consumers can take benefit from the IoT. Thanks to this new technology, life might become easier in many respects. For example, ambient-assisted living technologies may enable elderly people, who formerly could not manage their life without the help of others, to live a more self-determined life at home. Furthermore, smart devices can compensate human failings and thus increase the effectiveness of production processes and prevent damages. Finally, smart devices may help individuals to record and gather information about their lifestyle and thus better understand their actual habits and what they want to change in their lives.

However, the IoT also creates new challenges and risks. As its basis is the idea of collecting, processing, and storing large quantities of data, data protection is a main concern related to the IoT that affects both businesses and individuals. Individuals might fear the loss of control of their data and risk of profiling. In fact, the more intelligent objects become, the more they can become intrusive of private life. For manufacturers of smart devices and other stakeholders involved in the IoT, data protection constitutes a serious legal issue, too, as the European data protection framework imposes a large number of obligations to those who qualify as data controllers. In addition, the IoT harbors security risks. As more and more IoT devices are operated autonomously without any human intervention, they are more susceptible to technical malfunctioning and attacks from hackers. Therefore, concerns such as liability and consumer protection have to be taken in account. A difficulty in this context is the attribution of responsibilities, as the IoT involves various stakeholders, often from different countries.

This chapter shall give an overview of the main legal issues related to the IoT, starting with an analysis of its compatibility with the EU data protection framework, namely the Directive 95/46/EC (Data Protection Directive), as this is one of the strictest of the European data protection regulations. Thereby, new EU-Regulations not yet in place will not be taken into consideration due to uncertainties with regard to their final regulatory content. In the following sec-

tions, questions of liability and consumer protection shall be examined from a German perspective, with the focus lying on the legal consequences of IT-security gaps and malfunctioning. The chapter ends with an outlook, raising the question of the necessity and feasibility of a global legal framework to the IoT.

IoT and Data Protection and Security

In Europe, the relevant framework to assess data protection issues (also related to the IoT) consists of the Data Protection Directive (Directive 95/46/EC) and specific provisions of the e-Privacy Directive (Directive 2002/58/EC as amended by Directive 2009/136/EC). As with regard to any EU directive, it falls to the member states to implement the provisions of the directives in their national laws. In the following, all data protection issues will nevertheless be discussed on the basis of the directives as those create the uniform framework.

The Data Protection Directive applies to all processing of personal data carried out *in the context of an establishment* of the controller on the territory of the respective member state (Article 4-1 (a) of the directive). Establishment is to be interpreted in a broad sense; it implies any “effective and real exercise of activity through stable arrangements” regardless of the concrete legal form (see Recital 19 in the preamble of Data Protection Directive, European Court of Justice, *Google vs. Spain*, C-131/12, para. 48 f.). The Data Protection Directive is also applicable if a controller established outside the territory of the EU makes use of *equipment* situated on the territory of an EU member state (Article 4-1 (c) Data Protection Directive). As smart devices are designed to collect and process data, they regularly qualify as “equipment” in the sense of this provision.

The e-Privacy Directive particularizes and complements the Data Protection Directive, in particular with regard to the right to privacy and confidentiality with respect to the processing of personal data in the electronic communication sector (Article 1 (1) e-Privacy Directive). *Personal data* is “any information relating to an identified or identifiable natural person” (Article 2 (a) of the Data Protection Directive). A *data controller* is “the natural or legal person, public authority, agency or any other body which alone or jointly with others determines the purposes and means of processing of personal data” (Article 2 (d) of the Data Protection Directive). The IoT involves a great number of different stakeholders that qualify as data controllers under the Data Protection Directive. *Device manufacturers* regularly qualify as data controllers in terms of the Data Protection Directive as they usually do not only sell the physical item, but also develop or modify the device’s operating system or its software. As many data collected are shared on *social platforms* (by the user or automatically

by the device itself), social platforms also qualify as data controller if they use the data for different purposes, for example, in order to personalize the advertisement shown to a subscriber. If a smart device allows the installation of third-party applications, the developers of these applications usually gain access to data stored on the device. Unless the data are completely anonymized, the *app developer* is considered a data controller. Even third parties that have no control over the type of data collected by a device may qualify as data controllers if they store or collect data generated by the thing. For instance, health insurances may be interested in the data collected by *quantified selves* that are designed to record information about a person's habits and lifestyle. Finally, some manufacturers have developed platforms that aim at hosting the data collected through many IoT devices, in order to centralize their management. Such *IoT data platforms* qualify as data controllers if they collect the users' personal data for their own purposes. Businesses that qualify as data controllers under the Data Protection Directive (in the following *IoT stakeholders*) are subject to several obligations that shall be outlined in this section after an overview of the main challenges and the scope of EU data protection law.

Main Principles of EU Data Protection Law and Challenges Related to the IoT

The primary goal of the EU data protection law is to ensure the greatest possible anonymity of individuals by keeping the amount of collected data to a minimum. The fact that the right to remain anonymous is protected by the constitution of many EU member states shows how sensitive the subject of EU data protection law is. In Germany, for example, the right to remain anonymous is included in the right to informational self-determination that is guaranteed by Article 1 Section 1 and Article 2 Section 1 of the German constitution (subcategory of the right of privacy, see judgment of the German Federal Constitutional Court of December 15, 1983, 1 BvR 209, 269, 362, 420, 440, 484/83, the so-called *Volkszählungsurteil*).

The right to remain anonymous is protected through three main principles of data protection law, being:

- The necessity of an informed consent or a legal authorization,
- The purpose limitation principle, and
- The data minimization principle.

The first key principle of EU data protection law is the *necessity of an informed consent or a legal authorization* before any form of data collection, processing, or transmission. In the absence of such consent or authorization, collecting, processing, or transmitting of data is illegal (“prohibition with authorization option”). The second key principle, the *purpose limitation principle*, requires that the purpose of a data collection, processing, or transmission must be clear and understandable in advance. Last but not least, the *data minimization principle* implies that the number of data collected shall be limited to the amount strictly necessary for the purpose previously determined and shall be deleted after the purpose is reached.

By its nature and purpose, the IoT can hardly be brought in line with these three basic principles of EU data protection law. First of all, the IoT bears a risk of a devaluation of the concept of *informed consent or legal authorization* before data collection. Already the requirement that individuals need to be informed about the fact that data are collected at all in advance poses questions with regard to IoT. Many IoT devices are technically prepared to collect data without giving human beings any opportunity to realize that their data are gathered. For instance, communication between objects can be triggered automatically, without the individual being aware of it. Interactions between IoT devices result in a flow of data that can hardly be recognized or controlled by users. Additionally, IoT-generated data are rarely reviewable by the data subject prior to their publication. Moreover, IoT devices raise several questions with regard to the requirement of *informed consent*. In some cases, the type of device might cause practical difficulties how to inform individuals that data collection is intended. Furthermore, the requirement of informed consent does not just demand to inform that data is collected, but also what type of data is collected. As smart connected products are technical capable to collect an almost unlimited amount of data, it might be impossible for the individual to find out what type of data is collected. The principle of informed consent also requires enabling individuals to exclude specific purposes of data collection in advance. The possibility to renounce certain features of a smart connected product seems to be more a theoretical concept, than a real option. Even if IoT devices contain mechanisms for the exclusion of data collection for specific purposes, especially consumers might also face practical difficulties to identify and use these options.

The IoT also bears the risk of “repurposing” of the collected data which collide with the *purpose limitation principle*. While the user was comfortable with sharing the data collected for a specific purpose, he or she may not want to share the secondary information which could be used for completely different purposes.

Finally, IoT collides with the *principle of data minimization* that aims for limiting the number of collected data to the amount strictly necessary for the specific purpose. Contrary to that, the IoT aims at collecting as much data as possible. IoT is simply more efficient when more data are collected. As a consequence, the IoT becomes more and more intrusive in people's private life. The collected data help creating unique fingerprints and even provide enough information to generate a profile of an individual's life and behavior patterns. This does not only increase the fear of users' self-exposure, but also the risk of re-identification; this contravenes the (fundamental) right of individuals to remain anonymous. Consequently, efficiency and security need to be balanced by the stakeholders of IoT.

Obligations of IoT Stakeholders According to Article 5 (3) e-Privacy Directive

IoT stakeholders that want to either store (additional) information on the device or access information already stored on an IoT device have to comply with Article 5 (3) of the e-Privacy Directive. As the provision refers to any type of information, it includes, but is not limited to, personal data in the terms of the Data Protection Directive. Pursuant to Article 5 (3) of the e-Privacy Directive, the user must first be provided with clear and comprehensive information about, inter alia, the purpose of the processing. Having obtained all necessary information, the user needs to give his or her consent before the IoT stakeholder stores information or gains access to the user information. If, for instance, a smart sports shirt collects information about the distance covered, speed, and total time of each sport session and transmits this information to the user's mobile phone, the manufacturer of the shirt needs the user's consent before uploading the data from the user's mobile phone to its server.

Article 5 (3) e-Privacy Directive does, however, not apply, if technical storage or access is for the sole purpose of carrying out the transmission of a communication over an electronic communications network. Consequently, the user's consent is not required for the mere transmission of the data collected by the shirt to the user's mobile phone (Article 5 (3), sentence 2, alternative 1 e-Privacy Directive). The same applies if the storing of data or access to data is strictly necessary in order for the provider of an information society service explicitly requested by the subscriber or user to provide the service (Article 5 (3), sentence 2, e-Privacy Directive). The user's consent is therefore not required if the user has subscribed to an online service for automatic preparation of monthly training statistics provided by the manufacturer as in

this case; the technical storage of the user data is strictly necessary for the provider to provide the service (Article 5 (3), sentence 2, alternative 2, e-Privacy Directive).

Obligations of IoT Stakeholders According to the Data Protection Directive

If an IoT stakeholder wants to further *process* personal data, the Data Protection Directive applies (as the case may be in addition to the e-Privacy Directive). *Processing* of personal data is any operation using personal data, whether or not by automatic means, and, inter alia, includes collection, recording, storage, and making available of data (Article 2 (b) of the Data Protection Directive). Processing of personal data by IoT stakeholders is only legitimate if one of the requirements for the processing of personal data set out in Article 7 of the Data Protection Directive is met.

First and foremost, processing of personal data is legitimate if the data subject has *unambiguously* given (and not revoked at a later stage) his *consent* (Article 7 (a) of the Data Protection Directive). The data subject's consent is, for instance, required if the manufacturer of the smart shirt wants to further process the data collected by occasion of the preparation of the training statistics for other purposes such as personalized offers of sports clinics depending on the evaluation of how athletic the user (data subject) is.

The data subject's consent to the processing of personal data relating to him is valid if it is *freely* and *unambiguously* given, *specific* and *informed* (Article 2 (h) of the Data Protection Directive). *Freely given* means that the data subject is aware there is no threat of negative consequences if he/she does not consent (Article 29, data protection working party, WP 187 2011, p. 34). Consent is *unambiguous* if the mechanism how consent was obtained leaves no doubt with regard to the data subject's intention to provide consent. IoT stakeholders have to use mechanisms to ensure that a data subject's consent fulfills this requirement. From a legal point of view, express consent acquired by a clear statement of the data subject that he/she agrees to the processing of data is the safest option for both sides, IoT stakeholders and data subjects. However, mechanisms that ask for implied consent, for example, consent that relies on actions that indicate agreement (Article 29, data protection working party, WP 187 of July 2011, p. 35), may be used as well. Contrary to that, the requirement of unambiguous consent is not fulfilled if consent shall be derived from mere silence or inaction of the data subject (Article 29, data protection working party, WP 187 of July 2011, p. 35). Consequently, pre-ticket

boxes or internet browser settings that are set by default do not fulfill the consent requirement.

The requirement of *specific* consent implies that consent must be given with regard to the use of the data for specified purposes. Moreover, specific consent clauses instead of a general agreement to all General Terms and Conditions have to be used (Article 29 Data Protection Working Party, WP 187 of July 2011, p. 35).

The probably most crucial requirement for IoT stakeholders processing personal data is the requirement of an *informed* consent. Consent is *informed* if three requirements are met. First, the correct *type* of information as defined in Articles 10 and 11 Data Protection Directive has to be provided. Second, the information needs to be provided in an appropriate and understandable language. Third, the information must be clear and sufficiently obvious to warrant that users cannot overlook it (Article 29, data protection working party, WP 187 of July 2011, p. 35).

Articles 10 and 11 of the Data Protection Directive define the type of information that has to be provided by IoT stakeholders qualifying as data controllers. The information requirements set out in Article 10 apply in cases of collection of data from the data subject. Contrary to that, Article 11 is applicable if data have not been obtained from the data subject. In this respect, data subjects are not only users of IoT devices, but also other individuals from whom IoT devices collect data. Smart glasses might, for instance, also collect personal data from data subjects other than the person wearing the smart glasses (Article 29, data protection working party, Opinion 8/2014, p. 13). Pursuant to Article 10, the data subject must be informed about the identity of the controller and of his representative (e.g. the manufacturer of the IoT device or another IoT stakeholder) and the purposes of the processing for which the personal data are intended. With regard to the strict purpose limitation principle, IoT stakeholders must specify the purpose of the processing as accurate as possible.

Besides, any further information that is, having regard to the specific circumstances in which the data are collected, necessary to guarantee fair processing in respect of the data subject has to be provided. This includes, but is not limited to, information about the recipients or categories of recipients of the user data, information whether replies to the questions are obligatory or voluntary, as well as the possible consequences of a failure to reply and the existence of the right of access to and the right to rectify the users' data. Consequently, IoT stakeholders have the obligation to inform data subjects if their personal data are only processed within their entity or if third parties also gain access to these data. Article 10 is, for instance, applicable if a shop

for clothing uses smart mirrors that measure height and volume of the bodies of the customers to automatically find fitting clothes with regard to body proportions for them. Article 11 applies if personal data have not been obtained from data subjects. This applies, if personal data are already stored in a data base, and it is intended to disclose any such data to third parties. In such a case, the data subjects must be provided with information about the identity of the controller and of his representative and the purposes of the processing. Besides, any further information that is, having regard to the specific circumstances in which the data are collected, necessary to guarantee fair processing in respect of the data subject has to be provided. This includes, but is not limited to, information about the categories of data concerned, recipients or categories of recipients of the data, as well as the existence of the right of access to and the right to rectify the data concerning him.

Furthermore, an *informed* consent requires that the information is provided in appropriate and understandable language. Consequently, IoT stakeholders may not hide information by use of complex legal terms or futuristic technical expressions that are not understood by the majority of data subjects (Article 29, data protection working party, WP 187 of July 2011, p. 35).

Moreover, all obligatory information must be provided in a clear and conspicuous manner. It is the obligation of the IoT stakeholders to make a choice between the manifold options for the supply of all required information. If sensors are used to collect information, information could, for instance, be provided by using location preserving proximity testing that is done by a centralized server that informs users that are located in a certain area around the sensor (Article 29, data protection working party, opinion 8/2014, p. 18). Device manufacturers could also print QR codes on IoT devices or use a flashcode (Article 29, data protection working party, opinion 8/2014, p. 18).

Apart from consent of the data subject that legitimates data processing pursuant to Article 7 (a) of the Data Protection Directive, processing of personal data is also legitimate when it is *necessary for the performance of a contract to which the data subject is party* (Article 7 (b), alternative 1, Data Protection Directive) or *if the processing is required to take steps at the request of the data subject prior to entering into a contract* (Article 7 (b), alternative 2, Data Protection Directive). The processing is only necessary for the performance of a contract to which the data subject is party if there is a direct link between the processing and the purposes of the contractual performance. This applies, for instance, if the user of the abovementioned smart shirt that collects data about the distance covered, speed, and total time of each sport session has subscribed to an online training program of the smart shirt manufacturer that is explicitly based on the data collected. The requirement that the processing

is necessary to take steps at the request of the data subject prior to entering into a contract is applicable in cases where an IoT device user who wants to conclude a contract for additional features of his device provides personal data that are transmitted to the server of the IoT stakeholder for the purpose of preparing the contract. This might, for instance, apply if the user of a smart fridge that can automatically reorder food in an online supermarket provides the IoT stakeholder with data about the amount of food that shall be reordered as well as personal preferences.

Finally, the processing of personal data is permitted if the controller or third parties to whom the data are disclosed have legitimate interests for the processing that outweigh the interests protected by fundamental rights and freedoms of the data subject (Article 7 (f), Data Protection Directive). Particularly IoT devices in the field of domestic and home automation (smart energy and water use, remote control systems, intrusion detection systems), or in the field of e-Health (fall detection, medical fridges, patient surveillance, ambient assisted living), are likely to touch the heart of the user's fundamental right of privacy.

Being profit-oriented businesses, the manufacturers of IoT devices have merely economic interests to collect as many data as possible. Consequently, the economic interests of these businesses are most likely not sufficient to outweigh the user's right of privacy in these cases.

Article 7 (f) of the Data Protection Directive might, however, legitimize processing of data in cases where public IoT stakeholders are involved and public interests such as the protection of the environment come into play. If, for instance, the city council uses an IoT-based parking monitoring system that collects data about cars that approach a free parking slot to calculate the parking fee that depends on criteria relevant for environmental protection such as the type of engine and its age, the processing of the license plate information could be justified by the public interest of environmental protection that might outweigh the personal interest of the car's owner not to disclose any personal data (Article 29, data protection working party, opinion 8/2014, p. 17). Therefore, Article 7 (f) might particularly come into play with regard to projects related to smart cities where public interest is involved.

The mentioned legitimations for the processing of personal data are complemented by the data subject's right to object the processing of personal data in certain cases. The right to object the processing of personal data is given by Article 14 (a) of the Data Protection Directive *at least* in cases where processing is necessary for the performance of a task carried out in the public interest (Article 7 (e) of the Data Protection Directive) or in cases where the controller or third parties to whom the data have been disclosed have legitimate interests

for the processing that overweigh the interests of the data subject (Article 7 (f) of the Data Protection Directive). Additionally, data subjects are entitled to object to the processing of personal data for the purposes of direct marketing, before disclosure of such data to third parties or the use of such data on behalf of third parties for direct marketing (Article 14 (b) of the Data Protection Directive). These requirements pose logistic challenges for IoT stakeholders as they need to reckon with data subjects objecting to the processing of personal data or revoking their already given consent and consequently need to provide for mechanisms enabling data subjects to object.

If sensitive data, such as data relating to racial or ethnic origin, political opinions, religious or philosophical beliefs, trade-union membership, health or sex life, are involved, the requirements for the processing of sensitive data are even stricter (Article 8 of the Data Protection Directive). Contrary to the processing of non-sensitive data pursuant to Article 7 of the Data Protection Directive, *explicit* consent of the data subjects is required to legitimate the processing of sensitive data, unless the information was made public by the user himself. In the context of the IoT, Article 8 of the Data Protection Directive comes into play with regard to quantified self devices (Article 29, data protection working party, opinion 8/2014, p. 17). Quantified self devices are IoT devices that collect data related to a person's daily life such as nutrition, wellness and health parameters, and his/her mental and physical performance. Although any of these data might on their own not qualify as health data in a strict sense, the fact that many data related to the well-being of the IoT device user are registered over a certain period of time may allow conclusions on the state of health of this individual. Consequently, providers of quantified self devices should implement a mechanism that asks for explicit consent of the device users.

Processing of personal data by e-Health-related IoT devices might even be legitimate without explicit consent of the IoT user if the requirements set out in Article 8 (3) of the Data Protection Directive are fulfilled. This applies if the processing of data is required for the purpose of preventive medicine, medical diagnosis, the provision of care or treatment, or the management of health-care services, provided that those data are processed by a health professional subject under national law or rules established by national competent bodies to the obligation of professional secrecy. Consequently, it is up to the member states to decide which establishments qualify as health professional subjects under national law. Provided that the establishment that processes the data qualifies as health professional subject under the applicable national law, this justification for the collection of personal data might, for instance, apply if a digital blood glucose meter connects wirelessly to a monitoring and

display device and alerts patients—and eventually medical staff—to glucose levels that require attention.

Finally, IoT stakeholders have to ensure security of the data processing pursuant to Article 17 of the Data Protection Directive. They must implement appropriate technical and organizational measures to protect data against all unlawful forms of processing (Article 17 (1) of the Data Protection Directive). If processing is carried out on behalf of an IoT stakeholder, the IoT stakeholder is obliged to choose a processor providing sufficient guarantees in respect of the technical security measures and organizational measures governing the processing to be carried out, and must ensure compliance with those measures. The IoT entails numerous challenges with regard to data security requirements as stipulated in Article 17. First of all, IoT stakeholders qualifying as data controllers are responsible for breaches of the security principle. The strict security requirements should already be kept in mind at the stage of the development of the IoT device. In this regard, businesses involved in the development of IoT devices must weigh up the requirement to guarantee a sufficient security standard against other interests involved such as costs. For instance, sensors that are able to establish an encrypted link are preferable in terms of security, but prohibitive on the other hand. Additionally, security can be increased by ensuring that subcontractors delivering hardware components observe high security standards as well (Article 29, data protection working party, opinion 8/2014, p. 18). During the production process as well as later on when operating the IoT-related system, security checks of the systems as a whole, but also of the IoT devices and their components, should be conducted (Article 29, data protection working party, opinion 8/2014, p. 18). Additionally, the regular supply of updates contributes to high security standards.

Moreover, IoT devices create challenges with regard to security for technical and business reasons. First, depending on their individual features and quality, IoT devices can be vulnerable with regard to all types of cyber-attacks. Second, the multiplicity of manufacturers, subcontractors, and IoT stakeholders involved can raise problems to identify who is responsible for a security breach. Third, data security might be endangered by limited computing capacity. In this case, it is vital to comply with the data minimization principle and to confine processing of personal data to the utterly required minimum. Overall, it is in the interest of both sides, IoT stakeholders and device users, to ensure high security standards. The biggest threat in this respect may not even be under the control of the IoT stakeholder: just like any business is, IoT applications might be attacked by hackers. This is probably the biggest challenge for all established businesses.

Liability and Consumer Protection

The more complex IT-systems of IoT devices become, the more they are susceptible to technical malfunctioning or hacker attacks. Businesses dealing with IoT will have to comply with high security standards, not only in order to meet their obligations under data protection law, but also to prevent (personal) damages and minimize liability risks. Today, there is no standardized framework to the IoT in Europe, which means that manufacturers of IoT devices can be held liable under many different national regulatory frameworks, as most devices are distributed in different countries.

The liability law in Europe is strongly influenced by European directives and regulations. In contrast to data protection law whose two main directives were addressed earlier in this chapter, a variety of directives and regulations impacts on the national laws dealing with liability of manufacturers and rights of consumers. Because of the complexity of the interaction between these directives and regulations, the main issues of liability and consumer protection with regard to IoT will hereinafter be outlined exemplary from the perspective of (German) national law. Germany was chosen as jurisdiction as the country's legal system belongs to the civil law jurisdictions. In contrast to common law jurisdictions, such as the UK or India, in which judges apply existing case-law to find answers to open legal issues, the answers to legal problems occurring in civil law jurisdictions can be found in statutes. Consequently, the discussion of legal issues concerning liability and consumer protection on the basis of a civil law jurisdiction such as Germany serves clarity as the statutes referred to below are easily accessible to everyone. Additionally, German law is one of the strictest laws in terms of data protection.

Main Principles of Liability in Germany

The concept of liability implies that a person or legal entity is to be held responsible for his or her debts arising from an obligation. The obligation can result from a contract or be provided by statutory law (contractual or non-contractual liability).

Generally, liability in Germany requires fault. Only on an exceptional basis, if explicitly provided by law, a person or legal entity can be held liable without fault, based on the mere fact that he/she controls a source of danger. Examples for such strict liability without fault are the liability of the keeper of a vehicle that causes damage in street traffic or the product liability under the product liability Act. The standard for liability for fault is laid down in Article 276

para. 1 of the German Civil Code: the obligor is responsible for intent and negligence. Pursuant to Article 276, paragraph 2 of the German Civil Code, a person acts negligently if failing to exercise reasonable care. Whether reasonable care has been exercised in an individual case has to be determined from an objective point of view, taking into account the particular circumstances of this individual case. Reasonable care has not been exercised if a prudent person of same branch in the particular situation had acted differently and, based on this perspective, the damage was foreseeable and avoidable (Reinhard et al. 2007, p. 162). German law further distinguishes between gross negligence and simple negligence. If, for instance, a driver of a car overlooks red traffic lights in good weather, a court will almost certainly conclude that the driver acted at least with gross negligence. Contrary to that, a court might conclude that a driver overlooking red traffic lights in thick fog acted simply negligently.

Liability Standards with Regard to IT-Security

To determine if reasonable care has been exercised in a particular case, jurisprudence will consult the professional standards of the branch in case (if existing). However, in this respect, different courts might have distinguishing opinions on the characteristics of the professional standard. The relevant standards with regard to IT-security are provided namely by the Federal Office for Information Security (Bundesamt für Sicherheit in der Informationstechnik, BSI).

The main objective of IT-security standards is to ensure the confidentiality, availability, and integrity of information. The BSI standards contain recommendations on methods, processes, procedures, approaches, and measures relating to information security. BSI-standard 100-1 defines the general requirements for an Information Security Management System (ISMS), the BSI-standard 100-2 (IT Grundschutz Methodology) describes step by step how information security management can be set up, and operated in practice. In addition, the BSI-standard 100-3 contains recommendations on risk analysis; BSI-standard 100-4 points out a systematic way to develop, establish, and maintain an agency-wide or company-wide internal business continuity management system. Finally, the IT-Baseline-Protection Catalog (IT-Grundschutz-Katalog) contains an extensive collection of documents that provide information for detecting weaknesses and combating attacks in the information technology environment (Federal Office for Information Security 2009). With new threats emerging, security requirements are evolving constantly. Security gaps can cause considerable damages, especially if they affect organizations and businesses that are essential for the functioning of a

society and economy (so-called critical infrastructures). To prevent possible damage, the legislator has recently increased the security obligations for critical infrastructures. The IT Security Act of 2015 defines specific obligations with regard to the implementation of organizational and technical measures to ensure the functioning of the core processes of critical infrastructures and reporting obligations in case of disruptions, for example, energy companies, telecommunication companies, and water works.

If a business, for example, the manufacturer of an IoT device, fails to implement an ISMS, or if the ISMS is insufficient to protect the incorporated systems of a device against hacker attacks, and a damage occurs to a third person (e.g. the user of an IoT device), the operator is liable for negligence, if the damage had been prevented in case of existence of a security system that complies with the requirements of the abovementioned standards. On the contrary, if the abovementioned security standards are met, there is a *prima facie* evidence that the “reasonable care” in the terms of Section 276 para. 1 of the German Civil Code has been exercised. Certificates of the BSI help businesses to prove their compliance with security obligations. The BSI issues these certificates after conducting tests to establish if the product, system, or IT-security service that applied for the certificate fulfills the security requirements put up by public authorities.

Liability of Manufacturers of IoT Devices

As manufacturers of IoT devices usually do not only produce the physical item, but also design the device’s operating system, they are mainly responsible for the security and functioning of the device. If, due to a malfunctioning of the system or to security gaps in an IoT device, damage occurs to a third party (e.g. the device user), device manufacturers may, depending on the situation, be held liable both under contractual and extra-contractual law (Reinhard et al. 2007, p. 165).

Contractual liability requires a special link between the parties in form of a contract. That means that a user of an IoT device can assert contractual claims against the device manufacturer only if there is a contract between the user and the device manufacturer, which is not the case if a (standard) IoT device is sold by an intermediary. However, contractual liability applies if a user wishes a personalization of the features of an IoT device and therefore orders it directly from the manufacturer.

The type of the contract depends on the concrete content. If the user wishes the design and production and customization of a personalized item, the

contract qualifies as contract on services to perform pursuant to Section 631 of the German Civil Code.

In the absence of such a personalization (in case of a mere transfer of property of a standard IoT device from the manufacturer directly to the user), the contract qualifies as a purchase contract under section 433 of the German Civil Code. Both, the provisions applicable to contracts on services to perform and purchase contracts, contain warranty obligations (see sections 634 and 437 of the German Civil Code respectively), more precisely cure, reduction of price, revocation of the contract, damages, and reimbursement of futile expenses. A central requirement for any warranty obligation is the defectiveness of the object or service provided. A product/service is defective if it has not the agreed quality, and in the absence of an agreement between the parties if it is not suitable for the use intended under the contract or the use that can be normally expected from this type of product (see sections 633 and 434 of the German Civil Code). The defect has to be existent at the time of the transfer of risks (in a purchase contract at the time of delivery, in contract on services to perform at the time of acceptance). However, with regard to purchase contracts, consumers benefit from a statutory shift of the burden of proof (section 476 German Civil Code). Pursuant to section 476 of the German Civil Code, it is presumed that, if within six months after the risk passed to the consumer, a material defect manifests itself, the thing was already defective at the time when the risk passed unless this presumption is incompatible with the nature of the thing or of the defect. Damages and reimbursement of expenses may only be claimed in case of fault; however, fault is presumed (section 280, paragraph 1 of the German Civil Code). If there is a contractual relationship between any harmed person and the IoT manufacturer, the harmed person will usually rely on contract law as contractual claims are advantageous in terms of the burden of proof, for instance, because of the applicability of shift of the burden of proof pursuant to section 476 of the German Civil Code.

In the absence of a contractual relationship only extra-contractual liability (tort law, namely sections 823 et seq. of the German Civil Code) applies. The central provision of German tort law, section 823 of the German Civil Code, requires inter alia the violation of an absolute right (right that is enforceable against anybody, e.g. life, health, and property). The violation of the right must have been caused by an action or the infringement of a safety obligation of the device manufacturer. In contrast to contract law, under section 823 of the German Civil Code, it is generally the harmed person who has to prove that the requirements set out in section 823 of the German Civil Code are fulfilled.

In the context of product manufacturing, the jurisprudence has pointed out four types of safety obligations (Bräutigam and Klindt 2015, p. 7f.):

- Construction,
- Fabrication,
- Instruction, and
- Surveillance obligations.

For instance, if a car that autonomously adjusts its speed to the traffic situation by measuring the distances to other cars causes an accident due to a poor design or error of programming of the software incorporated and the driver of the car gets hurt, he/she may claim damages according to section 823 of the German Civil Code, based on the culpable violation of the obligations of safe construction or fabrication by the car manufacturer.

In addition, the manufacturer has to provide users with all instructions that are necessary to safely operate the device. Consequently, the manufacturer is liable under section 823 of the German Civil Code if, for instance, the manual of the abovementioned car is incorrect and a collision is caused by a wrong operation of the car.

The device manufacturer may even be held liable in case the device, at the time of its distribution, complies with the security standards, if due new insights or hidden safety gaps become obvious. The manufacturer is obliged to constantly monitor and assess the state of technology and has to recall products and take them out of the market if it turns out that they harbor considerable security risks. In order to ensure a high level of consumer protection, the product liability act contains a specific liability regime that, within its scope of application, complements the general liability under the German Civil Code.

Pursuant to section 1, paragraph 1 of the product liability act, the producer is obliged to compensate the person who suffered damage, if, as a result of a defect of a product, a human being is killed, is injured or affected in his health, or a thing is damaged. A *product* in terms of the product liability act is any moveable thing. With a view on IoT, the controversial issue whether software is covered by the product liability act gains practical relevance as the defect of an IoT product is frequently software related. At present, there is no uniform opinion on this issue. However, the major opinion of judicature and legal literature is that standard and individual are covered by the product liability act provided that the software is stored on an electronic device (Kilian and Heussen 2013, para. 45; Staudinger, § 2 ProdHaftG, para. 69). It is, however, contentious if software that is transmitted online without use of a physical data carrier also qualifies as product in terms of the product

liability act (Staudinger, § 2 ProdHaftG, para. 65; Münchner Kommentar, § 2 ProdhG para. 15). In the last decade, courts rarely dealt with the question whether software is a product in terms of the product liability act. With regard to the growth potential of the market for IoT products, courts will most likely increasingly have to deal with this issue in the future.

The aggrieved party bears the burden of proof for the defect having caused the damage. However, as the purpose of the product liability act is consumer protection, the product liability act facilitates evidence for harmed consumers. For instance, harmed consumers only need to prove that the defect causing the damage was present at the time the damage occurred, but do not have to bring evidence that the defect was present at the time the product was put on the market.

In case of damage to property, there is only liability pursuant to the product liability act if an object other than the defective product is damaged and if this object is normally intended for private use or consumption and has been used by the injured party primarily for this purpose. That means that if a car which autonomously controls its speed in order to prevent collisions causes an accident because of a defect of its incorporated system, the user can claim damages under the product liability act if he/she gets injured or if another thing is damaged or destroyed. However, he/she is not entitled to claim damages for the destruction of the IoT device itself.

The liability under the product liability act does not require fault. Nevertheless, liability risks for IoT stakeholders are manageable due to exclusions of liability and the kind of damages awardable under German law. First, liability is excluded if the product was not yet defective when it was put into circulation (section 1, paragraph 2, number 2 of the product liability act) and/or if the defect could not yet be discerned, having regard to the state of art at the time when the producer put the product into circulation (section 1, paragraph 2, number 5). Consequently, a manufacturer violating its obligation to monitor its products after placing them on the market, for example, by not recalling products later turning out to be dangerous, is not liable under the product liability act. He is, however, liable pursuant to section 823 et seq. of the German Civil Code, but only if there is proof of fault. Second, German law does not recognize punitive damages as known best in the jurisdictions of the USA and Great Britain to punish for extraordinary wrong behavior.

Liability of Distributors of IoT Devices

In most cases, the user will acquire an IoT device not directly from the manufacturer, but from a distributor. If an IoT device is defective at the time of the transfer of risks, the abovementioned contractual warranty rights apply (cure,

revocation, reduction of price, damages). However, as compensation claims require fault, damages can only be claimed from the vendor if the defect was discernible to him. As the distributors of IoT devices have not constructed the item and defects are often hidden, they will often be able to exculpate themselves. In the absence of fault, the extra-contractual liability pursuant to section 823 of the German Civil Code will regularly be excluded as well. The product liability act is inapplicable as it only governs the liability of the product manufacturers.

Liability of Data Platforms

As IoT implies the storage of a big quantity of data on data platforms, liability comes into play if, due to a malfunctioning of the platform or a hacker attack, data get lost. If there is a contractual link between the user of a device and the platform to which the data are sent, the platform may be liable for a loss of data pursuant to section 280 of the German Civil Code, as the safe storage of data constitutes a contractual obligation of the data platform. Fault is presumed (section 280, paragraph 1 of the German Civil Code). In the absence of a contract, section 823 of the German Civil Code applies. The destruction of data qualifies as violation of the right of property that is protected by the provision. Again, as stated above, contrary to the contractual liability under section 280 of the German Civil Code, fault is not presumed, but has to be proved by the damaged person. However, compensation pursuant to section 280 or 823 of the German Civil Code may only be claimed if the user proves that he has suffered material damage. An immaterial damage (a damage that is not a pecuniary loss) is only compensable in cases explicitly mentioned by law (section 253, paragraphs 1 and 2 of the German Civil Code: violation of body, health, freedom, or sexual self-determination). The mere loss of property does not qualify for compensation. That means that in most cases in which a security leak of a data platform causes a loss of data of a consumer (e.g. data of a consumer about the steps counted by a pedometer are destroyed), it will be difficult to prove the existence of material damage as the lost data have no or just a small material value. The situation is, however, different if business data get lost; for example, if data collected by a smart mirror that serve to evaluate the buying behavior of customers are transferred to a data platform and get lost because of a malfunctioning of the data platform. As data serve to increase productivity by adapting production to the customers' needs, they are of material value.

Challenges and Open Questions

The IoT poses a number of new challenges related to liability and consumer protection to which the current national legal framework seems inadequate. First of all, IoT involves many different IoT stakeholders and thus complicates the attribution of responsibilities. As things, even if they act autonomously due to their integrated software, cannot be held liable in case damage is caused, the point of reference of liability has to be found in a previous act or omission of one of the stakeholders above mentioned. This may be difficult in cases more than just one IoT stakeholder is involved. Things get even more complicated if the IoT stakeholders involved originate from different countries. If, for instance, a user in Germany buys an IoT device from a French manufacturer and installs an application of a US company that, due to a security leak, causes damage, it may be difficult to determine the applicable law.

Liability today is a national legal issue and IoT, with its approach to connect things globally via the internet, blurs national boundaries. This raises the question of the necessity of a global framework for the IoT.

Outlook: A Global Framework for the IoT

The creation of a global framework for IoT would certainly help solving a considerable number of problems outlined above. First of all, in a global framework for IoT, the points of reference for liability could be defined regardless of national boundaries and national legislation. This would avoid loopholes in protection currently present because of different national laws granting varied protection for the same issue. Just the same applies with regard to data protection legislation. A global, uniform level of protection is likely to increase the confidence of consumers in IoT products. Existing national legislation currently applicable to IoT-related issues would not contravene this global framework. Rather, would national laws be superseded by the new global framework? Be it because the global framework would be considered as the more specific legislation, or because global legislation would rank higher than national legislation?

Additionally, specific provisions of substantive law taking account of the particularities of IoT could be implemented in a global legal framework. This would be particularly useful as national laws have frequently been drafted a long time before the invention of computers and the internet. As a consequence, not all IoT-related issues with regard to which liability of IoT stakeholders seems to be fair and just are covered by the traditional provisions of national laws. Specific data protection regulation for IoT-related issues is also

conceivable. Present data protection legislation might in some places be too rigid and in others be too limited with regard to the necessities posed by IoT.

Moreover, in a global framework for IoT, the circle of persons and entities responsible and liable could be defined taking into account the particularities of IoT such as the high number of IoT stakeholders typically involved in the commercialization of a single IoT product.

Having the aforesaid arguments in favor of a global framework of IoT in mind, the crucial question is if such framework is feasible. Keeping in mind that drafting and finalizing EU legislation can be a lengthy process due to differences of opinions of the various countries and (legal) cultures involved, it does not take much creativity to imagine how long it might take to agree on a global framework for such a complex subject matter as the IoT. Therefore, a global framework dealing with IoT-related issues is still dreams of the future that will—with the need for and potential advantages of IoT-specific legislation in mind—hopefully become true at some point of time.

Bibliography

- Bräutigam, P., & Klindt, T. (2015). Industrie 4.0, das Internet der Dinge und das Recht. *NJW*, 2015(16), 1137–1141.
- Federal Office for Information Security. (2009). *BSI-standards*. Retrieved August 7, 2015 from <https://www.bsi.bund.de/EN/Publications/BSIStandards/standards.html>
- Friess, P., & Vermesan, O. (2013). *Internet of things-converging technologies for smart environments and integrated ecosystems*. Aalborg: River Publishers.
- Gartner (2013). *Gartner Says the Internet of Things Installed Base Will Grow to 26 Billion Units By*. Retrieved August 7, 2015 from <http://www.gartner.com/newsroom/id/2636073>
- Habersack, M., Papier, H-J., Schäfer, C., Schmidt, K., Schwab, M., Ulmer, P., & Wagner, G. (2013). *Münchener Kommentar zum Bürgerlichen Gesetzbuch: BGB Band 5: Schuldrecht – Besonderer Teil III §§ 705–853, Partnerschaftsgesellschaftsgesetz, Produkthaftungsgesetz*. München: C.H. Beck.
- Kilian, W., & Heussen, B. (2013). *Computerrechts-Handbuch – Informationstechnologie in der Rechts- und Wirtschaftspraxis*. München: C.H. Beck.
- Porter, M. E., & Heppelmann, J. E. (2014). How smart, connected products are transforming competition. *Harvard Business Review*, 92(11), 64–88.
- Reinhard, T., Pohl, L., Capellaro, H. C., Bäumer, U., Breithaupt, J., Ewald, K., et al. (2007). *IT-Sicherheit und Recht – Rechtliche und technisch-organisatorische Aspekte für Unternehmen*. Berlin: Erich Schmidt Verlag.

- Vermesan, O., Harrison, M., Vogt, H., Kalaboukas, K., Tomasella, M., Wouters, K., et al. (2009, September 15). *Internet of things-strategic research roadmap*. Brussels: European Commission and ETSI.
- Von Staudinger, J., Hager, J., & Oechsler, J. (2013). *J. Von Staudingers Kommentar zum Bürgerlichen Gesetzbuch: Staudinger BGB – Buch 2: Recht der Schuldverhältnisse §§ 826–829; ProdHaftG (Unerlaubte Handlungen Produkthaftung)*. Berlin: Sellier – de Gruyter.
- Working Party under Article 29 of Directive 95/46/EC. (2011). *Opinion 15/2011 on the definition of consent*. Brussels: European Commission.
- Working Party under Article 29 of Directive 95/46/EC. (2014). *Opinion 8/2014 on the on recent development on the internet of things*. Brussels: European Commission.

Part 5

Leading the Change

20

Establishing Continuous Change

Erik Strauss, Jürgen Weber, and Susanne Zubler

Ideas in Brief The subject of change has never been more relevant than today, as almost every organization has to undergo radical transitions to be able to continuously change and adapt to the dynamic economic conditions. Although the ability to change continuously has been primarily associated with private corporations, it is also relevant for public organizations because this type of organizations is moving from a public administration to a market-oriented logic. Based on an institutional theory framework, this study investigates how a shift from a public-administration logic to a market-oriented logic can be accomplished to enable the organizations to change continuously. Evidence from a German federal agency shows that a radical change is a possibility to establish the abilities of continuous change because it can be associated with shifts in power structures in the organizational field to overcome inert interdependencies between contextual intra-organizational dynamics.

E. Strauss (✉)

Witten/Herdecke University, Witten, Germany

e-mail: erik.strauss@uni-wh.de

J. Weber (✉)

Institute of Management Accounting and Control, WHU – Otto Beisheim School of Management, Vallendar, Germany

e-mail: juergen.weber@whu.edu

S. Zubler

Corporate Development and Strategy, Swiss Ministry of Finance, Zurich, Switzerland

© The Editor(s) (if applicable) and The Author(s) 2017

H. Ellermann et al. (eds.), *The Palgrave Handbook of Managing Continuous Business Transformation*, DOI 10.1057/978-1-137-60228-2_20

Accordingly, our results show that not only political authorities directly can intervene in a federal agency's business activities but also can an institutional entrepreneur engage in activities to influence contextual dynamics and mobilize external allies for her/his change project. Therefore, our results unravel how change agents and a radical change project that affected organizational members' value commitments can contribute to the institutionalization of a new template, that is, the template of continuous change.

Keywords Market-oriented logic • Public-administration logic • Radical versus continuous change

Introduction

Organizations are confronted with ever changing economic conditions to which they have to adapt in order to survive. While some building blocks of economies seemed to be stable in prior decades, the financial crisis and its consequences like bankruptcies of multinational banks or entire countries have shown that everything can change nowadays. As a result of this new situation, organizations can't rely on temporally limited change projects anymore but have to establish a continuous change culture (e.g., Benn et al. 2014; Thomas et al. 2011). Many studies have acknowledged this requirement for organizations but primarily focused on private or hybrid corporations (e.g., Jay 2013; Langley et al. 2013; Pache and Santos 2013). However, public organizations play also an important role for the economy and seem to face even more challenging situations as this kind of organization is characterized by inertia due to their strong institutional embeddedness (Modell 2004). Therefore, the aim of our study is to shed some light on how public organizations establish a culture of continuous change to deal with the ever changing economic conditions and how they overcome inertia by using a radical change project to initiate continuous change.

Our theoretical point of departure is the model of Greenwood and Hinings (1996) for understanding radical organizational change that concentrates on the interplay of contextual and intra-organizational dynamics, but we also integrated the notion of institutional entrepreneurship (Battilana et al. 2009) to account for the activities of actors who initiate and implement change. Integrating this two streams of literature bridging the old and new institutionalisms (Hardy and Maguire 2008, p. 198) helped to overcome the overly functionalist explanation of organizational structures and the preference for coherence and stability in organizational forms inherent in the original framework (Kirkpatrick and Ackroyd 2003).

Departing from this adapted framework, we conducted a qualitative single case study at a German federal agency. We focused on conducting qualitative process data that provided explanations in terms of the sequences of events leading to an outcome (Langley 1999). The Federal Employment Office (FEO) provided the opportunity to study a setting where radical change occurred after a long period of stability and non-response to external pressures for change and initiated continuous change. Although the FEO had been a target of several new public management (NPM) reform initiatives that were characterized by a turn away from a Weberian bureaucratic template to a result-oriented business-like template (Lapsley and Pallot 2000), the occurrence of the business-like template and the initiatives of the Federal Ministry of the Interior were insufficient to trigger radical change (Federal Ministry of the Interior 2006). This situation supported the assumption that radical change in public agencies is an unusual event due to the strong embeddedness of the agents in the institutional field (Lapsley and Wright 2004; Greenwood and Hinings 1996; Laughlin 1991). However, contextual pressures following a public scandal increased and created the momentum for the intended radical transformation that provided the opportunity to examine a continuous change culture. The crisis caused changes in the power structure in FEO's institutional field in favor of those who demanded for radical reforms in the FEO. Following this power shift, the social legislation which was the basis for the FEO's business activities was changed and a CFO with private sector background entered the organization. He played the role of an institutional entrepreneur during the reform and engaged in activities aimed at mobilizing allies and resources for his radical change project on the institutional field level. This external support provided him with sufficient power to enforce changes within the organization and to disempower or replace opponents. Meanwhile a new functional group (i.e., the management accountants) was selected and empowered to become a change agent. The management accountants engaged in rather socializing activities to change organizational members' value commitments and to mobilize them to join in the maintenance of the new business-like template as well as to establish a continuous change culture.

The findings show that neither the institutional entrepreneur nor the change agents were highly committed to the values underlying the old bureaucratic template. This indicates that actors who initiate and implement change do not have to be conceptualized over-voluntaristic and heroic, but that divergent value commitments can be a source for change. This different value commitments do not have to be a cross-field phenomenon (Suddaby and Greenwood 2005; Durand and McGuire 2005; Boxenbaum and Battilana 2005), but can be inherent in a single organization exposed to divergent contextual pressures.

Furthermore, the findings contribute to theory on continuous change in public organizations by showing how a radical change project initiated by agents in the organization but who also actively influenced the contextual dynamics to mobilize external allies and resources can be the required starting point for implementing a continuous change culture.

The remainder of this chapter is as following: In the next section, we outline the framework that was our theoretical point of departure for the present study. Before we present our results, we explain our research method and provide more information about the research site. Finally, the chapter closes a discussion of the main findings and implications for further research.

Theoretical Framework

The present study wants to contribute toward a better understanding of continuous change by investigating how a radical change process can implement a continuous change culture. Therefore, we chose the model of Greenwood and Hinings (1996) as theoretical point of departure as it concentrates on the interplay of contextual and intra-organizational dynamics to understand radical organizational change (Fig. 20.1).

The core idea of the framework is that “A design archetype is [...] a set of ideas, beliefs and values that shape prevailing conceptions of what an organization should be doing, of how it should be doing it and how it should be judged, combined with structures and processes that serve to implement and reinforce those ideas” (Greenwood and Hinings 1988, p. 295). Changes

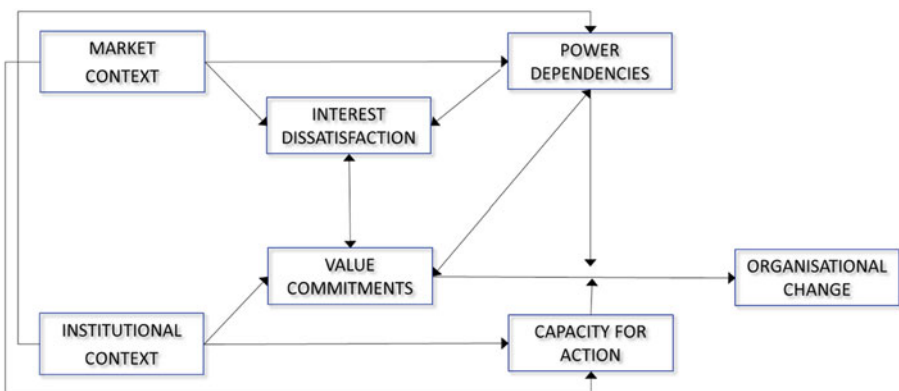


Fig. 20.1 Original framework for understanding organizational change (adapted from Greenwood and Hinings 1996, p. 1034)

in the environment interpreted by actors give rise to different perspectives about the prevailing conceptions and produce the need for change as well as create the opportunity for new templates to emerge (Oliver 1992). Due to the strong embeddedness of the bureaucratic template in organizational and institutional-level structures, the exploration of the interaction of contextual and intra-organizational dynamics seems crucial to understand change processes in embedded organizations like federal agencies (Modell 2004). To avoid an overly functionalistic perspective that is inherent in the model (Kirkpatrick and Ackroyd 2003), we integrated the concept of institutional entrepreneurs to account for different degrees of agency and to overcome the emphasis on a functionalist adoption of the organizational design to contextual demands.

Contextual Dynamics

The institutional context provides archetypal “templates of organizing” (Powell and DiMaggio 1991, p. 27) that are underpinned by the dominant ideas, values, and beliefs in the field. The organizational structures and processes as well as the management systems are a function of these ideas, values, and beliefs (Greenwood and Hinings 1993). In terms of templates, radical change occurs when an organization moves from one template to another (Greenwood and Hinings 1996). Thus, current processes of restructuring in public organizations under the label of NPM can be interpreted as an inter-archetype shift from a bureaucratic to a business-like template (Kitchener 1999; Lapsley and Pallot 2000).

NPM reforms all over the world have been characterized by a turn away from a Weberian bureaucratic template to a business-like, result-, and objective-oriented template. The bureaucratic control mechanisms that are based on hierarchical structures, rules, and formal procedures that clearly delineate the manager’s span of control (Adler 1999) are accused of being ineffective as they do not account for results. Accordingly, the new templates include fundamentally different accounting systems (Lapsley and Pallot 2000), no longer focusing on compliance and appropriate spending rules. Private accounting practices that enhance the organizational efficiency and effectiveness and ought to help closing the governance and control gaps in public organizations are seen as superior (Hoque and Moll 2001; Hood 1995). Selected initiatives to this end are the *Next Steps Initiative* in the UK (Carter and Greer 1993; Hyndman and Eden 2000; Likierman 1994) or the *Government Performance and Results Act/National Performance Review* in the USA (Cavalluzzo and Ittner 2004; Watkins and Arrington 2007).

Such inter-archetype shifts may also encompass deinstitutionalization processes. Deinstitutionalization is especially problematic if actors are strongly embedded in belief systems that shaped the structures and processes in the organization in which they operate (Zucker 1987). This is the case in the German public sector, which was for a long time isolated from other fields, due to the specific educational and career paths that limited the exchange with other sectors. The personal networks were often limited to the own sector and the diffusion of alternative templates, solutions, or methods that would enable change were rare in public agencies (Lapsley and Wright 2004). This traditionally strongly institutionalized bureaucratic template and the limited exposure to other concepts are likely to limit deinstitutionalization processes and to create resistance to change or as Laughlin puts it:

Change is not usually sought and the trauma involved in changing the interpretative schemes is something an organization will avoid, if at all possible, even though the challenge and importance of this concern to those who subscribe to the whole concept of progress and development in an evolutionary sense cannot be lightly avoided. (Laughlin 1991, p. 223)

Some institutional scholars support the view that some jolt or institutional crisis is necessary to overcome inertia and to facilitate radical change (Laughlin 1991; Seo and Creed 2002; Child et al. 2007). Therefore, actors in isolated fields started to search for alternative templates when contextual pressures increased and brought them in their own field, where they challenged the existing templates. However, there is limited evidence how actors in public organizations react to the existence of an alternative template and which additional contextual or intra-organizational dynamics may be necessary to trigger radical change that initiates continuous change.

Intra-organizational Dynamics

Following Greenwood and Hinings (1996) organizations' responses to external pressures is a function of their internal dynamics that are constituted by interests and values as well as power and capacity for action of the actors in the organization.

Interests and Value Commitments

Actors who initiate radical change and therefore contribute to the institutionalization of new templates have been termed "institutional entrepreneurs" by DiMaggio (1988). They can be individuals or groups of individuals (Fligstein

1997; Maguire et al. 2004) that take leadership roles in radical change processes (Colomy 1998). Organizations are typically divided in different groups with potentially divergent interests and value commitments (Greenwood and Hinings 1996). Thus, the seeds of alternative ways of viewing the organizations appropriate purposes and actions can lie in these different groups within the organization. Different templates privilege the interests of different organizational groups and interest dissatisfaction can become a pressure for change or resistance to change (Seo and Creed 2002). Especially professional groups have been identified as drivers of change processes as the professional group can host processes of discourse through which change is debated and endorsed (Greenwood et al. 2002). However, only if actors become conscious that their interest satisfaction is coupled to a specific organizational template, they become active to engage in or resist a change initiative (Seo and Creed 2002). The perception of these contradictions and the recognition of opportunities for change are facilitated through the occupation of a social position that is exposed to conflicting institutional demands (Thornton and Ocasio 2008). However, it is still unclear when radical inter-template change occurs, when divergent intra-template change is implemented, and how this can result in continuous change. Only those individuals or groups that initiate inter-template change and participate in the implementation and institutionalization of the new template are regarded as institutional entrepreneurs (Amis et al. 2004; Battilana et al. 2009; D'Aunno et al. 2000; Greenwood and Hinings 1996). Nevertheless, a radical transition from one template to another and therefore the institutionalization of the new template is only possible if most or all groups in the organization commit themselves to the values of the alternative template. Thus, the institutional entrepreneur needs sufficient power and capacity for action to initiate and implement change and therefore change people's value commitments throughout the whole organization.

Power and Capacity for Action

The outcome of a radical change initiative depends on the power and capacity of action of the institutional entrepreneur who initiates and implements radical, divergent change in contrast to other change agents who engage in non-divergent change (Greenwood and Hinings 1996; Battilana et al. 2009). Battilana et al. (2009) distinguish two categories of activities conducted by an institutional entrepreneur to implement change, for example, creating a vision for change and mobilizing allies. The former entails different forms of framing. Diagnostic framing makes the failing of the existing template visible, while prognostic framing seeks to legitimize the alternative template in

comparison to the existing one (Suddaby and Greenwood 2005; Creed et al. 2002). As a third dimension, motivational framing entails providing convincing arguments to support the implementation of the new template (Misangyi et al. 2008). The capacity to mobilize allies is closely linked to the power position of the institutional entrepreneur. As Fligstein (1991, p. 313) declares:

Change...can only occur when either a new set of actors gains power or it is in the interest of those in power to alter the organizations goals.

An institutional entrepreneur needs to mobilize resources that help him/her to convince other groups in the organization to endorse the implementation of the alternative template. Resources like formal authority (Phillips et al. 2000), informal network positions, and financial resources enhance the institutional entrepreneurs' power position and facilitate the implementation of the change project (Battilana et al. 2009).

The institutional context has an impact on the resources available to the institutional entrepreneur and other groups in the organization as it provides alternative templates that incorporate legitimate power structures (Thornton and Ocasio 1999). Such structures are typically institutionalized in regulative elements that directly affect resource flows and business activities of the agencies (Edelman and Suchman 1997).

In the present case of a federal agency, the market context is specific as an agency is not exposed to market competition or changing consumer demand. Thus the market context as a trigger for radical change seems to be less relevant for government agencies (D'Aunno et al. 2000), at least as long as corporatization and privatization are politically inopportune and private competitors do not enter the field. Therefore, the importance attached to the institutional context may be comparably higher than in other settings.

Method

The present single case study is grounded in the interpretative research paradigm and therefore fundamentally concerned with meanings and the understanding of organizational members' definition of the change process (e.g., Schwandt 1994). Thus, the research approach involves building a second-order theory of organizational members' interpretation of the change process (Schutz 1973). We moved back and forth between data and theory, where we used the abovementioned framework as sensitizing and orienting concept that was examined through the data collected to surface multiple interpretations of the change process (e.g., Ahrens and Chapman 2004).

Research Site

The FEO is a federal agency and provides employment and labor market services. It is under the control of the Federal Ministry of Labor and Social Affairs and organized as a public corporation. The board of directors consists of employees, employers, and the public corporation's representatives. Accordingly, the clients and premium payers of the unemployment insurance are represented in the board of directors. The executive board is responsible for the day-to-day operational management of the FEO. It provides the annual budget and report subject to approval by the board of directors.

The leeway in decision making and managerial functions is constrained by the dense social legislation that defines the possible measures taken within the employment and labor market services as well as the organizational structures of the FEO. Besides some minor private service providers, the FEO with its regulatory authority, the Federal Ministry of Labor and Social Affairs, is the main actor in the field. The FEO has a monopolist position, no other organization offering similar services in the German labor market. The specific social legislation limits the comparability to other public organizations in Germany or social service providers in other countries. Thus the interaction with actors outside the FEO or its regulatory authority is rare.

Data Collection

The data collection began in February 2009 and is the starting point for a larger research program based on a longitudinal observation of change (Langley 1999; Locke 2005). This longitudinal design of the study is critical to unravel the ways in which change took place. In addition, it responds to calls (Modell et al. 2007; Modell 2003; Dillard et al. 2004) to broaden management accounting research beyond intra-organizational path dependencies on which it primarily focused (Burns and Scapens 2000).

To assess the organizational members' interpretation of the change process in the FEO, three types of data were collected, that is, interviews, meeting observations, and archival documents. To prepare for the interviews and meeting observations and to further specify and refine interpretations, we collected and analyzed the following types of archival data. First, we were given access to internal documents related to the reform projects and the current management accounting practices at the FEO, for example, legislative documents, decrees, programs operated, scratch papers, manuals of accounting tools in use, annual and monthly reports. Second, the Federal Ministry of Labor and Social Affairs, the regulatory authority of the FEO, mandated two social

research institutes (WZB—Wissenschaftszentrum Berlin für Sozialforschung; Infas—Institut für angewandte Sozialwissenschaften GmbH) to evaluate the reform programs in respect of the improvement of the quality and speed of the internal processes. The results of this evaluation provide rich background information about the change process. Finally, we also collected publicly available archival documents helpful for understanding the political context. Most of the documents are related to the actual change process under observation. However, the collected and analyzed data goes back to 1993 and also covers former change initiatives that had little impact on the organization. The archival data in combination with the information gathered through the interviews allows examining the interplay between former government initiatives, a public scandal in 2002, and the intra-organizational dynamics at the FEO to understand the actual developments in the FEO and its organizational field. Overall, we analyzed more than 1000 pages of material. The historical material was handed out after an initial interview with our contact person in February 2009. Additional material concerning recent developments was handed out in May 2010 and a majority of the interview partners in the financial department in the headquarters underlined their statements with documents.

In total, we conducted 31 interviews with managers, financial managers, and management accountants in the headquarters, a subsidiary, and a subunit of the FEO (see Table 20.1). Even though the organization is large, multilevel and hierarchical as it is common in the German civil service, the structures in the headquarters are lean. The about 400 employees in the headquarters are not involved in the provision of front-line labor market services. Due to the lean structures in the headquarters, the financial and non-financial managers are strongly linked to the executive team members and have a good overview over the projects initiated in the headquarters. As the initial interviews and archival data revealed, that the change process was clearly initiated in the headquarters and driven top-down, the majority of the interviews were conducted in the headquarters, while the interviews in the subsidiary and the subunit should provide more information about the reception of the initiative.

We conducted problem-centered interviews (PCI), a concept that borrows largely from theoretical foundations (Glaser and Strauss 1967), which incorporate theory-generating procedures. The previous theoretical knowledge is seen as a sensitizing concept (Marginson 1999; Berry et al. 1991) and serves as a framework for questions during the interview. The PCI procedure insures that the pre-existing concepts do not predetermine the data collection and that the sensitizing theory is not superimposed upon the collected data (Witzel 2000, paragraph 3). The PCI combines narration-based and topical interview

Table 20.1 Overview of conducted interviews

Date	Interviewee	Location	Duration	Documentation
16.02.2009	Financial manager	On-site	01:00	Detailed notes
07.05.2010	headquarters	On-site	00:38	Tape-recorded
08.10.2009	Manager headquarters	On-site	01:00	Detailed notes
12.10.2009	Financial manager headquarters	On-site	00:45	Detailed notes
12.10.2009	Financial manager	On-site	01:10	Detailed notes
13.10.2009	headquarters	On-site	02:00	Detailed notes
26.11.2010		University	01:37	Tape-recorded
13.10.2009	Management accountant headquarters	On-site	01:00	Detailed notes
13.10.2009	Management accountant headquarters	On-site	01:00	Detailed notes
14.10.2009	Management accountant headquarters	On-site	00:30	Detailed notes
14.10.2009	Management accountant headquarters	On-site	01:30	Detailed notes
14.10.2009	Management accountant headquarters	On-site	01:00	Detailed notes
15.10.2009	Financial manager headquarters	On-site	01:30	Detailed notes
16.10.2009	Management accountant headquarters	On-site	01:00	Detailed notes
16.10.2009	Financial manager headquarters	On-site	01:15	Detailed notes
19.01.2010	Manager headquarters	On-site	01:22	Tape-recorded
20.01.2010	Manager headquarters	On-site	01:03	Tape-recorded
21.01.2010	Manager headquarters	On-site	38:00	Tape-recorded
25.01.2010	Management board member subunit	On-site	01:15	Detailed notes
25.01.2010	Manager subunit	On-site	39:00	Tape-recorded
26.01.2010	Financial manager	On-site	01:05	Tape-recorded
26.01.2010	Manager subunit	On-site	00:50	Tape-recorded
27.01.2010	Local management accountant	On-site	01:00	Tape-recorded
27.01.2010	Management board member subunit	On-site	00:53	Tape-recorded
28.01.2010	Management board member subsidiary	On-site	00:57	Tape-recorded
28.01.2010	Management board member subsidiary	On-site	01:16	Tape-recorded
29.01.2010	Management accountant subsidiary	One-site	01:07	Tape-recorded
29.01.2010	Manager subsidiary	On-site	01:33	Tape-recorded
01.02.2010	Financial manager subsidiary	On-site	01:02	Tape-recorded
01.02.2010	Manager subsidiary	On-site	01:13	Tape-recorded
01.02.2010	Manager subsidiary	On-site	01:24	Tape-recorded

elements. Therefore, the interviews were opened with a narration-generating question, and the structuring of the first phase of the interviews was up to the interviewees to reconstruct their opinions attributed to experiences and their perspective on specific events during the change process. During the narrative part of the interview, communication strategies to generate storytelling were envisaged and helped to break down the artificialness of the interview situation. General explorative techniques, that employ aspects of the interviewees' responses, were used to disclose and understand his/her view of the problem and to show the researcher's interest in the topic (Witzel 2000, paragraph 14). Ad hoc questions were used, if certain relevant topics were left out by the interviewees, but we tried not to interrupt the storytelling and therefore postponed ad hoc questions (Witzel 2000, paragraph 15). At the end of the interviews, topical elements were brought in to build a coherent story from the different perspectives of the interviewees.

The antecedent collection and analysis of archival data and therefore an adequate knowledge of the verticals of the reform program were helpful to conduct this type of interview, because we were able to integrate the interviewee's responses in the overall story and interact with the interviewees during the interview. The interviews were only partially tape-recorded to avoid any bias related to politically sensitive topics around the reform process. Instead, we relied on respondent validation by discussing interview summaries with the interviewees or additional follow-up meetings to clarify certain topics. With the exception of one interview, all interviews were held in the interviewee's office, which created a relaxed atmosphere and motivated them to underline their statements with additional data, like presentations, reports, or organization charts.

Additionally, we gained permission to observe several meetings during the yearly budgeting and target negotiation phase in November and December 2009. The discussions provided us with more situated details about the arguments and the underlying data for decision-making processes and the power positions of different groups. Before and after the meetings, informal talks with the participants to gain additional information about the meetings and especially their attitudes toward the topics and the results of the meetings were possible.

Data Analysis

The data analysis started with the analysis of the archival data that provided first verticals and a temporal frame of the change processes. Using a narrative strategy, a detailed story of the change process at the FEO was prepared

to assess the organizational members' understanding of this process (Langley 1999). This was achieved by examining the interviews case by case to account for emerging stories before moving to the next interview. Adding additional interviews provided further detail about what happened and who did what, when, and why.

To further structure the description of the organizational processes, a temporal bracketing strategy was used to decompose the story into periods that share a common set of activities and sense-making processes (Langley 1999). Briefly these periods are stability (e.g. dominance of the bureaucratic template), crisis that challenged the legitimacy of the template, development of a new business-like template, transition to the new template, and stabilizing the new template. These periods and the sets of activities that characterize them are described in detail in the next section. This strategy helped us not only to deal with the data amount but also to examine the effects of certain actions in subsequent phases. In a cyclical process, the themes that emerged in the different phases were linked to the theoretical conceptions that informed the case study. However, this process also initiated a recurrent examination of the literature and the adaption of the initial framework.

Radical Change to Initiate Continuous Change

New Public Management as an Alternative Template for the German Public Sector

Until the NPM initiatives were introduced, the public sector was tightly coupled with a clearly legitimated organizational template and consistent expectations, combined with monitoring mechanisms to ensure compliance with this template. In Germany, the monitoring mechanisms are reflected in a dense legislation and the activities within the federal agencies are subject to detailed regulatory statutes. However, in recent years, the German public sector has increasingly been characterized by competing ideas, since the NPM initiatives brought in elements of a business-like private sector management model, while the bureaucratic values were still influential.

NPM reforms started in Germany in the 1990s at local government level, initiated by the development center for public management that was founded in 1949 by municipalities and towns. At federal level, the initiative *Modern State—Modern Civil Service* (The Federal Government 1999) was started in 1999 and implemented during the following seven years. The first phase of the initiative from 1999 to 2002 focused on the organizational restructuring

of the federal agencies and the implementation of so-called “modern management.” Critical elements of this modern management were management by objectives and management accounting, whereby federal agencies ought to be held accountable for the efficient delivery of services and the outcomes in terms of effects for citizens or the society as a whole (The Federal Government 2002). Private sector-oriented management accounting practices were regarded as a precondition for good governance, because they would allow to make public managers accountable for their decisions (Federal Ministry of the Interior 2004). However, the evaluation of the reform program *Modern State—Modern Civil Service* by the Federal Ministry of the Interior showed that in many cases, the programs and measures had not been successfully implemented and that further coordinated efforts would be necessary to meet the actual demands on government and civil services (Federal Ministry of the Interior 2006). The FEO’s progress to adopt the new template following the reform program *Modern State—Modern Civil Service* resembles these general developments. In the FEO, organizational development programs were set up to enhance the performance orientation in reaction to the rather general calls for a new business-like management model. During these programs, new processes were defined and documented in every detail to improve the efficiency of the working processes and to enhance the organizations’ performance. To foster the new performance orientation and to enable the formulation and control of quantifiable performance targets, the necessity to adopt an elaborated management accounting system was stated. The existing fiscal accounting was only designed to provide the legally required financial data. In addition to the financial data, statistical information about unemployment placement and other labor market statistics were provided to render an account of the FEO’s business operations. Both fiscal accounting and statistics were part of the existing template and in line with the general belief that it is the social duty of the organization and therefore its employees to spend the available budget to help the unemployed:

Before 2003, the input orientation was dominant. It was all about spending the available money; if a manager spent his budget his task was completed. Outcome and thus they question: “what do I achieve with the money I am spending?” was just irrelevant. It was not part of people’s reality in the FEO. (Financial manager headquarters)

The new performance orientation did neither fit in the existing template nor was it able to challenge the prevalent values in the FEO. The pacing of the adoption process was moderate, because the engineering of the work processes

took time. Middle management and front-line employees had to be convinced to participate in the change process and to articulate their knowledge about work processes. Therefore, quality circles were installed and a collective attempt to slowly improve the FEO's operations was communicated inside and outside the organization. However, in fact, the performance orientation disappeared during the adoption process. While new processes were defined and documented in every detail to enhance performance, performance targets were not formulated and management accounting practices to measure them were not adopted.

In the phase depicted above, there was no institutional entrepreneur within the organization who tried to initiate radical change or engaged in the implementation of such an endeavor. Instead the actors in the organization rather engaged in the maintenance of the existing template and the alignment of the changes with the dominant values and beliefs.

Institutional Crisis That Triggered Radical Change

In January 2002, the German federal employment court of auditors published an audit report that held the FEO responsible for manipulated statistics, which described the number of placements by reason of FEO's active labor market measures. This scandal gave also rise to an intensified discussion about the poor performance of the organization and the lack of results of previous reforms. In reaction to that, the German federal government instated a committee for *Modern Services in the Labor Market* in February 2002 and entrusted it with the elaboration of a concept to improve the employment and labor market services. The aim was not only to enable governance and control but also to enhance the efficiency of the employment and labor market services. In the legislative procedure, the measures were transformed into four acts reforming the social legislation *Hartz I–IV*. Since the dominant values and beliefs in the field are reflected in the social legislation that guides the actions of the agencies, the release of the Hartz legislation provided a legal basis for the new business-like template. Hartz I and II concerned the range and design of measures in the unemployment and labor market services and came into effect on January 1, 2003. Hartz III regulated the restructuring of the FEO, symbolized through a formal renaming and came into effect on January 1, 2004. The final Hartz legislation, Hartz IV, concerned the administrative consolidation of unemployment assistance and social welfare; Hartz IV came into effect on January 1, 2005.

In parallel to the committee for *Modern Services in the Labor Market*, a new CFO with private sector background was hired to manage the restructuring of the FEO.

The change process was initiated by the statistics scandal. Wrong statistics were published from the FEO and that caused a stir. After the scandal a manager with a private sector background came on board. It was his aim to transform the FEO into a firm, a service provider with a stronger economic target orientation. That was the starting point for the changes that took place. (Management accountant headquarters)

He was mandated to analyze the possibility to transform the FEO in order to make the organization governable and controllable. The government even considered the closing down of the organization if there would not be a satisfactory concept for the restructuring. The statistics scandal had catalyzed the rivalry between proponents of the status quo and those who initiated change. The scandal and the publicity it caused changed the power balance in the organizational field and therefore laid the foundation for changes in the social legislation and the FEO. These developments not only increased the pressures on the FEO to implement change, but also provided the legal basis and thus the possibility for radical change, which had not been possible under the old legislation. The statistics scandal facilitated diagnostic framing activities for the proponents of a radical change process as it made the failing of the bureaucratic organization visible. The wrong numbers were constructed as a symptom of the inferior bureaucratic template with its lack of control and governance that caused uncontrollable expenses and manipulated statistics. Adopting this diagnostic frame, the introduction of a business-like template was introduced as a superior solution referencing NPM initiatives and the private sector. Business-like management was thus selected as a prognostic frame and the foundations for its implementation laid through the changes in the social legislation.

Development of a New Business-Like Organizational Design

The business-like template was introduced as a prognostic frame through FEO's regulatory authority and the Hartz commission. However, the business-like template had to be conceptualized to provide an alternative that resonated with the values and interests of the different stakeholders

and that accounted for the structural differences between the private and the public sector. Additionally, a change project had to be set up to manage the transition from the bureaucratic to the business-like template. This task was assigned to the private sector manager, who was hired to transform the FEO and, therefore, introduced in the role of an institutional entrepreneur. He entered the organization in the position of the CFO and received the budget to assemble a core team that consisted mainly of external consultants and some members of the FEO that would help him to conceptualize and roll out the business-like template. This core team was assigned to develop a new business-like template that rests upon the implementation of private sector concepts to create a transparent, performance-oriented, and efficient agency.

At the beginning we were installed in concurrence to the headquarters to build a new organization from scratch. The consultants were an important factor, because they provided the new concept. There was little to no initiative from within the FEO. (Financial manager headquarters)

In contrast to the rather abstract claims of the government initiative, the concept of the business-like template for the FEO provided a sound organizational design and a change project for its implementation. The new template involved changes in the three essential elements of an organizational design, the horizontal and vertical structures, the decision systems, and the human resource systems (Greenwood and Hinings 1993).

The organizational structures should be altered in the headquarters as well as in the subsidiaries with the primary aim to be able to make managers on all levels accountable for their actions. Therefore, clear targets and responsibilities were defined and a single line of command toward the subsidiaries was set up. Such targets were completely new to the organization and the necessary data basis had to be configured.

Specific targets in the organization were rare, targets that defined where the process should go. Of course, there were budget targets or specific labor market measurements that should be used, but for a manager it was variable where to direct his efforts. The actual situation with the clear target system is completely new and not comparable to what we had before. (Manager subsidiary)

The former primary target was exhausting the budget and outcome targets were neither measurable nor binding. According to the internal documents, this was regarded as the main factor that hindered a successful management

of the organization. Following the single line of command, the outcome and budget targets would be agreed upon between headquarters and subsidiaries. The CEOs of the subsidiaries in turn would be accountable for the performance and outcome of their unit and of the corresponding subunits. Additionally, the introduction of benchmarking practices should increase the transparency in the organization by allowing a comparison of the managers' performances. The vertical processes were also restructured and aligned to the clients' needs to improve the service quality and efficiency. The new decision system was no longer input oriented, but focused on outcome and efficiency. The newly adopted management accounting and control practices should provide the necessary outcome and cost information, whereby the initial focus should lay on the outcome-oriented information.

The changes in the human resources system involved performance-oriented payments and were supposed to support the efforts in the other elements of the organizational design. To enable changes in the human resources system, the civil servant status had to be abolished. This abolishment made it possible to link the target achievement to the career development and compensation of the managers. Even though the variable part of the compensation would be quite small, the promotion of the managers would strictly depend on their former target achievement. Earlier, managers were more or less automatically promoted after a certain period of time and their rather symbolic accountability had no impact on their career.

The new business-like template should also include a new functional group, the management accountants. Following the management accountants work role description, their task should include checking and balancing managers' activities to assure the rationality of decisions, on top of the bundle of tasks concerned with decision support and management control by means of management accounting methods such as business planning, cost accounting, budgeting, capital budgeting, reporting, and performance measurement. Additionally, the management accountants should substantiate the strategic objectives for the line managers of the subsidiaries and the subunits and assure their implementation in accordance with the new business-like template. Therefore, management accountants should act as change agents during the transition to the new organizational template.

All aspects of the new organizational design should be elementary and robust to achieve a fast and successful rollout. The speed of the process was essential as the government expected quick achievements that would assure

the political support for the reform. In contrast to the tangible elements of the organizational design, the underpinning values and beliefs and their diffusion in the organization were not an issue. According to the interview partners, even though the external pressures and the internal attempts to develop a new business-like organizational design were familiar to the members of the organization, neither a radical change nor an initiation of continuous change was expected. Instead, most people predicted another reform with little impact on their daily activities.

The statistics scandal served as a wake-up-call for the people in the organization and it was quite clear, that something would happen. On the other hand, there have been a lot of reforms before, which did not have an effect. People were skeptical and thought "ok, that is the next reform and it will pass as the others before". (Financial manager headquarters)

This situation changed in 2004 when the Hartz III legislation came into effect and the implementation of the business-like organizational design was authorized. To receive this authorization and the necessary resources to conduct the change project, the prognostic framing activities in this phase of the change process were mainly directed toward the supervisory committee and the political authorities. The specificity of the business-like template and a clear strategy for its implementation provided the possibility to depict the presented template as the optimal solution and therefore facilitated the prognostic framing activities. With the authorization, the prognostic frame was clearly legitimized and the institutional entrepreneur received the necessary resources to start the change project.

Transition to the New Business-Like Organizational Design

The authorization of the new organizational design was accompanied by the promotion of the former CFO as a champion of the change project who became CEO. This promotion underlined the political legitimacy of his endeavors and provided him with substantial power in the organization. Nevertheless, the newly assigned CEO was under intense pressure from the government and the supervisory committee to realize quick results to keep his external allies motivated to support the change project and to provide him continuously with the necessary resources and politi-

cal support. Thus keeping allies in the FEO's institutional field mobilized throughout the change process was important. In the change project, the institutional entrepreneur relied on the support of external consultants to impose changes which were strictly executed, whereby the external pressures supported the prognostic framing activities in the organization and helped to create an atmosphere of urgency and inevitability within the organization.

Even though hierarchical authority had been widely accepted in the former bureaucratic template, the managing directors of the subsidiaries had been highly autonomous with virtually unquestioned power in their units. Those who were not willing to follow the reforms were strictly replaced. Due to the former civil service career paths, most of these managers were over 50 years old and were compensated with generous retirement packages. In return, these retirements opened new job opportunities for proponents of the new business-like template.

The headquarters implemented actions that made clear that they are serious about the reform. Managers who resisted the reform received another position or were retired. They still earned their money, but their image was completely damaged. Additionally, they relied on consultants to drive the reform top-down in the organization. Such intensity was new, former reforms were never driven in the organization which such intensity. I think there was no faster way to implement the reform. (Financial manager headquarters)

In 2004, many CEO's of the subsidiaries were replaced. They were not replaced due to a lack of competence, but because they could not cope with the new mode. Until 2003, the FEO was characterized by its social duty and then the logic changed completely and the managers should achieve outcome and received quantified targets. This fundamental logic change was not feasible for everyone. Additionally, the MDs had a high hierarchical position and they had problems to accept a reduction of their power on a personal level, to accept instructions from the headquarters. They had been highly independent local princes and the headquarters did not dare to intervene in their business before the reform. It was a novel departure not only on the top level. Managers' positions were advertised internally and the former managers and employees could apply. These processes even reached the team leader level. We had a high personnel turnover in these days. (Management accountant headquarters)

Nevertheless, there were also existing managers within the organization who appreciated the upcoming changes.

It is hard to say when I exactly realized that something would radically change in the organization. It was not immediately after the statistics scandal, but I would say

2003 or 2004. This awareness was coupled with the hope, that we would be a completely new organization. An organization, for which I would prefer to work, compared to what we had before. (Management board member subsidiary)

The speed and intensity of the intervention prevented resistance to change from gathering momentum inside the organization. The interviewees described that the residual managers were paralyzed and self-absorbed with the understanding and enacting of their new roles. The same holds true for the newly established professional group of the management accountants. Most of them were staffed from other departments of the FEO or other public organizations and received a one-week basic management accounting training before they supported the managers handling the new planning instruments. Acting as change agents was out of reach for most of the newly hired management accountants in this phase of the change process.

Throughout this intervention, the business-like template was promoted as superior solution without alternative. This communication strategy was accompanied by the disempowerment of proponents of the bureaucratic template. Thus little attention was paid to interests, value commitments, or problems of potential allies within the organization as the institutional entrepreneur had sufficient power to drive the change process top-down. In contrast, the external legitimacy of the change project was still important and quick financial results sustained the enforcement of the changes. Even though the financial results were partially owed to the positive economic development, this window of opportunity was used to legitimize the introduction of the business-like template as the financial results were framed as a proof for the superiority of the new template.

Stabilizing the Business-Like Organizational Template

The reform program described above took two years and was slanted toward the tangible elements of the business-like template. The underlying ideas, beliefs, and values and the organizational members' identification with these had not been in focus. Motivational framing, for example, convincing people in the organization of the benefits of the new template and changing their value commitments, came to the fore when the organizational design was implemented and FEO's business operations were ensured.

At the beginning we were driving the change process top-down. We just endorsed the new structures and processes; it was a question of power. However, today we are convincing people. It took some time until the changes delivered positive results, but these

positive results help us to gain acceptance and convince people. Recently we had a debate about what may happen if the CEO as a power promoter of the change process would leave the organization. I think the managers in the organization are convinced that the new management model is superior. The new idea is in the minds of the people and we do not depend on a power promoter any longer. (Financial manager headquarters)

This does not mean that the underlying ideas were not communicated during the reform program, but as changes were enforced, it was less relevant if people in the organization believed in them or not. However, motivational framing gained relevance when the major changes had taken place and the institutional entrepreneur was trying to institutionalize and maintain the new business-like template and the idea of continuous change. As the social duty of the CEO was still important for the members of the organization, he relied on a form of motivational framing, which insisted on the fact that the new business-like template delivered a higher outcome with fewer resources and thus helped the organization to fulfill its social duty. Even though the new template relied on management accounting as the new language of the organization and the quantification of the organizations targets, it was framed in a way that made it appear to be congruent with the existing norms in the social sector.

While management accounting should be established as the new language of the organization, the management accountants should get an important role as “ambassadors of the new management model” (management accountant’s role description). Starting with a small group of management accountants in the headquarters, more than 150 additional management accountants were hired during the rollout of the reform. They were responsible for a subsidiary or a subunit and supported the respective executive team and co-signed financial decisions. All of them were hired under the premise of the business-like template and took part in trainings and regular events to teach them the values and beliefs underlying the new template. In the hiring process, the most experienced individuals with a certain degree of familiarity with the business-like accounting practices were selected for the headquarters and regularly trained internally and externally afterward to provide them with the necessary skills and competencies to act continuously as change agents. Even though the management accountants were committed to the new template, their motivation to enact the role of a change or maintenance agent also originated from their awareness that their power position depended on the new template. The management accounting function in the headquarters reported directly to the CEO and represented his interests in the annual

target agreement meetings. In the subsidiaries, management accountants had to co-sign all decisions that had a substantial financial impact and had no reporting line to the respective manager, but could escalate differences to the headquarters. That resulted in a power constellation that was not feasible in a bureaucratic template. Even though the management accountants in the headquarters acted as standard setters and monitored the compliance with these standards and therefore relied on their power position, they also engaged in other forms of motivational framing. For that reason, management accountants tried to act as role models.

The main part of our job is communication; talking to the people and helping them to solve their problems the right way. We can prove the value of the new way of doing things. If they are convinced that they can count on us, we can establish a trustful relationship. That's important, I always tell my management accountants. (Financial manager, headquarters)

Building a trustful relationship with managers and providing them with compelling reasons to rely on the new methods and instruments were even more important for the local management accountants who saw themselves as much as part of the local management team as members of the management accounting group. They achieved this relationship by proactively providing a range of services for the managers that should meet their needs.

When we started with the new management and accounting systems, the managers did not really have an expectation, what we should offer. They were just confronted with our products. We developed these products further relying on the feedback we received from the managers. However, these products are only one part of our job; the advisory service is also an important part. A high quality of the advisory service is crucial, because the managers have to work with our accounting figures. This starts with the necessity to understand the key performance indicators and ends with the cause and effect relations the managers have to understand in order to be able to take decisions that increase their performance. (Financial Manager Subsidiary)

Thus the management accountants focused on demonstrating benefits and improvements that were achievable in the business-like template.

The forceful intervention from the headquarters relying on formal authority and sanctioning mechanisms which we described in the former phases of the change process did not disappear completely, but formed the frame for the rather socializing activities that helped to convince and mobilize the

people in the organization. As more and more managers committed themselves to the new values and joined in maintaining the new institutionalized practices, power and authority became less important to maintain the changes and enable a continuous change culture.

Discussion

Organizations are confronted with ever changing economic conditions to which they have to adapt in order to survive. Bankruptcies of multinational banks or entire countries have shown that everything changes nowadays and that organizations can't rely on temporally limited change projects anymore but have to establish a continuous change culture (e.g., Benn et al. 2014; Thomas et al. 2011). Many studies have acknowledged this requirement for organizations but primarily focused on private corporations (e.g., Jay 2013; Langley et al. 2013; Pache and Santos 2013). Therefore, the target of this study was to shed some light on how public organizations establish a culture of continuous change to deal with the ever changing economic conditions and how they overcome inertia by using a radical change project to initiate continuous change. Based on an adjusted version of the framework of Greenwood and Hinings (1996), we conducted qualitative process data at FEO. At FEO, the contextual pressures initiated the change process as power shifts in the organizational field privileged the proponents of the business-like template. These power shifts and the legal actions taken by the proponents of the new template and the introduction of an institutional entrepreneur were preconditions for the radical change process at FEO that, finally, resulted in the establishment of a continuous change culture. Accordingly, the institutional entrepreneur relied on external resources and used his formal authority to enforce changes within the organization, while engaging in framing and mobilizing activities to maintain the external support for the change project. Simultaneously, the activities directed toward members of the organization focused on the identification and disempowerment of the opponents of the change process and the selection and empowerment of potential change agents. Mobilizing allies on a wide base within the organization and therefore changing their value commitments only came to the fore, when the tangible elements of the business-like template were implemented by the radical change project. However, these activities were no longer mainly driven by the institutional entrepreneur, but by a broader basis of change agents.

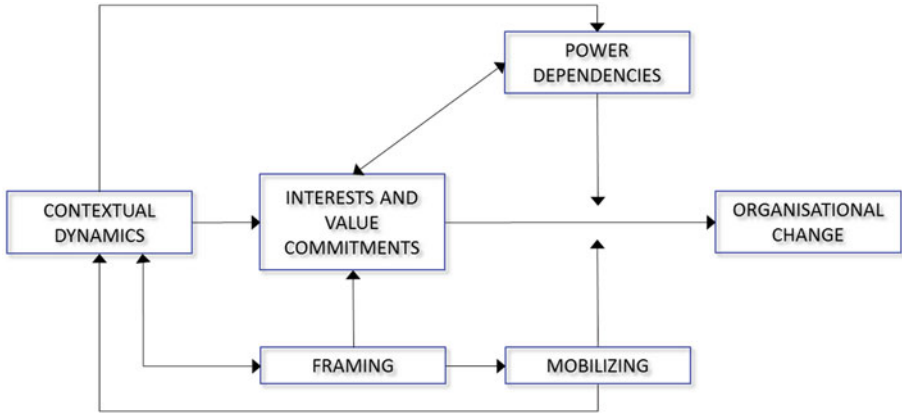


Fig. 20.2 Modified framework of radical organizational change

Referring to the conception of institutional entrepreneurship of Battilana et al. (2009) and based on the present findings, we modified the original framework (Fig. 20.2), integrating framing and mobilizing activities, which can be focused on the organization itself or toward the organizational field where they affect contextual dynamics.

Interdependence Between Contextual and Intra-organizational Dynamics

While former studies found that the availability of an alternative template is a sufficient precondition for radical change (Lounsbury 2002; Scott et al. 2000; Suddaby and Greenwood 2005), our case shows that the merely availability of a business-like template was insufficient to initiate change. The “critical event” (Laughlin 1991; Holm 1995; Greenwood et al. 2002; Child et al. 2007) of a public scandal was necessary to throw off the power balance in the organizational field in favor of those who were committed to the values underlying the new template and increased the pressure on the FEO. The statistics scandal was a catalyst for the diagnostic framing activities as it made the failing of the bureaucratic template visible. The wrong numbers were constructed as a symptom of the inferior bureaucratic template with its lack of control and governance that caused uncontrollable expenses and manipulated statistics. Presenting the closing down of the FEO as a feasible alternative created a sense of urgency and inevitability. Thus, the diagnostic framing activities that delegitimized the bureaucratic template on the field level had already taken

place when the institutional entrepreneur entered the FEO. The newly designated CFO, who was introduced as an institutional entrepreneur, developed a project that involved an alternative business-like template and a change project for its implementation. The original private sector template had to be adapted to the public sector environment to make its implementation feasible for a federal agency. The modification that resulted in fact in some kind of “hybrid template” was the precondition for the prognostic framing activities that promoted the project as the best solution for a federal agency. These activities were directed toward the supervisory committees and political authorities and therefore outside the organization. Motivational framing and thus providing them with compelling reasons to authorize and finance the project were crucial for the implementation of the change project that depended of external support. The financial resources and the formal authority provided the institutional entrepreneur with an immense power in the FEO, which enabled him to a commanding type of intervention. Thus, at the beginning of the change process, the framing and mobilizing activities directed toward the organizational field were crucial to maintain support and therefore the power basis of the institutional entrepreneur.

The effect of the contextual dynamics in this study seems to be substantially higher than those detected by, for example, Heugens and Lander (2009) in their meta-analytical study. We attribute this to the stronger institutional pressures that exist in public sector organizations due to their increased exposure to political authorities (Mizruchi and Fein 1999). In the present case, these authorities initiated changes in the social legislation that intervened directly in the FEO’s business activities. Vice versa, the framing and mobilizing activities of the institutional entrepreneur also aimed at influencing these contextual dynamics and maintaining external support for his change project. Thus our findings contribute to theory on continuous change by showing how a radical organizational change, possible due to the connection of contextual and intra-organizational dynamics, enables the initiation of a continuous change culture. Based on our present findings, we argue that not only the influence of contextual dynamics on intra-organizational change processes are relevant, but also the actions taken by agents in the organization to actively influence the contextual dynamics to mobilize external allies and resources. We suggest that further research is needed in this regard to further elaborate on the effects of actions taken to influence the contextual dynamics during change processes in organizations.

Institutional Entrepreneur and Change Agents as Enablers of Continuous Change

The conceptual distinction between institutional entrepreneurs who initiate and implement radical, divergent change and change agents who initiate and implement non-divergent change is clear (Battilana et al. 2009). However, this distinction is less obvious in the present case where an institutional entrepreneur introduced change agents to support the implementation of his change project. Even though the management accountants were actively engaged in the change process, it is hard to evaluate if their activities were targeted at transformational or incremental change or already the maintenance of the emerging institutions. We would therefore argue that the dichotomous approach that was the point of departure of the present study needs to be further explored to achieve a more fine-grained concept of different forms of change. A first step in this direction is taken in the present study that identifies the different strategies taken by an institutional entrepreneur and change agents. The institutional entrepreneur came from outside the organization and was armed with formal authority and sufficient resources to enforce changes. This power position had an effect on the activities directed toward the actors in the organization. The reform was constructed as being without alternatives and those who were not willing to follow the new vision were disempowered or replaced. Thus, the institutional entrepreneur was able to challenge the dominance of the bureaucratic template by using strategies that aimed at replacing actors instead of changing value commitments. In parallel, a functional group, the management accountants, was designated in the change concept to become change agents. They were selected based on their commitment to the values underlying the new template and their power position in the organization was tightly coupled to this template. The alteration of the design elements of the organization shifted the power structures in favor of the management accountants as proponents of the new template and enabled them to act as change agents. They relied on rather socializing strategies that focused on trust and cooperation to change organizational members' value commitments and therefore contributed to the institutionalization of the new business-like template. Their strategies were based on building trustful relationships and supporting the managers to make sense of the new practices and acting as role models to change the managers' value commitments and mobilize them to engage in the maintenance of the business-like template. Thereby, the change agents build the basis for continuous change that was able due to the institutional entrepreneur's activities that resulted in a radical change.

In contrast to the change agents, the institutional entrepreneur's activities were also focused on the political authorities to mobilize external support. Thereby, the different location of change agents' power basis seems to have an important effect on the direction of their activities. The power basis of the institutional entrepreneur was clearly lying outside the organization, whereas the power of the change agents was nested in the business-like template to whose maintenance they contributed. Both took actions to maintain or improve their power basis, which influenced the direction of their activities. In accordance with the original framework, we found that both, the institutional entrepreneur and the change agents, were committed to values divergent from those they intended to change. While the institutional entrepreneur had a private sector background and was highly committed to the values underlying the business-like template, he based the selection of the designated change agents on their positive attitude toward the new template. This shows that actors that initiate and implement change do not have to be conceptualized over-voluntaristic and heroic (Meyer 2006), but that divergent value commitments can be a source for change. This different value commitments do not have to be a cross-field phenomenon as in the case of the institutional entrepreneur (Suddaby and Greenwood 2005; Durand and McGuire 2005; Boxenbaum and Battilana 2005), but can be inherent in a single organization exposed to divergent contextual pressures. Therefore, the institutional entrepreneur was able to select change agents and managers with divergent value commitments.

Finally, it is worth noting that only due to the combination of a radical change project initiated and led by an institutional entrepreneur and institutionalized by newly implemented change agents, it was possible to overcome inertia and initiate a continuous change culture. Accordingly, our results show that very stable organizations which are deeply embedded in their institutional field can implement a continuous change culture, if a powerful institutional entrepreneur is able to perform a radical change project but simultaneously hands over some power to change agents that institutionalize the new activities, values, and norms.

Even though we were able to identify different strategies taken by the institutional entrepreneur and the change agents, further research that accounts for the activities of all actors who engage in creating, maintaining, and disrupting institutions in change processes may improve our understanding of change processes. Developing a more fine-grained understanding of the combination of different forms of institutional work (Lawrence and Suddaby 2006) that lead to change may also be necessary to gain practical relevance and being able to contribute to the successful reforming of some of our public organizations, which was intended in the NPM reforms.

Bibliography

- Adler, P. S. (1999). Building better bureaucracies. *Academy of Management Executive*, 13(4), 36–47.
- Ahrens, T., & Chapman, C. S. (2004). Accounting for flexibility and efficiency: A field study of management control systems in a restaurant Chain. *Contemporary accounting research*, 21(2), 271–301.
- Amis, J., Slack, T., & Hinings, C. R. (2004). The pace, sequence, and linearity of radical change. *Academy of Management Journal*, 47(1), 15–39.
- Battilana, J., Leca, B., & Boxenbaum, E. (2009). How actors change institutions: Towards a theory of institutional entrepreneurship. *Academy of Management Annals*, 3(1), 65–107.
- Benn, S., Dunphy, D., & Griffiths, A. (2014). *Organizational change for corporate sustainability* (3rd ed.). Abingdon: Routledge.
- Berry, A., Loughton, E., & Otley, D. (1991). Control in a financial services company (RIF): A case study. *Management Accounting Research*, 2(2), 109–139.
- Boxenbaum, E., & Battilana, J. (2005). Importation as innovation: Transposing managerial practices across fields. *Strategic Organization*, 3(4), 355–383.
- Burns, J., & Scapens, R. W. (2000). Conceptualizing management accounting change: An institutional framework. *Management Accounting Research*, 11(1), 3–25.
- Carter, N., & Greer, P. (1993). Evaluating agencies: Next steps and performance indicators. *Public Administration*, 71(3), 407–416.
- Cavalluzzo, K. S., & Ittner, C. D. (2004). Implementing performance measurement innovations: Evidence from government. *Accounting, Organizations & Society*, 29(3/4), 243.
- Child, J., Yuan, L., & Tsai, T. (2007). Institutional entrepreneurship in building an environmental protection system for the people's Republic of China. *Organization Studies*, 28(7), 1013–1034.
- Colomy, P. (1998). Neofunctionalism and neoinstitutionalism: Human agency and interest in institutional change. *Sociological Forum*, 13(2), 265–300.
- Creed, W. E. D., Scully, M. A., & Austin, J. R. (2002). Clothes make the person? The tailoring of legitimating accounts and the social construction of identity. *Organization Science*, 13(5), 475–496.
- D'Aunno, T., Succi, M., & Alexander, J. A. (2000). The role of institutional and market forces in divergent organizational change. *Administrative Science Quarterly*, 45(4), 679–703.
- Dillard, J. F., Rigsby, J. T., & Goodman, C. (2004). The making and remaking of organization context: Duality and the institutionalization process. *Accounting, Auditing & Accountability Journal*, 17(4), 506–542.
- DiMaggio, P. J. (1988). Interest and agency in institutional theory. In L. G. Zucker (Ed.), *Institutional patterns and organizations* (pp. 3–22). Cambridge, MA: Ballinger.

- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160.
- Durand, R., & McGuire, J. (2005). Legitimizing agencies in the face of selection: The case of AACSB. *Organization Studies*, 26(2), 165–196.
- Edelman, L. B., & Suchman, M. C. (1997). The legal environments of organizations. *Annual Review of Sociology*, 23(1), 479.
- Federal Ministry of the Interior. (1999). *Modern state – Modern civil service. The programme of the federal government*. Berlin: Federal Ministry of the Interior.
- Federal Ministry of the Interior. (2004). *Modernisation of the federal administration. Strategy for the 2. phase of the government programme “modern state – Modern civil service”*. Berlin: Federal Ministry of the Interior.
- Federal Ministry of the Interior. (2006). *Focused on the future: Innovations for administration*. Berlin: Federal Ministry of the Interior.
- Fligstein, N. (1991). The structural transformation of American industry: An institutional account of the causes of diversification in the largest firms, 1919–1979. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 311–336). Chicago: University of Chicago Press.
- Fligstein, N. (1997). Social skill and institutional theory. *American Behavioral Scientist*, 40(4), 387–405.
- Glaser, B. C., & Strauss, A. L. (Eds.). (1967). *The discovery of grounded theory: Strategies for qualitative research*. Hawthorne: Adeline de Gruyter.
- Greenwood, R., & Hinings, C. R. (1988). Organizational design types, tracks and the dynamics of strategic change. *Organization Studies*, 9(3), 293–316.
- Greenwood, R., & Hinings, C. R. (1993). Understanding strategic change: The contribution of archetypes. *Academy of Management Journal*, 36(5), 1052–1081.
- Greenwood, R., & Hinings, C. R. (1996). Understanding radical organizational change: Bringing together the old and the new institutionalism. *Academy of Management Review*, 21(4), 1022–1054.
- Greenwood, R., Hinings, C. R., & Suddaby, R. (2002). Theorizing change: The role of professional associations in the transformation of institutionalized fields. *Academy of Management Journal*, 45(1), 58–80.
- Hardy, C., & Maguire, S. (2008). Institutional entrepreneurship. In R. Greenwood, C. Oliver, K. Sahlin, & R. Suddaby (Eds.), *The SAGE handbook of organizational institutionalism* (pp. 198–217). Thousand Oaks: Sage.
- Heugens, P. P. M. A. R., & Lander, M. W. (2009). Structure! Agency! (And other quarrels): A meta-analysis of institutional theories of organization. *Academy of Management Journal*, 52(1), 61–85.
- Holm, P. (1995). The dynamics of institutionalization: Transformation processes in Norwegian fisheries. *Administrative Science Quarterly*, 40(3), 398–422.
- Hood, C. (1995). The “new public management” in the 1980s: Variations on a theme. *Accounting, Organizations & Society*, 20(2/3), 93–109.

- Hoque, Z., & Moll, J. (2001). Public sector reform. *International Journal of Public Sector Management*, 14(4), 304.
- Hyndman, N., & Eden, R. (2000). A study of the coordination of mission, objectives and targets in U.K. executive agencies. *Management Accounting Research*, 11(2), 175–191.
- Jay, J. (2013). Navigating paradox as a mechanism of change and innovation in hybrid organizations. *Academy of Management Journal*, 56(1), 137–159.
- Kirkpatrick, I., & Ackroyd, S. (2003). Archetype theory and the changing professional organization: A critique and alternative. *Organization*, 10(4), 731–750.
- Kitchener, M. (1999). “All fur coat and no knickers”: Contemporary organizational change in United Kingdom hospitals. In D. M. Brock, B. Hinings, & M. J. Powell (Eds.), *Restructuring the professional organization* (pp. 183–199). London: Routledge.
- Langley, A. (1999). Strategies for theorizing from process data. *Academy of Management Review*, 24(4), 691–710.
- Langley, A., Smallman, C., Tsoukas, H., & Van de Ven, A. H. (2013). Process studies of change in organization and management: Unveiling temporality, activity, and flow. *Academy of Management Journal*, 56(1), 1–13.
- Lapsley, I., & Pallot, J. (2000). Accounting, management and organizational change: A comparative study of local government. *Management Accounting Research*, 11(2), 213–229.
- Lapsley, I., & Wright, E. (2004). The diffusion of management accounting innovations in the public sector: A research agenda. *Management Accounting Research*, 15(3), 355–374.
- Laughlin, R. C. (1991). Environmental disturbances and organizational transitions and transformations: Some alternative models. *Organization Studies*, 12(2), 209–232.
- Lawrence, T. B., & Suddaby, R. (2006). Institutions and institutional work. In S. R. Clegg, C. Hardy, T. B. Lawrence, & W. R. Nord (Eds.), *Handbook of organization studies* (pp. 215–254). Thousand Oaks: Sage.
- Likierman, A. (1994). Management accounting in UK central government- some research issues. *Financial Accountability & Management*, 10(2), 93.
- Locke, K. D. (Ed.). (2005). *Grounded theory in management research*. London: Sage.
- Lounsbury, M. (2002). Institutional transformation and status mobility: The professionalization of the field of finance. *Academy of Management Journal*, 45(1), 255–266.
- Maguire, S., Hardy, C., & Lawrence, T. B. (2004). Institutional entrepreneurship in emerging fields: HIV/AIDS treatment advocacy in Canada. *Academy of Management Journal*, 47(5), 657–679.
- Marginson, D. E. W. (1999). Beyond the budgetary control system: Towards a two-tiered process of management control. *Management Accounting Research*, 10(3), 203–230.

- Meyer, R. E. (2006). Visiting relatives: Current developments in the new sociology of knowledge. *Organization*, 13(5), 725–738.
- Misangyi, V. F., Weaver, G. R., & Elms, H. (2008). Ending corruption: The interplay among institutional logics, resources, and institutional entrepreneurs. *Academy of Management Review*, 33(3), 750–770.
- Mizruchi, M. S., & Fein, L. C. (1999). The Social construction of organizational knowledge: A study of the uses of coercive, mimetic, and normative isomorphism. *Administrative Science Quarterly*, 44(4), 653–683.
- Modell, S. (2003). Goals versus institutions: The development of performance measurement in the Swedish university sector. *Management Accounting Research*, 14(4), 333.
- Modell, S. (2004). Performance measurement myths in the public sector: A research note. *Financial Accountability & Management*, 20(1), 39–55.
- Modell, S., Jacobs, K., & Wiesel, F. (2007). A process (re)turn?: Path dependencies, institutions and performance management in Swedish central government. *Management Accounting Research*, 18(4), 453–475.
- Oliver, C. (1992). The antecedents of deinstitutionalization. *Organization Studies*, 13(4), 563–588.
- Pache, A. C., & Santos, F. (2013). Inside the hybrid organization: Selective coupling as a response to competing institutional logics. *Academy of Management Journal*, 56(4), 972–1001.
- Phillips, N., Lawrence, T. B., & Hardy, C. (2000). Inter-organizational collaboration and the dynamics of institutional fields. *Journal of Management Studies*, 37(1), 23–43.
- Powell, W. W., & DiMaggio, P. J. (1991). Introduction. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 1–38). Chicago: University of Chicago Press.
- Schutz, A. (1973). *Collected papers I: The problem of Social reality*. The Hague: Martinus Nijhoff.
- Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 118–137). Newbury Park: Sage.
- Scott, W. R., Ruef, M., Mendel, P. J., & Caronna, C. A. (2000). *Institutional change and healthcare organizations*. Chicago: University of Chicago Press.
- Seo, M. G., & Creed, W. E. D. (2002). Institutional contradictions, Praxis, and institutional change: A dialectical perspective. *Academy of Management Review*, 27(2), 222–247.
- Suddaby, R., & Greenwood, R. (2005). Rhetorical strategies of legitimacy. *Administrative Science Quarterly*, 50(1), 35–67.
- The Federal Government. (1999). Modern state – Modern civil service. The programme of the federal government.
- The Federal Government. (2002). *Modern state – Modern civil service: Balance 2002*. Berlin: Federal Ministry of the Interior.

- Thomas, R., Sargent, L. D., & Hardy, C. (2011). Managing organizational change: Negotiating meaning and power-resistance relations. *Organization Science*, 22(1), 22–41.
- Thompson, M. P. (1988). Being, thought and action. In R. E. Quinn & K. S. Cameron (Eds.), *Paradox of transformation* (pp. 123–135). Cambridge, MA: Ballinger.
- Thornton, P. H., & Ocasio, W. (1999). Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry, 1958–1990. *American Journal of Sociology*, 105(3), 801–843.
- Thornton, P. H., & Ocasio, W. (2008). Institutional logics. In R. Greenwood, C. Oliver, K. Sahlin, & R. Suddaby (Eds.), *The SAGE handbook of organizational institutionalism* (pp. 99–129). Thousand Oaks: Sage.
- Watkins, A. L., & Arrington, C. E. (2007). Accounting, new public management and American politics: Theoretical insights into the national performance review. *Critical Perspectives on Accounting*, 18(1), 33–58.
- Witzel, A. (2000). The problem-centered interview. *Forum Qualitative Sozialforschung / Forum: Qualitative Social Research*, 1(1), 1–9.
- Zucker, L. G. (1987). Institutional theories of organization. *Annual Review of Sociology*, 13, 443–464.

21

Organizational Culture: An Additional Perspective to the Balanced Scorecard

Enrico Rühle and Valerie-Laura Wagner

Ideas in Brief By using a modified Balanced Scorecard tool with an additional focus on organizational culture as a fifth perspective, companies can gain or maintain a competitive advantage in today's marketplace. This chapter presents a consistent and holistic framework, which is flexible enough to help focus on changes originating from the marketplace or within the organization. It explains why the modified tool should be used in constantly changing environments. This idea emerges from a thorough literary review and a case study conducted by TÜV Rheinland India Pvt. Ltd. The findings of the case study have been conceptualized for this chapter resulting in an academic introduction to the modified Balanced Scorecard. The Balanced Scorecard with its systematic approach toward strategy development and implementation is widely used and rightly supported among practitioners. However, to stay competitive in today's market, it is important to understand that an organization's employees are an integral part of success, especially when considering that talent is becoming scarcer across the world. The modified Balanced Scorecard gives insight into how the additional perspective *organizational culture* makes a positive impact on the overall business performance. Even

E. Rühle
Festo Didactic SE, Munich, Germany
e-mail: enrico.ruhle@gmail.com

V.-L. Wagner (✉)
TÜV Rheinland, Dubai, UAE
e-mail: Valerie.Wagner@uae.tuv.com

© The Editor(s) (if applicable) and The Author(s) 2017
H. Ellermann et al. (eds.), *The Palgrave Handbook of Managing Continuous Business Transformation*, DOI 10.1057/978-1-137-60228-2_21

though several modifications of the Balanced Scorecard model exist, they have not incorporated aspects of organizational culture in the Balanced Scorecard insofar as to dedicate it a new perspective. Hence, the suggested modified tool can be seen as a pioneer in organizational development.

Keywords Balanced Scorecard • Change management • Organizational culture • Sustainable competitive advantage • VUCA

Introduction

The Balanced Scorecard initially launched as a performance measurement tool by Norton and Kaplan (1992) has emerged as a supporting tool for strategy implementation (Atkinson 2006). In the initial stages, it was perceived as a revolutionary approach (Frigo and Krumweide 2000). Nowadays, it has reached great popularity among organizations around the globe and is widely adopted by Fortune 1000 organizations (Brewer 2004; Atkinson 2006).

Over the past several decades, the evaluation of the market value of companies has evolved from being heavily influenced by a company's book value to an emphasis on intangible assets, such as goodwill, patents, and licenses (Brewer 2004). Therefore, moving the focus onto intangible assets closer to the center of attention seems to be inevitable for organizations to keep up with market evolution and the concomitant top-performing competition (Butler et al. 1997). Norton and Kaplan considered this approach in their Balanced Scorecard model; they introduced a multi-angle view on four factors that drive a company's performance: Finance, Customers, Internal Processes, and Learning and Growth (Maltz et al. 2003). Why this model might be lacking competitive characteristics of today's requirements, and how this can be overcome, shall be discussed in this chapter.

The Mechanism of the Balanced Scorecard

Introducing the Balanced Scorecard Model

The original Balanced Scorecard consists of four perspectives; these aim to cover the most important aspects of business operations: Finances, Customers, Internal Processes, and Learning and Growth which are combined to a performance measurement tool (Norton and Kaplan 1996). All perspectives are led by guiding questions (see Fig. 21.1) to facilitate the development of so-called objectives, measures, and targets. The combination of targets and measures

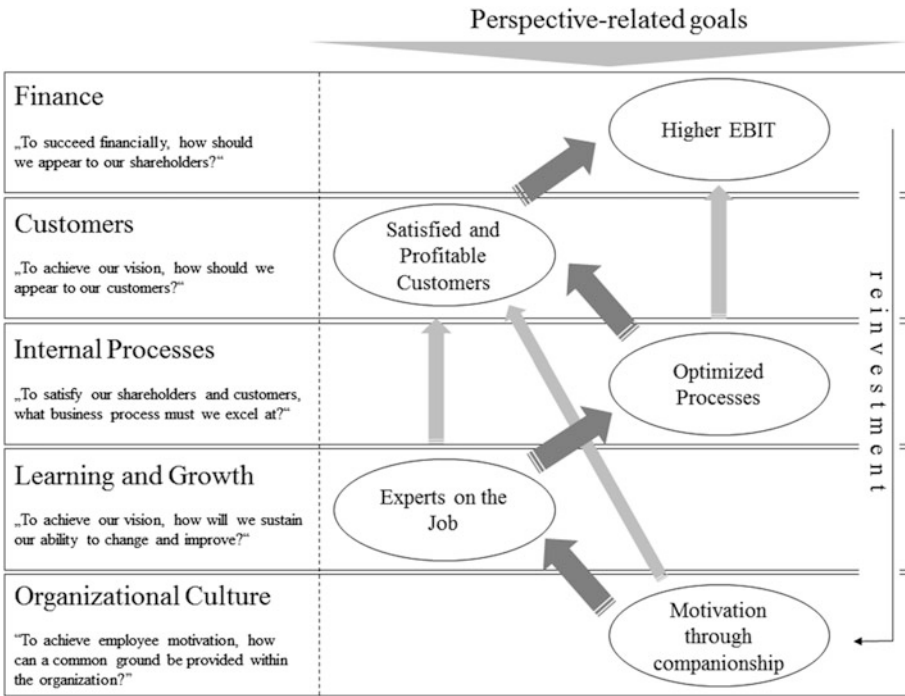


Fig. 21.1 Adapted strategy map

form the well-known key performance indicators (KPIs). While measures define an operational point of attention, such as customer satisfaction, it is the purpose of targets to describe the corresponding (desired) value, for example, 80 percent (Hicks and Moseley 2011). Objectives are determined to achieve these desired values which are comparable to small- to medium-scale projects, for example, introduction of regular customer satisfaction surveys.

As companies tend to lose sight of their vision, mission, and strategy plans when pursuing strategic objectives (Johnston and Pongatichat 2008), it is crucial to have a tool at hand that assures alignment. The Balanced Scorecard model emphasizes this pursuit. The four perspectives are built around the vision and strategy of an organization. Moreover, the perspectives form the center of the model and strategic objectives are derived from the vision and strategy (Hicks and Moseley 2011). Usually, an organization will deploy a corporate Balanced Scorecard that summarizes the essential KPIs for executives to monitor and provide a simple tool to make decisions upon (Sharma 2009). This Balanced Scorecard cascades into business-unit Balanced Scorecards where in turn the KPIs and strategic activities are derived from the corporate Balanced Scorecard (see Fig. 21.2). The method underlines the

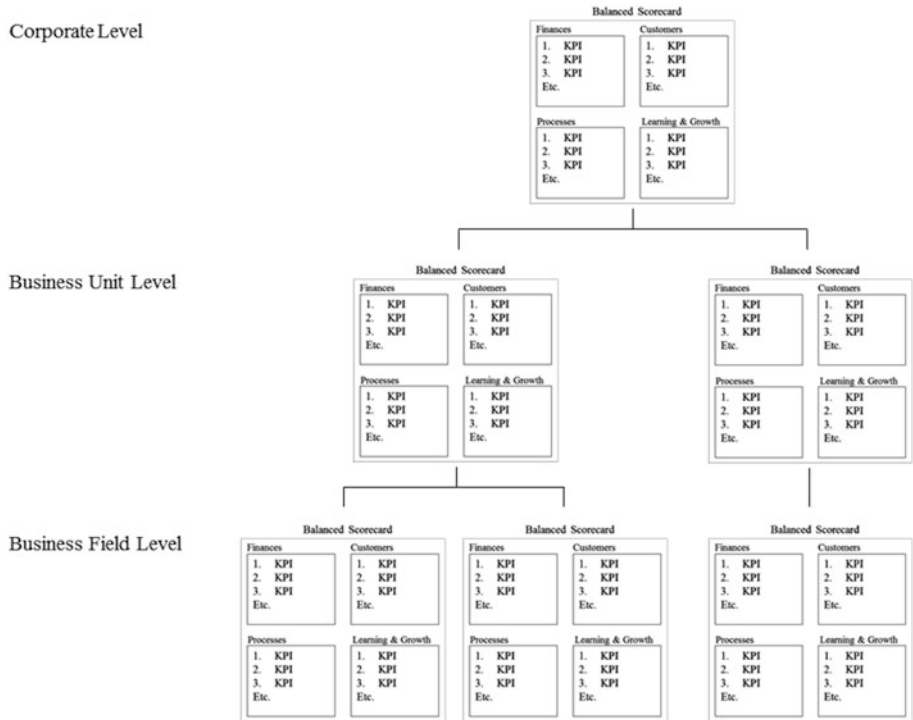


Fig. 21.2 Setting up a hierarchy of Balanced Scorecards in the organization

importance of strategic objective alignment to the organization’s operational activities (Paladino 2000).

Criticism of the Original Balanced Scorecard Model

When it comes to a holistic approach in strategy implementation, no other performance measurement system has yet proven to be as effective as the Balanced Scorecard. In Europe, around 40–45 percent of companies have used this tool (Brewer 2004), and 60 percent of the Fortune 1000 companies implemented it in their organizations (Atkinson 2006). However, more than 70 percent of Balanced Scorecard initiatives failed due to communication issues (Johanson et al. 2006; Pforsich 2005; Neely and Bourne 2000; Chytas et al. 2011). These arguments refer to weak communication efforts of the organization or a top-down communication approach. Top-down communication often fails to include the operational levels of the organization and hence omits the contribution of the employee base, which is an important

aspect for strategy development and implementation. Further, top-down communication slows down the necessary flexibility of organizations due to long feedback loops (Atkinson 2006).

According to Table 21.1, critical points further include a modest focus on employee motivation (Maltz et al. 2003); this in turn has an impact on the success of the strategy. Another aspect that influences the competitiveness of an organization is the external focus. The traditional Balanced Scorecard neither considers any monitoring of technology development in the market nor the competitors' activities.

However, the modified Balanced Scorecard, as proposed in this chapter, identifies these points in its framework by adding the organizational culture perspective. The adjustment positively affects the success of the organizational

Table 21.1 Weaknesses of the Balanced Scorecard model

Weakness	Type	Source
Weak human resources focus	Human resources	Johanson et al. (2006, p. 853) Atkinson (2006, p. 1449)
Missing focus on employee motivation	Organizational culture	Maltz et al. (2003, p. 190)
70 percent of Balanced Scorecard implementations fail due to communication	Communication	Pforsich (2005, p. 32)
Bottom-up communication is not emphasized which hampers employees contribution	Communication	Pforsich (2005, p. 32)
Developments of the external environment, i.e. of competition and technology are not monitored	External focus	Norrekliit (2003, p. 617)
Top-down approach slows down the necessary pace for changes deriving from market requirements	Communication	Atkinson (2006, p. 1450)
Insufficient explanation of how to operationalize the Balanced Scorecard	Implementation	Soderberg et al. (2011, p. 689) Brewer (2004, p. 17)
Weak systematic approach to obtain feedback on an organization's strategy	Implementation	Sharma (2009, p. 14)
Weak representation of organizational culture focus	Organizational culture	Flamholtz and Randle (2012, p. 90)
Limited focus on human capital management	Organizational culture	Maltz et al. (2012, p. 9)
Missing alignment with human capital and corporate identity	Organizational culture	Rampersad and Hussain (2014, p. 65)

strategy as well as improving competitive advantage in the market. This is explained in more detail in the coming chapters.

Why Culture as an Additional Perspective for the Balanced Scorecard?

It is suggested that an additional fifth dimension provides the necessary holistic picture of an organization to achieve sustainable competitive advantage.

Norton and Kaplan introduced the Balanced Scorecard with the aim to facilitate a managers' daily life by providing a system that establishes a balance of important KPIs, from financial and non-financial origin. Consequently, a manager should not need any other monitoring tool in order to keep track of the business and make the correct decisions. In today's world, it is significantly important to set a stronger focus on employees' trust and loyalty. High employee fluctuation and/or highly demotivated staff may adversely affect a company's profitability (Bharadwaj et al. 1993), especially as it becomes increasingly more difficult to recruit talented people for the organization. A recent market trend report for 2030 predicts a future war for talent (Roland Berger Strategy Consultants 2011). The emerging trend of talent scarcity is also addressed in a publication by Bartlett and Ghoshal (2013).

As part of Jay B. Barney's research activities in the field of resource-based strategy, he identified that internal resources of an organization are the most essential ones to bring the desired sustainable competitive advantage over its competitors (Barney and Hesterley 2012; Barney 1991, 2001).

While the Balanced Scorecard's Learning and Growth perspective considers social and employee-related subjects such as skill-sets, knowledge management, networks, and even cultural aspects (Norton and Kaplan 2004a, b), it is debatable whether all these subjects can be included within one perspective.

Since Norton and Kaplan suggest three to five KPIs per perspective (Norton and Kaplan 1992), a higher count of KPIs in one perspective consequently requires an increased number of KPIs in the others to maintain the necessary balance (Soderberg et al. 2011). At the same time, increasing the number of KPIs to maintain this conceptual balance carries the risk of potentially losing focus on the identified and critical KPIs that drive an organization's success. The reason is that these KPIs translate into the perspective-related goals which have been identified to drive forward an organization's development. Therefore, it is difficult to identify more than three to five KPIs per perspective that serve as guidance for the business performance without losing track.

In summary, the model should be updated to fit today's market demands. On the one side, it is most critical to include organizational culture into a management tool that allows companies to gain and maintain competitiveness in today's business world. While on the other side, organizations need to differentiate themselves and have the confidence to set a stronger focus on organizational development, employee satisfaction, and motivation. This can be achieved by adopting the suggested modification of the Balanced Scorecard which includes the organizational culture focus as the fifth perspective (see Fig. 21.1). As a result, it is suggested that the amendment is used to complement the original Balanced Scorecard and to create a holistic view fitting today's conditions.

Organizational Culture Perspective

Hereinafter organizational culture definition has been simplified based on Pettigrew's cultural attributes (Pettigrew 1979), and refers to a framework of common values, beliefs, trust, rituals, communication, and symbols. How the organizational culture focus positively influences the overall business performance is explained with the amended strategy map of Norton and Kaplan (see Fig. 21.1).

The strategy map is a crucial part of the Balanced Scorecard which demonstrates interrelations of perspective-related goals (Johnston and Pongatichat 2008). For each perspective, an overarching goal, highlighted by the oval forms, is determined to give guidance to the management of what measures and targets (KPIs) are to be derived to achieve these aims (Norton and Kaplan 2004c, 2007). In case of the suggested Balanced Scorecard modification, the strategy concept of an organization is built on a foundation of motivated staff which enable the company to strategically move forward and achieve its ambitions with the given support and belief.

Motivation emerges from team spirit and trust which is summarized and used in the statement of *motivation through companionship*. The outline of the strategy map describes the logical relationship of the perspective-related objectives and gives an example of their beneficial interrelations (Banker et al. 2011).

Motivation makes an impact on customer satisfaction as content employees have been found to positively and significantly influence the customer satisfaction rate (Youndt et al. 1996; Wright and Barney 1997). It is commonly found that motivation also encourages employees to continuously strive to improve their performance which ultimately makes them experts in their

field of operation. These experts understand the customer requirements and therefore can deliver highly satisfactory services with improved customer satisfaction as an outcome (Bharadwaj et al. 1993). Developing skill-sets and a continuously growing employee knowledge level provides a basis for continuous improvement initiatives driven by experts. These can contribute to operational excellence endeavors or lean management projects of an organization. Process improvements in turn may result in shorter lead-times and hence have a positive impact on EBIT (earnings before interest and taxes) margins due to resource savings. Combined, these also have a repeatedly positive impact on customer satisfaction rates, as the customer can be served faster.

So far the goal of satisfied and profitable customers has been observed as a lagging indicator since the performance is linked to earlier achieved perspective-related goals. However, it also acts as a leading indicator. The result of satisfied and profitable customers also influences the EBIT margins, when considering customer retention, customer long-term relationships, and the potential of premium price developments. The savings generated through an improved profit margin may be reinvested in areas that enable organizations to achieve strategic objectives, for example, in the Organizational Culture level to leverage the positive results of the strategy map interrelations.

If the model excluded the fifth additional perspective 'Organizational Culture', which is an essential premise of the model, the common ground for employees to shape trust, belief, and team spirit would be missing.

Organizational Culture may not be created by method, but it certainly can be shaped to a more favorable culture by investing time and effort in understanding the organizational needs and deriving the right management responsibilities from it.

In order to become a legitimate perspective of the Balanced Scorecard, it requires an accompanying, guiding question like the other perspectives feature. For the fifth perspective, it is proposed to refer to the following question: To achieve employee motivation, what common ground can be provided within the organization?

The answers may include motivation through companionship. The individual response of organizations identifies the right measures, targets, and objectives to achieve a motivated employee base.

In today's business environment, employees long for (a) more transparency, (b) better communication efforts from senior management, (c) more recognition as a part of the overall organizational success, (d) better understanding of their role as an element in this success, and (e) more freedom and decisional power in how to schedule their work-life balance. Additionally, demographical changes may have their own important aspects to be considered.

An organization needs to identify key factors that drive their organizational success to form their individual organizational culture.

For different organizations, the answer to this question may be the motivation through companionship, taken as an example throughout this chapter that creates the necessary common ground to proceed with a consistent strategy plan. However, a several other scenarios are possible and depend on the organizational vision, strategy, organizational structure, and so on. A few of these suggestions are listed in Fig. 21.3.

The common ground approach emphasizes on a communication mix of bottom-up and top-down. Therefore, the focus embraces organizational attributes such as vision, mission, and values. Being essential for any organization, these corporate attributes remain the same for an undefined time regardless of the strategy direction or the management in charge. That is why they serve as a reliable basis to define perspective-related goals which are measured with the help of quantified KPIs. Whether those are well known and used industry-wide or individually formed to fit the situated requirements of the organization is less important.



Fig. 21.3 Suggested attributes which shape organizational culture

A Sustainable Competitive Advantage with the Modified Balanced Scorecard

The strategy researcher Jay B. Barney developed a model to determine a sustainable competitive advantage, which he also applied to human capital management (Barney 1986). He found that this approach features all necessary attributes to serve as sustainable competitive advantage. It covers four conditions (Barney and Hesterley 2012): valuable, rare, imitable, and organizational (VRIO).

The VRIO model was applied to evaluate the feasibility of the modified Balanced Scorecard with its organizational culture perspective of whether a sustainable competitive advantage can be achieved by applying this framework:

Valuable? It has been identified in various pieces of research that motivated staff provide better service quality to their clients (Chatman et al. 2014; Rodriguez and Shaw 2014; Wright and Barney 1997). Therefore, some companies identify their key resource to be human capital. In particular, service companies have their core competence not with production or assembly lines but with their manpower. As highlighted in the strategy map, employee performance has a direct impact on customer satisfaction, which in turn influences the organizational performance and shapes brand reputation.

Rare? According to Polanyi and Barley, a culture is referred to as a complex creation based on the various individuals that form it (Barney 1986). By common understanding, it is agreed that individuals are seen to be unique, which means they are different to other individuals. Organizations that are representing a large team of individuals, striving for the organization's common goals, connected by the organizational values, have therefore a culture that is hard to find in other organizations. Hence, it can be assessed as rare.

Imitable? Something rare might yet be a victim of imitation. Therefore, an organizational culture needs to be inimitable or costly to imitate in order to serve as a competitive advantage. An organizational culture is not only rare but also difficult to imitate. Even though identified policies and processes can be copied by competition, those are just one element of the whole organizational construct which is among others formed by vision, values, principles, beliefs, and the interaction of team members. Lending once again to Barney's definition of culture, individuals are the vivid elements of an organization and form complex systems by interacting in teams which, regardless of the size of the teams, make it more costly and difficult to mimic its organizational culture. According to Wright and Barney (1997), Fortune 500 companies already focus strongly on teamwork enhancement which

fosters the complexity of a unique organizational culture such as Apple or Google. This strategy is supported by business researchers like Rodriguez and Shaw (2014) and Aguinis, H et al. (2013).

Organizational? The final VRIO requirement is more related to the organization's capabilities of how to lead such an organizational shift instead of the conceptually assess the Organizational Culture approach. It highlights the importance of having the right resources, systems, and procedures available to implement the changes in achieving a sustainable competitive advantage.

Initially, the senior management has to identify the organizational culture as the core element of future organizational success as it has to continuously guide and reinforce its strategic direction. Furthermore, this requires highly supportive managers with a dedicated workforce that identifies the cultural requirements of an organization and which connects various resources, such as the strategy and HR department, department managers, and a team of volunteering employees to provide a platform for communication and feedback rounds. The combination of both the organizational culture focus and the Balanced Scorecard model offers one management system that gives a holistic view required to steer the organization in the required direction.

How Does the Modified Balanced Scorecard Facilitate Continuous Change?

It is suggested that the Balanced Scorecard is a consistent element in the ever-changing business environment, and that the individual choice of measures (KPIs) provides flexibility to align change requirements with business operations.

Change is omnipresent and forces enterprises to be adaptive and flexible in order for their operations to succeed as markets change (Burnes 2004; Chytas et al. 2011). The futurist and business forecaster Bob Johansen speaks of the so-called VUCA environment which describes the environment which today's leaders have to feel comfortable in to successfully steer an organization toward success (Kinsinger and Walch n.d.). The VUCA acronym stands for (Johansen 2008):

- Volatility,
- Uncertainty,
- Complexity, and
- Ambiguity.

Developed in a military college to originally analyze the *fog of war*, Bob Johansen adopts this model to describe the current situation of an organization. He states that an enterprise has to succeed volatile, uncertain, complex, and ambiguous markets to be competitive. The guidance of managing the aspects of VUCA is called VUCA Prime, again developed by Bob Johansen:

- Volatility can be evened out with a clear organizational vision.
- Uncertainty is overcome by understanding of the situation and its related possible impacts.
- Complexity is dissolved by clarity.
- Ambiguity is proposed to be battled with agility/flexibility.

The proposed modified Balanced Scorecard has the necessary attributes to serve as a facilitator in the VUCA world. With its *Vision* in focus to derive strategic objectives, measures, and targets, the modified Balanced Scorecard construes a strategic intent, and remains flexible in how to accomplish it.

The leading questions of the modified Balanced Scorecard allocated to each perspective help understand the current organizational position and provide necessary clarity. The complexity is broken down in smaller, easier-to-approach goals (initiatives) that are clearly defined and measured with the KPIs.

As thoroughly designed and well-thought-out plans may be, they are yet subject to ambiguity and agile behavior is required. That is possible with the flexible KPIs that can be adjusted throughout the journey of accomplishing the strategic intent.

The modified Balanced Scorecard with its fifth perspective Organizational Culture provides room to consider necessary characteristics that feature the competitiveness of the organization in the VUCA environment. Critical thinking, ambitious response times to market changes, consistent communication exchange (Biswas 2009), or teamwork are behavioral characteristics required in today's market (Lawrence 2013), which the management should emphasize on when defining the common ground for their organization. Common ground forms the foundation for organizational success as shown in the strategy map and is the ultimate requirement to build a sustainable strategy.

In the scenario of an organization which is operating in an industry, where market saturation is achieved more rapidly and a shift in focus is more common, KPIs can be identified that foster the active collaboration of employees with change. These can be, for example, (a) identified change seminars provided to employees throughout the year, (b) annual innovation contests which help encourage employees toward change as their ideas may lead the organization forward, or (c) enhancement of international project-based work, to regularly move voluntary employees (like young talents) out of their comfort zone. It increases their feeling

of comfort working internationally, exposed to different environments, individuals, and processes. These initiatives may be linked to synchronized appraisal and reward systems. However, it is based on the individual scenario of an organization to evaluate what measures have to be taken to achieve a change resilient or even pro-active employee base with a favorable attitude toward change.

It is emphasized that the configured framework of the modified Balanced Scorecard is not suggested to be changed as frequently as KPIs can be changed. Moreover, the Balanced Scorecard is the spine of an organization which provides guidance in (a) how the organization communicates, (b) serves as a basis for decisions, (c) identifies fields of attention, and (d) may help employees identify their important role for contribution in the organization's objectives.

Changes, resulting from internal or outside influences like VUCA, are known to bring about resistance (Gill 2003). Some see the system-related matters of approach and implementation as an issue and other researchers identify a counter-productive attitude of individuals toward change (Kubr 1996).

The modified and implemented Balanced Scorecard is suggested to counterbalance both system-related and individual resistance. With its five perspectives, Organizational Culture, Learning and Growth, Internal Processes, Customers, and Finances, it grants a holistic organizational overview. Its guiding goals for each perspective form a stable framework for managers to decide what changes might be required and help employees comprehend why these changes are necessary. Subsequently, it reduces the risk of uncertainty and potential skepticism of employees toward the planned change initiatives.

It is understood by the members of an organization that the modified strategy map can only achieve its positive interrelations if the goals of the perspectives are met. Otherwise, misalignment of the organization is the consequence. As positive interrelations of the five goals can be interpreted, negative impacts can be analyzed as well by reading the strategy map. For example, a service provided by negligent staff may have a consequential effect on the customer satisfaction rate, which in turn causes a drop in sales. That again may influence the profitability in the mid-term and results in fewer funds to invest in employee's training, equipment, and so on. Communicating the reverse interaction of the perspective-related goals also has a motivational effect. It conveys the message to all employees to not lose track of the organizational spine.

Furthermore, the modified Balanced Scorecard sustains a stable setup which will remain the same, even when KPIs of individual perspectives are changed. When market requirements make the organization change their vista, the identified goals of each perspective support re-aligning the organizational direction. Whereas the identified change requirements affect the KPIs, the perspective-related goals do not necessarily change.

Conclusion

Norton and Kaplan's Balanced Scorecard is a widely accepted tool to implement strategies (Brewer 2004; Atkinson 2006). Despite its popularity, it does not consider the importance of today's organizational culture effects which play a key role in the resource-based strategy approach as to achieving a sustainable competitive advantage (Bartlett and Ghoshal 2013).

The modified Balanced Scorecard consists of an additional perspective called organizational culture. Its guiding question is described as: To achieve employee motivation, how can a common ground be provided within the organization? With this perspective, the original Balanced Scorecard framework is complemented with the missing foundation of employee's buy-in, support, trust, and belief. This is crucial for any successful strategy approach. As part of the modified Balanced Scorecard, the strategy map was adjusted (see Fig. 21.1). The modified map shows how the additional perspective positively influences the interrelations of all perspective-related goals.

The conducted VRIO analysis highlighted that the modified Balanced Scorecard fulfills all necessary criteria to achieve this desired sustainable competitive advantage. It was also identified that the modified Balanced Scorecard features attributes that provide an organization with flexibility and stability to cope with the VUCA environment. Stability and strategic intent are provided by the guiding questions of each perspective, whereas the KPIs of each perspective that can be individually adjusted provide the necessary flexibility. Furthermore, the organizational culture perspective can help an organization react appropriately to both expected and unexpected change.

It is argued that any organization can benefit from this suggested model if it identifies the importance of organizational culture for its strategic orientation.

Today and more so in future years, organizational culture advantages are expected to gain in importance among leaders. The recent market trend report for 2030 by Roland Berger Strategy Consultants (2011) predicts a scarcity of talented employees. Therefore, an organization will have to either learn how to assure steady performance with an alternating employee base or find a way to retain its talent by providing it with a desired environment. For this challenge, the proposed modified Balanced Scorecard successfully combines a performance measurement tool with an organizational culture approach that is applicable in today's constantly changing business environments.

Bibliography

- Aguinis, H., Gottfredson, R. K., & Joo, H. (2013). Avoiding a “me” versus “we” dilemma: Using performance management to turn teams into a source of competitive advantage. *Business Horizons*, 56, 503–512.
- Atkinson, H. (2006). Strategy implementation: A role for the balanced scorecard?. *Management Decision*, 1441–1460.
- Banker, R. D., Chang, H., & Pizzini, M. (2011). The judgmental effect of strategy maps in balanced scorecard performance evaluation. *International Journal of Accounting Information Systems*, 259–279.
- Barney, J. B. (1986). Organizational culture: Can it be a source of sustained competitive advantage?. *The Academy of Management Review*, July, 656–665.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 99–120.
- Barney, J. (2001). Is the resource-based “View” a useful perspective for strategic management research?-YES. *Academy of Management Review*, 41–56.
- Barney, J. B., & Hesterley, W. S. (2012). *Strategic management and competitive advantage* (4th ed.). Upper Saddle River: Pearson Education.
- Bartlett, C., & Ghoshal, S. (2013). Building competitive advantage through people. *Sloan Management Review*, 43(2).
- Bharadwaj, S. G., Varadarajan, P. R., & Fahy, J. (1993). Sustainable competitive advantage in Service industries: A conceptual model and research propositions. *Journal of Marketing*, October, 83–99.
- Biswas, S. (2009). Organizational culture and transformational leadership as predictors of employee performance. *The Indian Journal of Industrial Relations*, April.
- Brewer, P. (2004). Putting strategy into balanced scorecard. *Chartered Accounts Journal*, April.
- Burnes, B. (2004). Kurt Lewin and the planned approach to change: A Re-appraisal. *Journal of Management Studies*, September, 977–1002.
- Butler, A., Letza, S. R., & Neale, B. (1997). Linking the balanced scorecard to strategy. *Long range planning*, 242–253.
- Chatman, J. A., Caldwell, D. F., O’Reilly, C. A., & Doerr, B. (2014). Parsing organizational culture: How the norm for adaptability influences the relationship between culture consensus and financial performance in high-technology firms. *Journal of Organizational Behavior*.
- Chytas, P., Glykas, M., & Valiris, G. (2011). A proactive balanced scorecard. *International Journal of Information Management*, 460–468.
- Flamholtz, E. G., & Randle, Y. (2012). Corporate culture, business models, competitive advantage strategic assets and the bottom line. Theoretical and measurement issues, *Journal of Human Resource Costing & Accounting*, 76–94.
- Frigo, M. L., & Krumwiede, K. R. (2000). The balanced scorecard: A winning performance measurement system. *Strategic Finance*, January, 50–54.

- Gill, R. (2003). Change management or leadership?. *Journal of Change Management*, February, 307–318.
- Hicks, K., & Moseley, J. L. (2011). Developing and executing strategy: Using the balanced scorecard for alignment and accountability. *Performance Improvement*, September.
- Johansen, B. (2008). Get there early. Sensing the future to compete in the present. *Berret Koehler Publishers*, 1–11.
- Johanson, U., Skoog, M., Backlund, A., & Almqvist, R. (2006). Balancing dilemmas of the balanced scorecard. *Accounting, Auditing & Accountability Journal*, 842–856.
- Johnston, R., & Pongatichat, P. (2008). Managing the tension between performance measurement and strategy: Coping strategies. *International journal of Operations & Productions Management*, 941–967.
- Kinsinger, P., & Walch, K. (n.d.) Living and leading in a VUCA World. www.PowerofUnderstanding.net
- Kubr, M. (1996). *Management consulting: Guide to profession*. Geneva: International Labour Office.
- Lawrence K. (2013). Developing leaders in a VUCA environment. *UNC Executive Development 2013*.
- Maltz, A. C., Shanhar, A. J., & Reilly, R. R. (2003). Beyond the balanced scorecard: Refining the search for organizational success measures. *Long Range Planning*, 187–204.
- Maltz, A. C., Shenhar, A. J., Dvir, D., & Poli, M. (2012). Integrating success scorecards across corporate organizational levels. *The Open Business Journal*, 8–19.
- Neely, A., & Bourne, M. (2000). Why measurement initiatives fail. *Measuring Business Excellence*, 3–6.
- Norreklit, H. (2003). The balanced scorecard: What is the score? A rhetorical analysis of the balanced scorecard. *Accounting, Organizations and Society*, 591–619.
- Norton, D. P. & Kaplan, R. S., 1992. The Balanced Scorecard - Measures that drive Performance. *Harvard Business Review*, January-February, pp. 71–79.
- Norton, D. P., & Kaplan, R. S. (1996). Linking the balanced scorecard to strategy. *California Management Review*, Fall.
- Norton, D. P., & Kaplan, R. S. (2004a). Strategy maps. *Strategic finance*, March, 27–35.
- Norton, D. P., & Kaplan, R. S. (2004b). Measuring the strategic readiness of intangible assets. *Harvard Business Review*, 19–34.
- Norton, D. P., & Kaplan, R. S. (2004c). How strategy maps frame an organization's objective. *Financial executive*, March/April, 41–45.
- Norton, D. P., & Kaplan, R. S. (2007). Using the balanced scorecard as a strategic management tool. *Harvard Business Review*, July–August, 2–14.
- Paladino, B. (2000). How to conduct a balanced scorecard – Review to create strategic alignment. *Harvard business school publishing*.
- Pettigrew, A. M. (1979). On studying organizational cultures. *Administrative Science quarterly*, 570–581.

- Pforsich, H., 2005. Does your Balanced Scorecard need a workshop. *Strategic Finance*, February.
- Rampersad, H., & Hussain, S. (2014). Authentic governance: Aligning personal governance with corporate governance. *Management for professionals*, 65–78.
- Rodriguez, J. O., & Shaw, M. E. (2014). Leveraging employee engagement for competitive advantage. *Journal of Business Leadership Today*, February 2014, Volume 5.
- Roland Berger Strategy Consultants. (2011). Trend compendium 2030.
- Sharma, A. (2009). Implementing balanced scorecard for performance measurement, Jaipur: s.n.
- Soderberg, M., Kalagnanam, S., Sheehan, N. T., & Vaidyanathan, G. (2011). When is a balanced scorecard a balanced scorecard?. *International Journal of Productivity and Performance Management*, 688–708.
- Wright, P. M., & Barney, J. B. (1997). *On becoming a strategic partner: The role of human resource in gaining competitive advantage*. CAHRS working paper.
- Youndt, M. A., Snell, S. A., Dean, J. W., & Lepak, D. P. (1996). Human resource management, manufacturing strategy and firm performance. *Academy of Management Journal*, August, 836–866.

22

Integrating Holistic Marketing into the Stakeholder Management Approach

Mihaela Herciu and Claudia Ogrea

Ideas in Brief The context of globalization and the growing pressures toward sustainable development are nowadays forcing firms to deal with a paradoxical situation: while undeniable engines and major beneficiaries of globalization, businesses are also sources for significant negative externalities that impact on the dynamics of the global system. In these circumstances, the sustainable business should not only represent a major strategic challenge but must also become an effective strategic solution. This is the transformational shift we are advocating for in this chapter, by the instrumentality of a strategic model that integrates holistic marketing into the stakeholder management approach. Based on an interdisciplinary, multilevel, and integrative approach, we have developed a model by following a logical path: identifying the problem (the paradox of business), defining the general solution (the sustainable business), finding the proper implementation tool (the stakeholder management), and recommending the main instrument for operationalizing it (the holistic marketing). This model, if properly internalized and implemented by businesses, can lead to a radical change in the very essence of firms in terms of their

M. Herciu

Department of Finance and Accounting, “Lucian Blaga” University of Sibiu, Sibiu, Romania

C. Ogrea (✉)

Department of Management, Marketing and Business Administration, “Lucian Blaga” University of Sibiu, Sibiu, Romania

e-mail: claudia.ogrea@ulbsibiu.ro

business models' foundations, while (re)positioning them within the global architecture as good corporate citizens. Therefore, a win–win situation for businesses and society will occur, based on the positive economic, social, and environmental impacts this kind of approach will bring.

Keywords Holistic marketing • Stakeholder management • Strategic model • Sustainable business • Sustainable development

Introduction

Since publication of the Brundtland Report of the UN Commission on Environment and Development (WCED 1987), *sustainable development* is no longer a concern for academia alone. It is now an ever present goal on the agenda of national, regional, and global organizations. The main idea of sustainable development is to ensure the needs of the present generation while not jeopardizing the existence and development of future generations. While this paradigm has remained valid over the past three decades, the concept itself (Redclift 2005; Toth 2014), the main actions, and the methods for measuring progress are sometimes very different (Moran et al. 2008; Garnåsjordet et al. 2012).

However, we consider that broadening the scope of the analysis to the *business* level is the most important change the field of sustainable development has experienced during these decades. This shift was accompanied by the growing emphasis on the essential role businesses play in the process of sustainable development (Utting and Unies 2000; Crowther and Aras 2009; Patzelt and Shepherd 2011) both as *unintentional contributors* and *strategic agents*. Quite different in terms of responsibility and accountability, these two capacities that businesses develop are complementary in terms of impact and consequences.

In this context, *sustainable business* represents the behavioral model that theory has recommended (DesJardins 2007; Fowler and Hope 2007; Wells 2013) and businesses have increasingly started to embrace (Dewhurst and Thomas 2003; Edvardsson and Enquist 2008; Winston 2012). The reasons behind these decisions were primarily related to strategic differentiation and positioning within the industry, and their results were immediate: the leading companies in the field of sustainable development have begun to receive validation for their business models through global rankings such as *Corporate Knights*—Top 100 Most Sustainable Corporations (Corporate Knights 2015), which is released at the World Economic Forum annual meeting in Davos and published by *Forbes*. Ranked the first in the 2015 *Global 100*, Biogen Idec “is a global biotechnology

player. [...] While its business has grown significantly over the years – it generated \$6.9 billion in revenues in 2013, up 26 per cent from just a year earlier – so has its attempt to make its operations more energy efficient and its workforce more diverse. It started in 2008 when the company began taking a more holistic approach to sustainability performance” (Parmar 2015, p. 1).

But realities have changed, and sustainability is no longer just one of many choices corporate decision makers have to consider; it becomes a *major strategic challenge*, *conditio sine qua non* for the viability of businesses. Several factors have contributed to this new situation:

- Intensifying of globalization and the unprecedented growing of its complexity (Rosenau 2000);
- Widening of disparities/gaps in the various components of the global system (Walby 2009);
- Increasing pressures coming from different stakeholders (Giunipero et al. 2012); and
- More restrictive regulatory requirements toward sustainability (Ioannou and Serafeim 2014).

A genuine *paradigm shift at business level* is therefore necessary, in order to optimally capture all these dynamics into both strategic decisions and operational instrumentation. This will eventually lead to the *repositioning of businesses both internally, in terms of the foundations of their business models, and externally, in relationship to the various categories of stakeholders and the global environment*.

But the outlining of the current state of knowledge would be incomplete if not mentioning two relatively recent theories that encapsulate the advancements in the fields of strategic management and marketing, respectively. These refer to *stakeholder management* and *holistic marketing*, which represent essential tools in order to support the materializing of this approach.

Thus, stakeholder management (Donaldson and Preston 1995; Garvare and Johansson 2010; Freeman 2010) has emerged as a response to the traditional approaches of management and firm strategies, accustomed to ignore, marginalize, or minimize the interests of major categories of stakeholders. This attitude has begun to prove its inadequacy in the new contexts characterized by rapid changes and accentuated turbulences. As a result, *stakeholder management* has proposed the integration of key stakeholders’ interests into the very strategic intent of the company, while managing the relationships with them in a coherent strategic manner, based on a partnership mentality (Hitt et al. 2006).

Holistic marketing, on the other hand, has appeared against the background of the traditional model of marketing which became obsolete (Stengel and Officer 2004); it could no longer cope with the increasing complexity of the interrelations with different components of the business environment and with the growing pressure from its various constituents (Govindarajan 2007; Faarup 2010). *Holistic marketing* has then emerged as an alternative for approaching marketing management in a more comprehensive and integrated perspective; it recognizes that *everything matters* for marketing when it comes to stakeholders, and promotes coherence and overall consistency of the decision-making processes when it comes to performance (Keller and Kotler 2006).

Current researches reveal: (a) Often, a *parochial approach*, which directly and exclusively reflects the authors' particular area of expertise. This kind of approach sometimes is extraordinarily valuable in itself, but it usually limits either the potential to provide an integrated image of the issue, or the possibility to propose synergistic solutions for businesses. This category includes exclusive thematic studies in areas such as: sustainable development (Quental et al. 2011; Elliott 2012), sustainable businesses (Lo 2010; Tueth 2010), or business marketing (Armstrong et al. 2012; Ferrell and Hartline 2014). (b) The increasing presence of ambidextrous approaches; they are more comprehensive in terms of capturing the complexity of issues, and more valuable in terms of revealing relevant solutions. This is the case when talking, for example, about the stakeholder management approach, whose essence is to ensure sustainability as a strategic goal for the company (Preble 2005; Carroll and Buchholtz 2015), or about the marketing area studies, and especially the holistic marketing or marketing 3.0, placed in the context of the global sustainability challenges (Kotler et al. 2010; Kotler and Keller 2012). (c) The lack of an integrated approach, able to provide synergistic solutions by bringing together the concerns toward: sustainable development (in the context of intensifying the globalization process and increasing its complexity), business sustainability, stakeholder management, and holistic marketing.

Assuming that only by taking an interdisciplinary (sustainable development, strategic management, holistic marketing), multilevel (mondo, meso, and micro), and integrative (at business level) perspective one can provide a quasi-exhaustive picture on businesses and the dynamics of the internal and external challenges they face, the purpose of this chapter is to develop a strategic model for the sustainable business—by integrating holistic marketing into the stakeholder management approach. As a result, the following sections of the chapter will follow a logical path, in order to favor both the contextual understanding of the analyzed issues and the particular formulating of practical business solutions: globalization, sustainable development, sustainable business, stakeholder management, and holistic marketing.

Sustainable Business: Solution for the Business Paradox Shown in the Context of Globalization and Sustainable Development

There are nearly three decades that have elapsed since the *paradigm of sustainable development* emerged as major concern regarding the future of the global economic, social, and environmental system (Salim 2007). Ever since, it permanently has accompanied academic debate, while being a constant landmark for the development of political and institutional strategies undertaken at national and international level (Lafferty and Eckerberg 2013; Atkinson et al. 2014; Blewitt 2014). Developed against the background of *the globalization process*, which has defined the evolution of the global system during this period, the sustainable development paradigm seems to have reached today a turning point, due to the new realities and trends that characterize globalization as it is today (Adams 2013; Ritzer and Dean 2014).

By embracing a mondo–macro perspective, Dunning (2006) shows that globalization, in its current 20/21 phase, has been accompanied by some major changes. These changes refer to issues such as: market liberalization, technological progress, ideological shifts, relative growth of capitalism through alliances and networked relationships, learning experiences of past, emergence and development of new global players, new significance given to the institutional structures of society. In addition to making globalization 20/21 very different from its prior 19/20 phase, all these changes ask for the rethinking of the entire economic theory that was dominant until recently.

Advocating for a new paradigm of development, whose foundation is provided precisely by the key features of *new globalization*, Dunning (2006) brings as arguments three Nobel laureates approaches on development: Amartya Sen, Joseph Stiglitz, and Douglass North. He highlights that, although they adopt different perspectives, all three of them: consider development as a holistic concept, multi-faceted and contextual, which brings together a variety of human needs and objectives; are concerned about the structural dynamics of societal transformation; emphasize the importance of institutions; and look at the means and goals in a single network, part of the development process (Dunning 2006). Reaching this point, we can argue that the macro-economic theory has already set the backgrounds for the longtime-claimed reconciliation between businesses and society. It “just” needs to become operationalized, and businesses should play a key role in this process.

On the other hand, from a micro, meso, and mondo perspective, the analysis becomes, as expected, more focused and applied. This not only confirms but also strengthens both the idea of in tandem evolution of globalization and

the sustainable development paradigm, on the one hand, and the need for repositioning the latter in relation to the globalization process, on the other hand. This shift is necessary in order to properly capture the new realities and the likely trends of the globalization process, which is dominated by the omnipresence and the myriads of interactions among different actors behaving like global stakeholders. Thus, analyzing the business landscape in the light of the major changes that have occurred in less than a quarter of a century, Mayrhofer and Urban (2011) define globalization as a process of rapid international integration toward a geo-economics of complexity.

This complexity emerges, according to the authors cited, from at least three reasons: first, the fact that globalization captures now all the world's entities. It is a process of interconnection and interdependencies among a growing number of different global actors (firms producing goods and services, consumers, citizens, trade unions and non-governmental organizations, public, financial, political, charitable, and cultural organizations, etc.). Second, the very different forms that the interconnections among these entities may take: material/tangible or immaterial/intangible, financial or legal. They basically follow the rules that govern, both formally (by constitution, legislation, force) and informally (through contracts under private signature or consensus), the social systems in terms of defining the role each actor has to play and the number and quality of the relationships it has with all the other entities. Third, uncertainty, concerning: information (partial information, missing or deformed information) on the one hand, and the possibility to anticipate negative behaviors of actors (cheaters or fraudsters who do not comply with any rule, corrupt agents distorting the market laws and thus altering the features of all the interdependent links) on the other hand (Mayrhofer and Urban 2011).

Under these circumstances, we can easily see that the challenges of globalization impact on all the global actors, while the decisions and the (rational and/or irrational) behaviors of the latter permanently affect, whether they want it or not, the architecture of the global system. Significant, but non-deterministic, and, therefore, uncertain consequences on the dynamics of the global system will occur, contributing to the escalation on the spiral of uncertainty.

Therefore, we strongly believe that repositioning the sustainable development paradigm on the new coordinates of the *geo-economic complexity* shaped by globalization is not only a useful approach but an imperative one. It is likely to help solving *the business paradox*: in the context of globalization and sustainable development, businesses are indisputable engines of globalization, whose decisive role reveals when analyzing the globalization's development path (Bower et al. 2011; Cullen and Parboteeah 2013); on the other hand, businesses are also sources of negative externalities and market imperfections

(Werner and Weiss 2005; Cohen and Winn 2007) with a significant impact on the three dimensions of sustainable development: economic, social, and environmental (Rogers et al. 2012).

There is no doubt that businesses are an essential and defining dimension of the process of globalization. The issue here is about *(re)coupling* businesses to the imperative of sustainable development, in accordance with the new conditions outlined above, which are characterized by multiple, dynamic, and uncertain interconnections and interdependencies. The individual initiatives undertaken until recently in this respect, as various *sustainable business practices* (Fowler and Hope 2007; Estes 2009), even if meritorious, are no longer sufficient. Now an unanimous and joint commitment toward ensuring sustainable development is needed; the *sustainable business* solution seems to be best suited to provide an integrated approach to the issue. As emphasized by Visser and Sunter (2002), this pragmatic commitment toward sustainability must characterize all businesses, regardless of its motivation (moral conviction, fashion, practical necessity, improving company image, or business opportunity). It will be able to set the backgrounds for an internal reform, which is absolutely necessary in order for businesses to successfully cope with the global environmental changes and shifts.

A key factor of the long-term success of this approach is precisely the way businesses recognize the most significant challenges of sustainability (Smith et al. 2010) and deal with them, inasmuch as some of the challenges are extremely visible, while others are more subtle, but equally as damaging in terms of their potential impact on the social and environmental parameters, as well as on the profitability of industries and of businesses within them (Kopnina and Blewitt 2014). Due to both its means and its ends, *strategic management* should take a leading role in this process: First, based on the continuous scanning and monitoring of the characteristics of the environment, the strategic management's task is to early identify the signals of changes and to evaluate how the new trends are affecting a company's dynamics and its competitive landscape. Second, in search of strategic competitiveness, the strategic management's goal is to define, formulate, and successfully implement a strategic system, able to harness opportunities and capitalize on the strengths, while avoiding (or at least minimizing the negative impact of) threats and improving the weaknesses (Rothaermel 2015).

But the nowadays imperative of sustainability, and its myriad of determinants and consequences on various global stakeholders, asks for more from businesses; therefore, as the strategic management approach has emerged in order to deal with the challenges of change (Ogreaan 2000), *stakeholder management* goes a step further, representing the best integrated strategic approach to deal with the challenges of sustainability and sustainable business.

Stakeholder Management: An Integrated Strategic Approach to Business Sustainability

Basically, strategic management “is a continuous, iterative process aimed at keeping an organization as a whole appropriately matched to its environment” (Certo and Peter 1993, p. 23). The need for an organic connection of businesses to the challenges of an environment, that is more complex and dynamic than ever, gets increasingly imperative nature. It implies from businesses to take decisions and pursue behaviors that synergistically meet the needs and expectations of different constituents of the environment, while ensuring at the same time the sustainable competitiveness of the company. And *stakeholder management* is intended precisely to make it possible, by contributing to the longtime-claimed need for reconciliation between business and society/environment (Berg and Zald 1978; Post et al. 1996; Dentchev 2009).

Based on an essentially proactive approach (Freeman and McVea 2001), the *stakeholders theory* considers that every business has a variety of stakeholders, composed by individuals and groups (shareholders, employees, customers, suppliers, creditors, media, local community, state, competitors, special interest groups, activists and environmental organizations, etc.) that have an interest in its success or failure, and could thus influence the business to some extent.

By comparison to the traditional approaches to business, which were exclusively seeking to maximize the shareholders' value/wealth, the stakeholders theory has promoted, since its very beginning (in the 1980s), the solution of enlarging management perspective by taking into account the interests and welfare of all those who can influence the company in achieving its goals. Due to its unorthodox approach, both *critical distortions* and *friendly interpretations* have accompanied stakeholder management (Phillips et al. 2003), arguing for the insufficient pragmatic value of the theory and the lack of operationalizing tools able to transpose it into business practice.

There are at least two major reasons that now bring the stakeholder management approach back into the spotlight: first, the strategic challenge of ensuring business sustainability in the new conditions of the geo-economic complexity outlined by the globalization process as it is today—which highlights the need for such an approach. Second, the advancements in the operationalization of stakeholder management and some of its main concepts (such as corporate social responsibility [CSR], shared value, triple bottom line) in business practice—which provide the concrete tools to internalize and valorize the abovementioned challenge at business level.

In essence, *stakeholder management* aims at the efficient and effective balancing of the needs and interests of different stakeholders (Rothaermel 2015); this is a goal which can only be achieved if strategically combining the diachronic and synchronic perspectives on the business and its environment. By doing so, *stakeholder symbiosis* (Dess et al. 2014) valorizes the mutual dependencies among stakeholders in the success and welfare of everyone, and eventually, it will lead to a win–win situation for all the stakeholders. The *stakeholder impact analysis* (Hill et al. 2014) is the decision-making tool that theory provides to businesses in order to operationalize this approach; it helps managers to recognize, prioritize, and respond to the different needs of stakeholders in such a manner that allows the company to gain competitive advantage while acting as a good corporate citizen (Rothaermel 2015).

(Re)coupling businesses to the imperative of sustainable development and ensuring their sustainability heavily depend on how businesses relate to citizens and the broader society, considered beyond the interests of immediate stakeholders (shareholders, employees, suppliers, and customers); in this light, CSR, the concept and practice of shared value, and the triple bottom line perspectives are the main indicators of businesses behaviors toward society and environment (Dess et al. 2014).

With reference to CSR, both the understanding of the concept and its operationalization at business level have experienced quite controversial dynamics, if only to mention Friedman's view (1970), which unfortunately represented a false shell for many irresponsible or non-responsible business practices ever since: "there is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud" (Friedman 1970, p. 124).

Well aware that *one size does not fit all* when talking about CSR, Argandoña and von Weltzien Hoivik (2009, p. 225) provide a comprehensive definition of the concept: "from the firm's viewpoint, its CSR is the set of moral duties toward other social actors and toward society that the firm assumes as a result of its economic, social, political and, of course, ethical reflection on its role in society and on its relationships with those other actors; from external observers' viewpoint, it is the set of moral duties that the other agents and society attribute to the firm as a consequence of the role it assumes and its relationships with those actors. In practice, CSR will be the result of a dialogue between the firm and its stakeholders about the obligations of the first and the expectations of the second."

As regards implementation at business level, CSR represents *a process of organizational transformation*, which is highly contextual in terms of (Blowfield and Murray 2011):

- Type of approach (defensive—aiming to: reduce risks, protect the company's reputation, maintain the business in legal parameters; or offensive—involving the full engagement of firm's actives in finding solutions to societal problems); and
- Goals and methods.

The best practices in the field reveal the following steps to be taken by the CSR process (Blowfield and Murray 2011): first, driving internal and external consultations in order to decide the purpose. Second, involving the meaningful stakeholders into the managerial process and communicating to them both the purpose intended and the progress milestones achieved. Third, designing of a functional managerial structure to support the approach. Fourth, raising awareness and empowering of everyone involved. Fifth, making decision on actions to be taken, in line with: the organizational culture, the industry in which the company operates, and the resources available.

The recent emergence of the concept of *shared value* is likely to add an additional valence to business sustainability, due to the essential transformation it advocates for in terms of defining and operationalizing firms' business models, which will lead to significant improvements in the relationships between businesses and society. Shared value is the solution that Porter and Kramer (2011) have offered for businesses to get out of the *vicious circle* they are trapped in now: blamed for the economic, social, and environmental challenges the society faces, businesses are increasingly losing their legitimacy, which leads to public policies that undermine competitiveness and exhaust growth; by embracing the shared value concept, businesses will basically create economic value in a manner that also creates value for society.

In terms of business, creating shared value involves a set of “policies and operating practices that enhances the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates” (Porter and Kramer 2011, p. 66). This kind of *win-win approach* is expected to generate higher levels of synergy when firms take into account the social aspects of a shared value perspective and develop new operational modalities to solve them (Dess et al. 2014).

The imperative of business sustainability has led Elkington (1997) to develop and promote the concept and practice of *triple bottom line*, against the background of growing awareness concerning the unsustainable nature of the traditional models of creating and distributing value/wealth. The triple bottom line's agenda brings together the economic, social, and environmental performance of the businesses within the triptych: profit–people–planet;

thus, the economic value created by businesses is completed/corrected with the social and environmental value created and/or destroyed. Although it was sometimes regarded with skepticism (Norman and MacDonald 2004; Sridhar and Jones 2013), the triple bottom line paradigm has been both evolved and enriched over time. This is due to (a) the evolution of the measuring and reporting tools able to capture the economic, social, and environmental impact of businesses, on the one hand, and (b) the growing concerns and pressures toward the sustainability, transparency, and accountability of businesses, coming from a variety of global stakeholders, on the other hand (Hubbard 2009; Savitz 2012).

Thereby Fauzi et al. (2010, p. 1347) have introduced the concept of *sustainable corporate performance* as an aggregate indicator of the triple bottom line; this instrument is based on two defining dimensions: “corporate financial performance (which can be measured using three alternative approaches: market-based measures, accounting-based measures, and perceptual-based measures) and corporate social performance – which include environmental issues (and can be measured using five alternative approaches: based on analysis of the contents of annual reports, pollution indices, perceptual measurements derived from questionnaire-based surveys, corporate reputation-indicators and, data produced by measurement organizations specialized in social performance measurement).”

Holistic Marketing: An Essential Tool for Operationalizing Stakeholder Management and Ensuring Business Sustainability

Businesses are inevitably and inextricably integrated into a multi-faceted network of exchange relationships with various stakeholders. Therefore, the task of stakeholder management is to understand the complexity of this network of relationships and to be able to proactively shape it in order to *maximize the added value created together and to fairly and transparently manage the process of distribution of this value* (Rothaermel 2015). In this light, the role and contribution of *holistic marketing* become obvious and essential for operationalizing stakeholder management and ensuring business sustainability. Thus, both the processes of value-creation and value distribution could be enhanced, and the stakeholder management approach (based on specific tools, such as: CSR, shared value, or triple bottom line) could be validated as strategic determinant of business sustainability.

In a *relational era* (Boone et al. 2010) like ours, which is dominated by multiple and dynamic connections and interdependencies, holistic marketing is the integrated type of approach, which is able to bring mutually reinforcing benefits for all parties involved. Based on *participation* and *collaboration* (Kotler et al. 2010), holistic marketing could contribute to the harmonization of the major societal trends (that shape the evolution of businesses) with the internal dynamics businesses experience (in terms of capabilities and skills). Both the framework and the necessary tools for implementing this goal are provided by the four components that define the content of holistic marketing: relationship marketing, integrated marketing, internal marketing, and performance marketing (Kotler and Keller 2012).

Thus, *relationship marketing* brings together a company's customers, employees, market partners (such as suppliers and distributors), and the financial community (shareholders, investors, analysts). It aims at building a unique organizational asset, called the marketing network, whose concerted efforts will deliver mutually beneficial business relationship for all the constituents. *Integrated marketing*, at its turn, is concerned about designing and implementing each marketing activity (regarding communications, distribution channels, products and services) in close relationship with all the other activities a business has to take care of, in order to generate a synergistic effect. *Internal marketing* involves hiring, training, and motivating all the employees (no matter the functional areas of the company they belong to) in line with the principles of marketing, on the one hand, and connecting marketing, both horizontally, to the other departments, and vertically, to the management, so that its efforts to be fully supported and valorized, on the other hand. Last but not least, *performance marketing* seeks to fully capture the return (no matter if financial, such as sales revenues, or non-financial, such as relations with the community, business ethics, laws and regulations) on the marketing programs and activities, for both the company and the society at large (Kotler and Keller 2012).

Accordingly, the configuration of holistic marketing at business level, together with the symbiotic functioning of all its components, is likely to intensify stakeholder management efforts and outcomes in each of its steps:

1. The *stakeholder impact analysis* involves the progressive identification of the actual and potential stakeholders and their interests, the opportunities and threats each category of stakeholders raises in front of the business, the responsibilities business has toward each category of stakeholders, and, ultimately, the most effective solutions for managing the relationships with stakeholders (Rothaermel 2015). Within this endeavor, the role of holistic marketing reveals itself at each stage of the process and even beyond (in building and maintaining the business relations network, ensuring permanent

communications with stakeholders, etc.). Sometimes very deep and subtle issues (such as identifying the power that a certain category of stakeholders has over the company, the legitimacy, and/or urgency of different claims) ask for the abilities of holistic marketing.

2. The practice of *CSR* asks for the contribution of holistic marketing from at least three different perspectives:
 - (a) The first one refers to the “quadripartite model” of *CSR*, which distinguishes four interrelated aspects arranged as a pyramid that together give content to the social responsibility of business (Carroll and Buchholtz 2015): Economic (to be profitable), legal (to obey the laws), ethical (to behave ethically), and philanthropic responsibility (to be a good corporate citizen).
 - (b) The second one refers to the main types of corporate initiatives highlighted in the literature: Promoting a cause, cause related marketing, corporate social marketing, social philanthropy, community volunteering, and socially responsible business practices (Kotler and Lee 2005).
 - (c) The third one refers to social and environmental reporting, issue which encompasses the efforts (volunteering based or due to regulatory constraints) carried out by a company in order to ensure business accountability and transparency (Moon and Vogel 2008).

As can be easily seen, *CSR* is an area of major interference between stakeholder management and holistic marketing.

3. The concept and practice of shared value, highly promoted by the new stakeholder management approaches, are perfectly applicable from the (holistic) marketing perspective, considering: (a) the transition of management approaches from the business models emphasizing on value-appropriation to those valorizing value-creation (Ghoshal et al. 1999). (b) The shift that strategic management perspective registers, from maximizing business value toward creating value together with stakeholders (Sirmon et al. 2007; Wagner et al. 2010). (c) The innovative step further that stakeholder management proposes through the shared value approach: by enlarging the views on both the boundaries of business and the goals of the business endeavors, value will jointly be created by business and its stakeholders, while aiming for enhancing the value and competitiveness of business will also result in increasing the value of the society/community where the business operates (Porter et al. 2011). All these dynamics are consistent with the new (holistic) marketing approach, if considering the most recent definition that the American Marketing Society has released:

“Marketing is the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large” (AMA 2013, p. 1).

4. The *triple performance* (economic, social, and environmental) approach of business, and its *triple bottom line* reporting instrument, advocate for business behaviors able to ensure long-term economic performance while avoiding short-term behaviors that menace to harm the society or to waste environmental resources (Porter and Kramer 2006). Therefore, a vision of partnership is the keystone of the whole approach; it will be able to transform traditionally antagonistic relationships into new forms of symbiosis, likely to support each partner to achieve its traditional tasks more efficiently, while providing a common platform for joint results that none of the partners would have hoped to reach on their own (Elkington 1998). On the other hand, measuring and reporting the triple performance of business is a difficult task considering the following (Hubbard 2009):

- All the changes that permanently occur in terms of what to be measured, because all the advancements on the sustainability path add new dimensions to its assessment.
- The deficiencies of the measurement systems: the lack of a unifying measurement framework, as well as the high complexity of the existing ones.

Under these circumstances, holistic marketing, if properly operationalized, based on an integrative and comprehensive view emphasizing the performance marketing dimension, could bring significant contributions to ensuring long-term success.

The interconnections among *holistic marketing–stakeholder management–sustainable business–sustainable development–globalization* are, without any doubt, more complex. But due to reasons related to consistency of ideas and logic of argumentation, we have chosen this kind of approach. We consider it to be the most appropriate one in order to clearly emphasize the broad implications of this endeavor.

Conclusion

Taking an *interdisciplinary* (sustainable development, strategic management, holistic marketing), *multilevel* (mondo, meso, and micro), and *inclusive* (at business level) *approach* has allowed and favored us to support and advocate for the *main contribution* of this chapter: a *strategic model* for the *sustainable business*, which integrates *holistic marketing* into the *stakeholder management* approach.

The importance of our endeavor, for both academia and business, is revealed by its attempt to provide an *integrated solution to a strategic challenge* with global lengthening and stake: *business sustainability*. It is also strengthened by the logical course of the proposed model, which validates the viability of the solution, making it operational at business level.

Thus, in the context of increasing *complexity*, which characterizes the *globalization* process nowadays, *sustainable development* is a widely recognized and proclaimed imperative, whose embodiment asks for joint and responsible commitment from all the actors of the global system. On the other hand, objective reality reveals (sometimes) significant gaps and paradoxes with respect to businesses behaviors, which negatively impact the sustainability of the global system in terms of its economic, social, and environmental dimensions.

As leading actors of these transforming dynamics, *businesses* (regardless of the particular sign of each one's impact, positive or negative) are facing a major *strategic challenge*. Capitalizing on this challenge will allow them to radically change their business core and the foundations of their business models, while (re)positioning them within the global socio-economic architecture as good corporate citizens. Thus, *business sustainability* will be likely to generate not only long-term competitiveness for businesses, but also their organic connection to the global environment, which is increasingly characterized by dynamic interrelations among the systems and networks that define it.

Against this background, and in order to obtain this type of synergy, *stakeholder management* represents the optimal strategic solution that the theory of strategic management has recommended, and the practice of business has already experienced in a growing number of cases. The arguments which support this solution find their grounds in:

- The crystallization and sophistication of the instruments that make concepts such as CSR, shared value, and triple bottom line to become operational for businesses.
- The substantial results achieved by businesses, in terms of brand value, reputation, loyalty, acceptance in the community, and so on, when engaged in such approaches and behaviors.

A key role in the success or failure of the strategic process defined by the stakeholder management approach belongs to *holistic marketing*, given the multiple valences its contribution to the process could add or cut. Therefore, holistic marketing should become a key strategic instrument, whose inputs are essential for both the interconnected processes of identifying the needs and expectations of different stakeholders (together with their respective power, legitimacy

and urgency), on the one hand, and managing the complex business network together with the stakeholders and for the benefit of all, on the other hand.

Leveraging the way each one of the *holistic marketing* dimensions will be designed and operationalized during the process of *stakeholder management* will ensure *business* sustainability, while validating the *strategic model* proposed, in the context of:

- *Extending the boundaries* of businesses toward a loyal network of strategic partnerships with all the internal and external stakeholders.
- Searching for *multiple endings* (economic, social, and environmental) to be reached by businesses together with their stakeholders and for the benefit of all.

Future research directions will focus on:

- Identifying specific behavioral models as best practices in the field, in order to extract possible key sources of success, or even patterns that could be duplicated.
- Developing the proposed strategic model based on empirical studies, in order to increase its operability.

Bibliography

- Adams, G. F. (2013). *Globalization, today and tomorrow*. New York: Routledge.
- American Marketing Association (AMA). (2013). *Definition of marketing*. <https://www.ama.org/AboutAMA/Pages/Definition-of-Marketing.aspx>
- Argandoña, A., & von Weltzien Hoivik, H. (2009). Corporate social responsibility: One size does not fit all. Collecting evidence from Europe. *Journal of Business Ethics*, 89(3), 221–234.
- Armstrong, G., Kotler, P., Harker, M., & Brennan, R. (2012). *Marketing: An introduction*. London: Pearson Prentice-Hall.
- Atkinson, G., Dietz, S., Neumayer, E., & Agarwala, M. (Eds.). (2014). *Handbook of sustainable development*. Cheltenham: Edward Elgar Publishing.
- Berg, I., & Zald, M. N. (1978). Business and society. *Annual Review of Sociology*, 4, 115–143.
- Blewitt, J. (2014). *Understanding sustainable development*. Abingdon: Routledge.
- Blowfield, M., & Murray, A. (2011). *Corporate responsibility*. Oxford: Oxford University Press.
- Boone, L., Kurtz, D., MacKenzie, H. F., & Snow, K. (2010). *Contemporary marketing*. Toronto: Nelson Education Ltd..
- Bower, J. L., Leonard, H. B., & Paine, L. S. (2011). *Capitalism at risk: Rethinking the role of business*. Boston: Harvard Business Press.

- Carroll, A., & Buchholtz, A. (2015). *Business and society: Ethics, sustainability, and stakeholder management*. Stamford: Cengage Learning.
- Certo, S. C., & Peter, J. P. (1993). *Strategic management: A focus on process*. Boston: Irwin.
- Cohen, B., & Winn, M. I. (2007). Market imperfections, opportunity and sustainable entrepreneurship. *Journal of Business Venturing*, 22(1), 29–49.
- Corporate Knights. (2015). *The global 100 most sustainable corporations*. <http://www.corporateknights.com/channels/leadership/2015-global-100-results/>
- Crowther, D., & Aras, G. (2009). *The durable corporation: Strategies for sustainable development*. Farnham: Gower Publishing, Ltd.
- Cullen, J., & Parboteeah, K. P. (2013). *Multinational management*. Mason: Cengage Learning.
- Dentchev, N. A. (2009). To what extent is business and society literature idealistic? *Business & Society*, 48(1), 10–38.
- DesJardins, J. R. (2007). *Business, ethics, and the environment: Imagining a sustainable future*. Upper Saddle River: Pearson/Prentice Hall.
- Dess, G. G., Lumpkin, G. T., Eisner, A. B., & McNamara, G. (2014). *Strategic management. Text and cases*. New York: Mc Graw-Hill Education.
- Dewhurst, H., & Thomas, R. (2003). Encouraging sustainable business practices in a non-regulatory environment: A case study of small tourism firms in a UK national park. *Journal of Sustainable Tourism*, 11(5), 383–403.
- Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence, and implications. *Academy of Management Review*, 20(1), 65–91.
- Dunning, J. H. (2006). Towards a new paradigm of development: Implications for the determinants of international business. *Transnational Corporations*, 15(1), 173–227.
- Edvardsson, B., & Enquist, B. (2008). *Values-based service for sustainable business: Lessons from IKEA*. London/New York: Routledge.
- Elkington, J. (1997). *Cannibals with forks. The triple bottom line of 21st century*. Oxford: Capstone Publishing Ltd.
- Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st-century business. *Environmental Quality Management*, 8(1), 37–51.
- Elliott, J. (2012). *An introduction to sustainable development*. New York: Routledge.
- Estes, J. (2009). *Smart green: How to implement sustainable business practices in any industry-and make money*. Hoboken: Wiley.
- Faarup, P. K. (2010). *The marketing framework*. Aarhus: Academica.
- Fauzi, H., Svensson, G., & Rahman, A. A. (2010). “Triple bottom line” as “sustainable corporate performance”: A proposition for the future. *Sustainability*, 2(5), 1345–1360.
- Ferrell, O. C., & Hartline, M. (2014). *Marketing strategy, text and cases*. Mason: Cengage Learning.
- Fowler, S. J., & Hope, C. (2007). Incorporating sustainable business practices into company strategy. *Business Strategy and the Environment*, 16(1), 26–38.

- Freeman, R. E. (2010). *Strategic management: A stakeholder approach*. Cambridge: Cambridge University Press.
- Freeman, R. E., & McVea, J. (2001). A stakeholder approach to strategic management. In M. A. Hitt, R. E. Freeman, & J. S. Harrison. (Eds.) (2006). *The Blackwell handbook of strategic management*. Oxford: Blackwell Publishing. Ch. 6.
- Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & De Colle, S. (2010). *Stakeholder theory: The state of the art*. Cambridge: Cambridge University Press.
- Friedman, M., (1970, September 13). The social responsibility of business is to increase its profits. *The New York Times Magazine*, pp. 32–33, 122–124.
- Garnåsjordet, P. A., Aslaksen, I., Giampietro, M., Funtowicz, S., & Ericson, T. (2012). Sustainable development indicators: From statistics to policy. *Environmental Policy and Governance*, 22(5), 322–336.
- Garvare, R., & Johansson, P. (2010). Management for sustainability – A stakeholder theory. *Total Quality Management*, 21(7), 737–744.
- Ghoshal, S., Bartlett, C. A., & Moran, P. (1999, April 15). A new manifesto for management. *Sloan Management Review*, Spring.
- Giunipero, L. C., Hooker, R. E., & Denslow, D. (2012). Purchasing and supply management sustainability: Drivers and barriers. *Journal of Purchasing and Supply Management*, 18(4), 258–269.
- Govindarajan, M. (2007). *Marketing management. Concept, cases, challenges and trends*. New Delhi: Prentice-Hall of India Private Limited.
- Hill, C., Jones, G., & Schilling, M. (2014). *Strategic management: Theory: an integrated approach*. Stamford: Cengage Learning.
- Hitt, M. A., Freeman, R. E., & Harrison, J. S. (Eds.). (2006). *The Blackwell handbook of strategic management*. Oxford: Blackwell Publishing.
- Hubbard, G. (2009). Measuring organizational performance: Beyond the triple bottom line. *Business Strategy and the Environment*, 18(3), 177–191.
- Ioannou, I. and Serafeim, G., 2014. The consequences of mandatory corporate sustainability reporting: Evidence from four countries. *Harvard Business School Research Working Paper*, pp. 11–100.
- Keller, K. L., & Kotler, P. (2006). Holistic marketing. In J. N. Seth & R. S. Sidodia (Eds.), *Does marketing need reform?: Fresh perspectives on the future*. New York: M.E. Sharpe . Ch. 36.
- Kopnina, H., & Blewitt, J. (2014). *Sustainable business: Key issues*. Abingdon: Routledge.
- Kotler, P., & Armstrong, G. (2012). *Principles of marketing*. Englewood Cliffs: Pearson Prentice Hall.
- Kotler, P., & Keller, K. L. (2012). *Marketing management*. Upper Saddle River: Prentice Hall.
- Kotler, P., & Lee, N. (2005). *Corporate social responsibility*. Hoboken: Wiley.
- Kotler, P., Kartajaya, H., & Setiawan, I. (2010). *Marketing 3.0: From products to customers to the human spirit*. Hoboken: Wiley.
- Lafferty, W. M., & Eckerberg, K. (Eds.). (2013). *From the earth summit to local agenda 21: Working towards sustainable development* (Vol. 12). London: Routledge.

- Lo, S. F. (2010). Performance evaluation for sustainable business: A profitability and marketability framework. *Corporate Social Responsibility and Environmental Management*, 17(6), 311–319.
- Mayrhofer, U., & Urban, S. (2011). *Management international. Des pratiques en mutation*. Paris: Pearson.
- Moon, J., & Vogel, D. (2008). Corporate social responsibility. *Government, and Civil Society*. <http://www.rwi.uzh.ch/lehreforschung/alphabetisch/weberr/seminare/JeremyMoon.pdf>
- Moran, D. D., Wackernagel, M., Kitzes, J. A., Goldfinger, S. H., & Boutaud, A. (2008). Measuring sustainable development – Nation by nation. *Ecological Economics*, 64(3), 470–474.
- Norman, W., & MacDonald, C. (2004). Getting to the bottom of “triple bottom line”. *Business Ethics Quarterly*, 14(2), 243–262.
- Ogorean, C. (2000). Provocările schimbării–determinante ale abordării strategice a managementului firmei (The challenges of change – Determinants of the strategic approach of firm management). *Economie și finanțe*, 2(33), 83–89.
- Parmar, N. (2015, January 21). Top company profile: Biogen. *Corporate Knights*. <http://www.corporateknights.com/reports/2015-global-100/biogen-global-100-14218558/>
- Patzelt, H., & Shepherd, D. A. (2011). Recognizing opportunities for sustainable development. *Entrepreneurship Theory and Practice*, 35(4), 631–652.
- Phillips, R., Freeman, R. E., & Wicks, A. C. (2003). What stakeholder theory is not. *Business Ethics Quarterly*, 13(4), 479–502.
- Porter, M. E., & Kramer, M. R. (2006). The link between competitive advantage and corporate social responsibility. *Harvard Business Review*, 84(12), 78–92.
- Porter, M. E., & Kramer, M. R. (2011). Creating shared value. *Harvard Business Review*, 89(1/2), 62–77.
- Porter, M. E., Hills, G., Pfitzer, M., Patscheke, S., & Hawkins, E. (2011). Measuring shared value: How to unlock value by linking social and business results. Report. http://bibliotecadigital.ccb.org.co/bitstream/handle/11520/1416/Measuring_Shared_Value.pdf?sequence=1&isAllowed=y
- Post, J. E., Frederick, W. C., Lawrence, A. T., & Weber, J. (1996). *Business and society: Corporate strategy, public policy, ethics*. New York: McGraw-Hill.
- Preble, J. F. (2005). Toward a comprehensive model of stakeholder management. *Business and Society Review*, 110(4), 407–431.
- Quental, N., Lourenço, J. M., & Da Silva, F. N. (2011). Sustainable development policy: Goals, targets and political cycles. *Sustainable Development*, 19(1), 15–29.
- Redclift, M. (2005). Sustainable development (1987–2005): An oxymoron comes of age. *Sustainable Development*, 13(4), 212–227.
- Ritzer, G., & Dean, P. (2014). *Globalization: A basic text*. Chichester: Wiley.
- Rogers, P. P., Jalal, K. F., & Boyd, J. A. (2012). *An introduction to sustainable development*. London: Earthscan.

- Rosenau, J. N. (2000). Change, complexity, and governance in globalizing space. In J. Pierre (Ed.), *Debating governance; Authority, steering, and democracy* (pp. 167–200). Oxford: Oxford University Press.
- Rothaermel, F. T. (2015). *Strategic management*. New York: Mc Graw-Hill Higher Education.
- Salim, E. (2007). The paradigm of sustainable development. *OECD Sustainable Development Studies*, 25–29.
- Savitz, A. (2012). *The triple bottom line: How today's best-run companies are achieving economic, social and environmental success—and how you can too*. San Francisco: Wiley.
- Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of Management Review*, 32(1), 273–292.
- Smith, N. C., Bhattacharya, C. B., Vogel, D., & Levine, D. I. (Eds.). (2010). *Global challenges in responsible business*. Cambridge: Cambridge University Press.
- Sridhar, K., & Jones, G. (2013). The three fundamental criticisms of the triple bottom line approach: An empirical study to link sustainability reports in companies based in the Asia-Pacific region and TBL shortcomings. *Asian Journal of Business Ethics*, 2(1), 91–111.
- Stengel, J., & Officer, G. M. (2004, February 12). The future of marketing. In AAAA (American Association of Advertising Agencies), *Media conference*. Orlando.
- Toth, G. (2014). Towards a new economic paradigm: The parallel history of economic thought and the way forward. In M. Mulej & R. G. Dyck (Eds.), *Social responsibility – A non-technological innovation process, Social responsibility beyond neoliberalism and charity* (Vol. 1). Shāriqah/Oak Park/Bussum: Bentham Science.
- Tueth, M. W. (2010). *Fundamentals of sustainable business*. Hackensack: World Scientific.
- Utting, P., & Unies, N. (2000). *Business responsibility for sustainable development* (Vol. 2). Geneva: United Nations Research Institute for Social Development.
- Visser, W., & Sunter, C. (2002). *Beyond reasonable greed: Why sustainable business is a much better idea!* Cape Town: Tafelberg Human & Rousseau.
- Wagner, S. M., Eggert, A., & Lindemann, E. (2010). Creating and appropriating value in collaborative relationships. *Journal of Business Research*, 63(8), 840–848.
- Walby, S. (2009). *Globalization and inequalities: Complexity and contested modernities*. London: Sage.
- WCED. (1987). *Report of the world commission on environment and development: Our common future*. <http://www.un-documents.net/wced-ocf.htm>
- Wells, G. (Ed.). (2013). *Sustainable business: Theory and practice of business under sustainability principles*. Cheltenham: Edward Elgar Publishing.
- Werner, K., & Weiss, H. (2005). *Noua carte neagră a firmelor de marcă (The new black book on brand companies – Romanian edition)*. București: Aquila.
- Winston, A. (2012, December 18). Top 10 sustainable business stories of 2012. *Harvard Business Review*.

23

Corporate Value Creation from Restructuring Through Divestitures

Wiboon Kittilaksanawong

Ideas in Brief Corporate divestitures have increasingly gained legitimacy as a strategic option that can also maximize a firm's equity value. However, their sources of value creation are still not clear to academics and practitioners. This study is based on a comprehensive review of recent conceptual and empirical journal articles widely recognized in the field; it presents the drivers, paths, and performance consequences of corporate divestitures. Corporate divestitures are not always an indicator of past managerial mistakes to deal with poorly performing operations. Divestitures are also a means of strategic reorientation and resource reallocation for value creation when a particular subsidiary operation is no longer fit with the company. This value creation is largely derived from increased corporate focus and more efficient internal governance. Firms may divest operations in one location in response to better investment opportunities in terms of lower production costs and new market in other locations. Asset relatedness and strategic choices at the time of entry influence subsequent exit options in terms of closure, spin-offs, and sell-offs. Performance of divestitures depends not only on these exit modes but also on interdependencies between divested and remaining operations, bargaining advantages, and divestiture implementation and structuring during and

W. Kittilaksanawong (✉)
Saitama University, Saitama, Japan
e-mail: wiboon@mail.saitama-u.ac.jp

after the due diligence. This study demonstrates that the drivers, paths, and performance of corporate divestitures are interdependent. Managers have to consider firm- and industry-level factors across geographic markets and timing of implementation to maximize value creation from divestitures.

Keywords Divestiture • Restructuring • Sell-off • Spin-off • Value creation

Introduction

Corporate divestitures have increasingly gained legitimacy as a strategic option not only for dealing with poor operations but also for responding to better opportunities for existing firm resources. Traditionally, asset divestments are viewed as an indicator of managerial mistakes and organizational decline. Nowadays, divestitures are also used in good economic conditions as a reorganization strategy for resource reallocation, including investments into new subsidiaries, product diversification, and research and development. A firm's growth trajectories are thus involved with both divestments and investments. However, divestitures are mostly involved with ambiguity regarding the source of value creation and their underlying financials and strategy consideration. Therefore, understanding of drivers, paths, and performance consequences of corporate divestitures is rather limited. This study discusses emerging issues and challenges of corporate divestiture, beginning with factors that influence firms to divest their subsidiary operations, then exit modes of these operations, and finally its performance consequences.

Firms with diversified businesses are generally understood to divest their subsidiary operations because of poor performance. However, such restructuring decision may be indeed not because of performance per se but it is influenced by other better opportunities for existing firm resources in terms of lower-cost production elsewhere and new market potentials (Berry 2010, 2013). To exit from current subsidiary operations, firms may either simply liquidate or divest these operations (Mata and Portugal 2000). Among divestment options, managers may choose between spin-offs and sell-offs (Bergh et al. 2008). The decision among these exit options is influenced by prior entry mode choices, ownership structures, and ownership advantages, as well as characteristics of divested assets and restructuring firms.

Managers select from these alternatives of divestiture implementation that best address restructuring objectives while generating highest financial returns. Divestiture performance of restructuring companies is influenced not only by whether it is spin-off or sell-off (Bergh et al. 2008; McKendrick

et al. 2009) but also by types of divested asset (e.g., legacy assets) (Feldman 2014) and industry divestiture waves and characteristics (e.g., munificence) (Brauer and Wiersema 2012). Because divested assets are a part of the restructuring company (instead of a stand-alone entity as in the acquisition), these assets are usually not very large and negotiated confidentially. Performance of acquirers of these assets is thus largely determined by bargaining advantages between transacting parties (Laamanen et al. 2014). In addition, performance of divested units is also critically determined by how the divestiture is implemented during and after the due diligence (Moschieri 2011).

The following discussion is organized into three main sections, including drivers (i.e., motivations), paths (i.e., modes), and performance of corporate divestiture. In the drivers of corporate divestiture section, there are two main discussion points. First, given that poor performance of subsidiary operations is not always a prerequisite for divestment decision, how do low-cost production elsewhere and new market opportunities increase the likelihood of restructuring firms to divest their existing operations for resource reallocation? Second, given that firms usually divest poorly performing subsidiary operations, how do product market relatedness and market growth potential of these operations reduce the likelihood of such divestiture?

In the paths of asset divestment section, there are two main discussion points. First, given that liquidation and divestiture are two major exit options, how do prior entry mode in terms of greenfield investment and acquisition, ownership structure in terms of joint venture, minority holding, and legal form, and ownership advantage in terms of human capital endowment, influence the likelihood of restructuring firms to choose either one of these exit options? Second, given that spin-off and sell-off are two main divestment options, how do relatedness of divested assets and diversification degree of the restructuring firm influence managers to pursue either one of these divestment options?

In the performance of divesting firm and acquirer of divested asset section, there are four main discussion points. First, given that spin-offs are a prevalent divestment option of many technology firms, how does this divestment option affect innovation performance of these restructuring firms? Second, given that managers are often skeptical about potential values of their company's legacy businesses, which are often in declining industries, how does divestment of legacy assets affect performance of restructuring firms? Third, given that sources of value creation from corporate divestiture are usually ambiguous, how do industry divestiture waves and industry munificence mitigate information asymmetry to improve assessment of investors on a restructuring firm's divestment decision? Fourth, given that divested assets are a part of restructuring firms, how do bargaining advantages of acquirer in terms of

asset relatedness and seller distress as well as management of divested units in terms of unit managers' involvement and unit independence improve performance of acquirers of divested business?

Drivers of Corporate Divestiture

Corporate divestiture can be a sale of major corporate assets or it can be in the form of a sell-off, spin-off, or equity carve-out of a business unit. Such asset divestments constitute a major strategic decision whereby management of a firm restructures its businesses and resource portfolios. Motivations for corporate divestiture are largely to discard unattractive business units, to focus on core activities, and to meet corporate liquidity requirements (Hamilton and Chow 1993). Such strategic decision is mainly determined by organizational characteristics (e.g., shortages of capital, capital investment requirements, and high degree of diversification within the company), financial performance (e.g., low return of target units, low revenue growth of target units, and low price-earnings ratio), and environmental influences (e.g., general economic environment and industry growth) (Hamilton and Chow 1993).

Lower-cost Production Elsewhere and New Market Opportunities

Firms generally divest business units because of their poor performance. However, this is not always the case because, often, managers also pursue divestitures to reallocate firm resources to invest in lower-cost production elsewhere or new market opportunities across geographic locations (Berry 2010). When less efficient operations in one or more locations are divested, firms can better use available firm resources from this divestiture for reinvestment in lower-cost production in other locations. Foreign operations can therefore transform a firm's divestitures in one or more locations into resource reconfiguration across geographic markets. Such resource reconfiguration allows firms to relocate business operations between countries to lower production costs.

A firm can exploit firm-specific assets developed in home market and expand overseas through foreign direct investments (Dunning 1980). This market-seeking growth can augment a firm's operations in home country. Firms can also better use their resources at home by divesting some operations in home country to expand in new markets. Such resource reallocation is especially important when firms are highly diversified across products and geographic

markets. As firms become more diversified and new products are introduced, the need for additional complementary resources may call for such reduction in market share of existing products (Roberts and McEvily 2005). In particular, because it takes time to acquire and assimilate these complementary resources, firms with relatively high levels of international diversification are likely to reallocate their resources across products and geographic markets via concurrent asset divestments in one or more locations and investments in other locations.

When firms have reallocated existing resources across products and geographic markets, they may find it difficult to continue managing less related peripheral operations. Because capabilities to introduce new products or expanding in new markets are path dependent (Helfat and Raubitschek 2000), firms may need to more refocus on core activities or on activities that have a better growth prospect. To strengthen efficient use of existing resources, they may thus divest those peripheral operations in one or more locations to allow managers to pay more time and attention to expanding core products and markets in other locations. Firms with highly diversified operations are therefore likely to divest some of their home-country operations after they invest in foreign operations to access new market opportunities (Berry 2010).

Such divestments and investments for lower-cost production elsewhere and new market opportunities are likely to be more pronounced for firms in industries that have low levels of research and development (Berry 2010). Firms in these industries often do not have strong firm-specific advantages (Davies et al. 2001). Because of relatively high cost pressures in these industries, firms are more motivated to access to cheaper factor inputs in foreign markets. For industries that have high levels of research and development, firms are however more likely to exploit their proprietary assets in home market while investing in other countries to augment their home-country operations. However, regardless of levels of research and development, reallocation of firm resources across products and geographic markets is subject to the industry's profitability in such a way that firms are more likely to divest in poorly performing industries and invest in better performing ones (Berry 2010).

Market Growth Potential and Product Market Relatedness

Although firms usually divest poorly performing subsidiary operations, particularly those in unfavorable markets, this decision is contingent upon growth potential of the subsidiary's market and levels of relatedness between the subsidiary's operations and the parent firm's core businesses (Berry 2013). In markets with high growth potential, new market demands can offer promising opportunities

for firms to correct and improve performance of their subsidiary without having to struggle to compete for market share from other competitor firms.

Subsidiaries with operations related to the parent firm's core businesses can realize synergistic benefits through knowledge and resources sharing with the parent firm and other subsidiary operations (Hoskisson and Hitt 1990). In particular, the parent firm can efficiently exploit its technology core across these poorly performing related operations. Subsidiaries with unrelated businesses however incur additional costs associated with operational inefficiencies and misalignments of incentives between managers of the parent firm and those of other remaining operations. Managers of the parent firm are likely to be less willing to commit resources to less familiar business units. They are also likely to be concerned that higher growth potential of markets for these subsidiaries may not be able to turn around their poor performance. Therefore, a parent firm is less likely to divest subsidiaries that have poor performance but related businesses in markets that have high growth potential (Berry 2013).

Legacy Business

A firm's legacy businesses are often in declining industries, while these businesses are consuming considerable amount of managerial time (Anand and Singh 1997). Managers are thus likely faced with strong pressures particularly from investors to divest these businesses (Feldman 2014). Recently appointed executives are the ones most likely to divest legacy businesses because they often experience strong pressure to deliver results in their early years of tenures. Executives who have a long tenure with the company might instead want to retain, internally restructure, or even escalate their commitment in legacy businesses (Staw 1981). These executives are less susceptible to external pressures for short-term performance as they are likely to be more long-term oriented. These executives are also likely to be emotionally attached to legacy businesses. Further, long-tenure executives are more likely to be obliged to fulfill interests of others within their company, thereby impeding implementation of major organizational changes such as divestitures.

Paths of Asset Divestment

When firms decide to expand into a new market, one of several important considerations is to establish a new venture or to acquire an existing company. These strategic choices of market entry and corresponding ownership

structures (e.g., joint venture, minority holding, and ownership with limited liability) and ownership advantages (e.g., human capital endowment) have different effects upon the likelihood of post-entry exit options in terms of closure and divestiture (Mata and Portugal 2000). In particular, after entry in a foreign market, firms may continue their foreign subsidiary operations, may divest, or may close such operations.

Entry Mode Choice, Ownership Structure, and Ownership Advantage

Firms may prefer acquisition as the entry mode in foreign locations when the target firm possesses some location-bound advantages. However, when they own superior production-specific assets such as proprietary technologies, looking for a target company that possesses suitable complementary assets for acquisition may be difficult. These firms are thus more likely to establish a new venture in the foreign location. Firms entering foreign locations by acquisitions are thus more likely to own non-specific assets, while those entering foreign locations by greenfield investments are more likely to possess production-specific assets.

Because non-specific assets, once acquired, have gone through a process of reconfiguration to deal with their environment (Hannan and Carroll 1992), they are less vulnerable to unexpected contingencies that lead to closure of their productive operations. These assets are likely to be suitable for resale to other potential buyers. In contrast, production-specific assets, mostly with proprietary technologies, once created through greenfield investments, are more difficult to find potential buyers who are able to redeploy them without costly modifications. Firms possessing these assets are therefore more likely to exit through closure of their productive operations. Accordingly, firms entering foreign locations by acquisitions are more likely to subsequently exit from these operations through divestiture, while those entering foreign locations by greenfield investments are more likely to exit through closure (Mata and Portugal 2000).

Ownership structure of a subsidiary in foreign markets is either jointly or fully owned. Foreign and local partners in joint ventures share investments and ownership in specific assets while jointly claiming profits generated by the venture. Joint ventures are often not stable because partners are likely to free ride on each other's efforts. As the venture becomes mature, its benefits are likely to be offset by organizing costs, thereby leading to dissolution (Hennart 1991). Minority shareholders with low degree of control in

the venture are particularly more vulnerable to opportunistic behaviors of the parent firm. Minority positions are even less likely to be held when the parent firm increases the degree of control via investment in highly specific assets (Gatignon and Anderson 1988). Therefore, joint ventures and minority shareholdings are more likely to be divested than wholly owned and majority shareholdings (Mata and Portugal 2000).

The likelihood of divestiture also depends on legal forms of the venture. Limited liability firms are subject to more legal formalization, the transaction of one's stake in these firms is thus easier than that in unlimited liability firms, thereby facilitating the divestment decisions. Given the higher setup costs of limited liability firms, it is also less likely that these firms will be shut down. These firms are more likely to wait for insolvencies rather than voluntarily exiting through closure. The owners of unlimited liability firms are more vulnerable to poor performance, thus are likely to exit the venture before the moment where those of their limited liability counterparts would do so. Limited liability firms are therefore more likely to be divested than their unlimited liability counterparts (Mata and Portugal 2000).

Ownership advantages are often derived from firm-specific assets that cannot or are costly to imitate, thereby providing firms with competitive advantage (Wernerfelt 1984). Firms can develop these assets by investing in research and development, advertising, and human capital. Among these firm-specific assets, human capital is most directly related to the firm's ownership advantages. Firms that are able to develop and exploit a larger amount of human capital are likely to be more successful in doing business in a foreign country. Therefore, firms with a larger pool of human capital are more likely to survive and experience less probability of closure or divestiture of their overseas ventures (Mata and Portugal 2000).

Managers in a highly diversified firm generally have better knowledge of the firm's value than its investors. Investors are thus vulnerable to potential opportunistic behaviors of managers in terms of adverse selection and moral hazard (Sanders and Boivie 2004). To reduce such vulnerability, investors may withdraw or commit fewer resources, thereby lowering the firm's market value. To improve market valuation, managers can undergo asset restructuring via spin-offs or sell-offs to reduce information asymmetries about restructured assets and the firm's corporate diversification strategy (Bergh et al. 2008). Sources of such knowledge differences between investors and managers are the extent to which restructured assets are related to the parent firm's remaining operations and the parent firm's levels of corporate diversification.

Relatedness of Divested Asset and Parent Firm's Degree of Diversification

In a diversified firm, managers are likely most knowledgeable about their firm's primary and related businesses, and, particularly, they deeply understand how assets of these businesses are interacted to create values (Hill and Hoskisson 1987). These assets are thus most likely to create information asymmetries between managers and investors. When restructuring is necessary, managers can transform such information asymmetries into financial gain through spin-offs (Bergh et al. 2008). Because these assets are highly specific to the firm, their applications are difficult to value and fit into other organizations. The number of potential buyers via sell-offs may be very limited, whereas these buyers might become a future rival. Spin-offs can strengthen efficiency and value of the divesting firm not only by reducing information asymmetries through a less complex organizational structure but also by continuing mutually beneficial relationships with the spun-off businesses (Krishnaswami and Subramaniam 1999). In addition, the restructured businesses also become more attractive due to their opportunity to further leverage resources and capabilities of the parent firm.

Similarly, in firms with highly related product lines, when restructuring is necessary, spin-offs are more likely to reduce such information asymmetries and thus create more values than sell-offs (Bergh et al. 2008). These low-diversified firms create value by using strategic control that emphasizes close cooperation and reciprocal relationships within different business units (Hill et al. 1992). Strategic control uses subjective measures that are complex and not transparent, and thus are difficult for investors to comprehend. Through spin-offs, managers are able to not only reorganize linkages within related business units to improve understanding and assessment of investors, but the parent firm can also continue valuable relationships in a more efficient manner with the spun-off businesses. (Krishnaswami and Subramaniam 1999). Although sell-offs also mitigate information asymmetries, they discontinue such valuable relationships.

For secondary and unrelated businesses, managers are less likely to have very deep knowledge about assets of these businesses. Potential buyers are more likely to have greater knowledge about how to create values from these assets. To capitalize on this knowledge difference, buyers have an incentive to purchase these assets at price lower than what they may be worth to the seller. To maximize financial value, managers of the restructuring firm are likely to use sell-offs to restructure these unrelated assets (Bergh et al. 2008). By involving multiple potential buyers, sell-offs reduce incentives of buyers to

capitalize on information asymmetries and thus reallocate the divested assets to their most efficient and productive uses through a competitive bidding.

Similarly, in a highly diversified firm where business units have low levels of relatedness, when restructuring is necessary, managers are likely to restructure their company's assets by sell-offs (Bergh et al. 2008). These firms typically manage unrelated assets through transparent financial control, which employs internal capital markets as competitive forces to mitigate information asymmetries and opportunistic behaviors (Hill et al. 1992). Sell-offs create values by eliminating underperforming assets and reallocating proceeds from the sale to remaining business units on a competitive basis. Sell-offs also allow restructuring firms to maximize sale value of divested assets via a competitive bidding. Investors can also clearly assess potential gains from restructuring because the restructuring organization becomes less complex. Spin-offs, while refocusing and removing negative synergies within diversified business units, however, do not generate financial proceeds for the restructuring firm.

Performance of Divesting Firm and Acquirer of Divested Asset

Performance of divesting firms and acquirers of divested assets is determined not only by characteristics of divested assets (e.g., asset relatedness and bargaining advantages) (Bergh et al. 2008; Feldman 2014; Laamanen et al. 2014), but also by implementation of restructuring (e.g., spin-off vs. sell-off, involvement of unit managers, and independence of divested units) (Bergh et al. 2008; McKendrick et al. 2009; Moschieri 2011), and industry characteristics (e.g., industry divestiture waves and munificence) (Brauer and Wiersema 2012).

Innovation Performance of Technology Firm

Spin-offs are a prevalent divestment option of many technology firms. Technology firms experiencing spin-offs are likely to become more innovative than those without such experience (McKendrick et al. 2009). Spin-offs act as a mechanism that forces firms to evaluate their current competitive position and to implement changes to realign their organization with new environment. If organizations lose key technical personnel to form a new venture, they would have to quickly recruit new personnel for replacement. Because such realignment may not instantaneously occur, the parent firm's

performance will immediately decline upon such spin-off. However, in the longer run, new personnel that bring in new ideas, processes, and routines as well as strategic changes may result in more effective organizational realignment with new technological and competitive environment.

A technologically strong and successful spin-off may be so disruptive that the parent firm's performance significantly declines initially. In such situation, managers would be strongly forced to evaluate their strategies, as well as resources and capabilities and intensely react to remedy losses in the short term. However, in the longer term, such intense response may allow the organization to become even better aligned with new technological and competitive environment. Further, having successful, technologically strong spin-offs might also be beneficial to the parent firm in the long term due to labor market reputation (Burton et al. 2002). The parent firm may derive reputational benefits from these spin-offs as a successful incubator of talented entrepreneurs in the labor market. Through this recognition, parent firms may more easily attract high-quality technical talents in the future.

Interdependencies Between Divested and Remaining Businesses

Investors typically respond positively to announcement of legacy business divestitures, particularly when restructuring firms are highly diversified and divested businesses are in declining industries with poor performance (Feldman 2014). However, such divestiture is not always productive in the long term. Knowledge embedded in legacy businesses is developed over time in a path-dependent manner while firms may have taken it for granted and extensively applied it in other parts of the organization (Teece et al. 1994). Divestitures of these businesses may also remove key organizational knowledge embedded within the interdependencies between divested and remaining units of the organization. The functioning of these organizations is likely to be disrupted at least in the short term (Feldman 2014).

The extent of such potential damage to repositories of organizational knowledge tends to be larger when the divestment involves human assets (Fisher and White 2000). The elimination of a business unit that possesses an individual who has established multiple relationships with individuals in remaining business units can significantly damage learning capacity of the divesting firm. If the legacy business is in the same industry as remaining businesses, interdependencies between these businesses are likely to be substantial. Divestitures of such businesses are thus disruptive with significant operational

costs to the divesting firms (Feldman 2014). Recently appointed executives with short tenures are the ones most likely to underestimate these operational costs (Lant et al. 1992). Relying more on diverse external information sources, these executives are likely to overlook importance of legacy businesses. They are thus the ones most likely to undertake operationally costly legacy divestitures (Feldman 2014).

Industry Divestiture Waves

Corporate divestitures increase transparency of a firm's business portfolio and corporate strategy by removing unfit business units. However, sources of value creation and strategic motives of divestitures are rather ambiguous because of a potential variety of efficiency gains. Financial information for divestitures is usually limited because divested units are a part of the restructuring firm's consolidated businesses. Further, these transactions are usually lacking public disclosure, making it difficult for investors to assess their quality and values (Brauer and Wiersema 2012). Apart from firm-level factors (e.g., relatedness of divested unit and modes of divestiture), investors may therefore rely on contextual information to interpret quality of divestiture decisions (Brauer and Wiersema 2012).

In particular, social context matters because divestitures tend to occur in industry waves (Mulherin and Boone 2000). Because firms operate in an uncertain environment, to reduce search costs, managers often make decisions in relation to actions of other firms that operate in their environment (DiMaggio and Powell 1991). To seek organizational legitimacy, managers often imitate decisions of industry peers. This imitation potentially leads to herding where strategic decisions are not based on the firm's private information, but instead are imitating actions of other divesting firms (Bikhchandani et al. 1992). Investors may thus rely on pervasiveness of divestitures in the industry to make inference about quality of the divesting firm's decision and respond accordingly.

Investors are likely to respond more positively to firms that divest early and late rather than at the peak in an industry divestiture wave (Brauer and Wiersema 2012). Managerial decisions in the early stage of the wave tend to improve organizational resource efficiency because these decisions are usually based on the firm's private information. Divestitures occurring at the peak of the wave are likely to be the result of imitation and herding, which may not lead to efficiency gains (Bikhchandani et al. 1998). As divestitures become more pervasive, individuals are better informed due to release of more

information to the public, thereby slowing down the herding and lowering the divestiture activity in the industry accordingly (Bikhchandani et al. 1998). Divestitures occurring late in the wave thus again tend to realize resource efficiency as managers are more likely to make decisions based on their private information.

Further, investors are likely to respond more positively to divestitures that occur in low-munificence rather than in high-munificence industries regardless of the divestiture wave (Brauer and Wiersema 2012). In low-munificence industries, firms are likely to have fewer resources at disposal and thus compete for resources to pursue value-enhancing activities. Divestitures are thus likely to be perceived by investors as a valid strategic option for firms to reconfigure their resources by allocating them from divested businesses into other businesses with a higher value-generating opportunity (Maksimovic and Phillips 2001).

Bargaining Advantages

Acquisitions of divested assets are likely to outperform acquisitions of publicly and privately held firms (Laamanen et al. 2014). Markets for privately held firms are less competitive than the markets for publicly held firms (Capron and Shen 2007). Available information for publicly and privately held firms is also significantly different. Markets for divested assets are thus even less liquid with much less available information. Sellers of these assets first have to make known to the market that a particular asset will be separated from their organization and available for sale.

Further, sellers of assets to be divested often set up private sales dealings rather than public auctioning (Datta et al. 2003). Private dealings with limited number of buyers reduce pervasive perception of the divestiture as a past managerial mistake, mitigate adverse effects on existing customers which may weaken attractiveness of the business to be divested, and save time and expenses for finding a sufficient number of prospective buyers (Markides and Singh 1997). These factors critically force assets in the divestiture to be purchased at a greater discount compared to acquisitions of privately and publicly held firms.

If assets for sales are more related to the acquirer's than to the divesting firm's operations, the acquirer tends to have information advantage vis-à-vis the divesting firm in terms of value creation from higher synergistic potentials from these assets (Lippman and Rumelt 2003). In addition, firms that divest when in a financially constrained position may be forced to provide significant

discounts to the buyer to quickly attain required liquidity to meet with their upcoming debt payments (Pulvino 1998). Such asymmetric information advantage of the buyer and financial distress of the seller reduce bargaining power of the seller, thereby increasing the acquirer's returns on purchase of divested assets (Laamanen et al. 2014).

Management of Divested Unit

While potentially increasing organizational efficiency, divestitures may create an ambiguity about future of the organization (Johnson et al. 1990). Parent companies may not have sufficient disclosed information about the divestiture to unit managers. Unit managers may also not possess an entrepreneurial mindset because they perceive the divestiture as a past managerial failure. Effective management of divested units during and after the due diligence may mitigate these tensions and thus increase the likelihood of these divested units becoming a successful independent entity.

Unit managers play an important role in successful divestitures. Divested units with managers participating in the restructuring processes and with ad hoc incentives are likely to perform better after the divestiture (Moschieri 2011). Through participating in due diligence of the divestiture and operating of the new independent entity in the form of a special task force, unit managers would feel more accountable for their roles in the divested unit. Such participation strengthens their cognitive order, which facilitates transition of people to the new independent entity. Meanwhile, ad hoc incentives help align the unit manager's objectives with those of the divested unit. Particularly, by increasing research and development expenditures in the divested unit and implementing reward system based on pursuit of opportunities, unit managers may become more risk-taking, thereby facilitating the mental shift toward an entrepreneurial mindset (Shane and Spell 1998).

Divested units with higher levels of independence are likely to be more successful (Moschieri 2011). Such independence reduces ambiguity, facilitates creation of a new identity, and enhances internal coherence between structure and strategy of the unit. Keeping distinct business activities and resources within the parent firm's unique structure indeed creates ambiguity and thus increases coordination and integration costs within the organization (Karim and Mitchell 2000). Once a unit with such activities and resources is divested, the unit can establish its own administrative and cultural mechanisms that support specific activities and thus to achieve internal coherence as a stand-alone entity.

Divestitures not only improve operations of the divested unit but also create new opportunities for the new independent entity. Unit managers are likely to perceive such opportunities when they understand the rationale and operations of the divestiture and when they perceive sufficient capabilities for managing the new independent unit (Moschieri 2011). This sense of opportunity is initially developed in individuals residing within the unit. However, when members of the organization believe that the changes can offer them beneficial opportunities previously not available when they are still within the parent organization, such sense of opportunity can eventually be extended to the organization as a whole (Daft and Weick 1984). Involvements of the unit managers in the divesting process and their perception of sufficient capability to run the independent unit are thus intertwined to create the sense of opportunity, which can lead to eventual success of the divested unit (Moschieri 2011).

Conclusion

Managers can also maximize their firm's equity value from restructuring through corporate divestitures. Divestitures are not always an indicator of past managerial mistakes to deal with poorly performing operations. Firms may make significant profits from divestments following prior acquisitions and reorganization of a company. Divestitures are also a means of strategic reorientation and resource reallocation when a particular subsidiary operation is no longer fit with the parent company. Divestitures are a valid strategy when sum of the parent firm's and the divested unit's equity values is greater than equity values of the original joint organization (Chemmanur and Yan 2004). This value creation is largely derived from increased corporate focus and more efficient internal governance.

Divestment decisions are influenced not only by common factors, such as poor performance and high debt, but also by investment opportunities that provide lower production costs and new markets (Berry 2010). Firms in industries that have relatively low levels of investment in research and development mostly compete on low-cost and efficient production. Managers should therefore divest production activities in a higher-cost location (e.g., home market) and relocate them to other lower-cost locations (e.g., foreign market). Managers of firms in industries that have relatively high levels of investment in research and development, however, should exploit strong proprietary capabilities they have developed in one location (e.g., home market) for growth opportunities in other locations (e.g., foreign market) without having to divest operations in their prior location.

In general, firms are likely to divest poorly performing subsidiary operations. However, managers can keep these operations when they are related to the parent firm's current products or markets and are located in markets that have high growth potentials (Berry 2013). With related operations, poorly performing subsidiaries can continue to leverage and benefit from resources and capabilities of the parent and other subsidiary firms that plausibly turn-around their poor performance in markets that have high growth potentials. Managers should consider divesting unrelated poorly performing subsidiary operations because these subsidiaries may not be able to leverage their parent firm's resources and capabilities. Although high-growth markets may provide more opportunities for these subsidiaries, such opportunity may not sufficiently mitigate negative prospects of their struggling operations.

Firms may exit from subsidiary operations through closure or divestiture (Mata and Portugal 2000). Managers should be cautious in making decisions about initial entry mode choice, ownership structure, and highly specific investments because these decisions may influence the likelihood to exit the subsidiary, if necessary, through closure or divestiture. In particular, firms are likely to subsequently exit from a subsidiary operation by divestiture when they enter that subsidiary through acquisition, limited liability company, joint ventures, and minority shareholdings and by closure when they enter that subsidiary operation through greenfield investment, unlimited liability company, wholly owned company, and majority shareholdings. A large human capital endowment also reduces the likelihood of such exit alternatives.

Investors generally react positively to divestiture announcements made by a highly diversified firm (Brauer 2006). Such reaction is however intervened by divestiture implementation alternatives, including spin-offs and sell-offs. Managers should choose between the two on the basis of the extent to which each of these alternatives more effectively converts information asymmetries between managers and investors into financial gains (Bergh et al. 2008). Managers in highly specialized and low-diversified firms should adopt spin-offs while low specialized, whereas managers in highly diversified firms should employ sell-offs. Managers should use spin-offs to restructure core and related businesses not only to reduce such information asymmetries but also to keep a post-restructuring mutually beneficial relationship. For secondary and unrelated businesses, managers should use sell-offs to mitigate an information disadvantage relative to the external parties.

Many incumbent firms in the technology-intensive industries experience spin-offs in the form of new ventures created by their former employees. Managers should look at these spin-offs as an opportunity for their firm to realign its resources and capabilities with the new competitive environment

(McKendrick et al. 2009). Initial negative effects are likely to be more pronounced when more sophisticated technology is spun off together with key technical personnel. Because such spin-off is so disruptive, managers may implement even more intensive realignment processes that better reconfigure its resources and capabilities and realign with the new environment. In the long run, however, parent firms may accrue positive reputational effects of having successful spin-offs, thereby helping them attract more highly qualified talents in the competitive labor market.

While the stock markets initially react positively to the divestiture of legacy businesses, managers should realize that the interdependencies between these and remaining businesses are likely to become the parent firm's operating costs in the longer term (Feldman 2014). Managers, particularly those recently appointed in the company, should not overestimate the positive stock market reaction while underestimating the costs of breaking such interdependencies. Similarly, investors, as external constituents, are even more easily misled to react positively to announcements of legacy divestitures. Long-tenured managers, however, might instead retain their firm's legacy businesses to avoid operational costs in the longer term, ignoring such short-term positive stock market reaction.

Sources of value creation and managerial motives of divestitures are mostly ambiguous with limited operational and financial information disclosure. Managers should be cautious about the divestiture timing and industry characteristics. Investors are likely to perceive value creation potentials of divestitures from industry divestiture waves (Brauer and Wiersema 2012). Firms divesting in early or late stages of the wave are likely to generate higher returns than those divesting at the peak. In early and late stages, managers are likely to use private information to make divestiture decisions, while at the peak, they are likely to imitate others and engage in herding. In addition, investors are likely to respond more positively to divestitures in industries with low munificence. In low-munificence industries, divestitures are perceived by investors as a valid strategy for firms to redeploy scarce resources into business activities that have greater value creation potentials.

Acquisitions of divested businesses outperform acquisitions of stand-alone privately and publicly held firms (Laamanen et al. 2014). This acquisition performance is contingent upon bargaining advantages. Acquirers are likely to be in an advantageous position when divested assets are more related to them than to the divesting firm and when the divesting firm is in financial distress. Managers should therefore implement acquisition strategy for divested assets that are related to their firm's products or markets, particularly during downturns when more firms are looking to restructure their assets.

Overall success of divestitures depends not only on their motivations and paths but also on implementation, which includes involvement of unit managers, independence of new entity, and sense of opportunity (Moschieri 2011). Participation of unit managers in the divestiture processes is fostered through a special task force and ad hoc incentives. Special task force facilitates alignment of their and the parent firm's interests with those in the divested unit. Ad hoc incentives help strengthen their entrepreneurial mindset. Without such involvement and appropriate incentives, unit managers may not identify themselves with the new independent entity. Managers should commensurate levels of unit independence with involvement through special task force and ad hoc incentives to strengthen unit managers' sense of opportunity that prompt entrepreneurial actions such as entering new markets and developing new products to ensure the unit's competitiveness.

Acknowledgment This work was supported by JSPS KAKENHI Grant Number 15K03694.

Bibliography

- Anand, J., & Singh, H. (1997). Asset redeployment, acquisitions and corporate strategy in declining industries. *Strategic Management Journal*, 18(S1), 99–118.
- Bergh, D. D., Johnson, R. A., & Dewitt, R. L. (2008). Restructuring through spin-off or sell-off: Transforming information asymmetries into financial gain. *Strategic Management Journal*, 29(2), 133–148.
- Berry, H. (2010). Why do firms divest? *Organization Science*, 21(2), 380–396.
- Berry, H. (2013). When do firms divest foreign operations? *Organization Science*, 24(1), 246–261.
- Bikhchandani, S., Hirshleifer, D., & Welch, I. (1992). A theory of fads, fashion, custom and cultural change as informational cascades. *Journal of Political Economy*, 100(5), 992–1026.
- Bikhchandani, S., Hirshleifer, D., & Welch, I. (1998). Learning from the behavior of others: Conformity, fads, and informational cascades. *Journal of Economic Perspectives*, 12(3): 151–170.
- Brauer, M. (2006). What have we acquired and what should we acquire in divestiture research? A review and research agenda. *Journal of Management*, 32(6), 751–785.
- Brauer, M. F., & Wiersema, M. F. (2012). Industry divestiture waves: How a firm's position influences investor returns. *Academy of Management Journal*, 55(6), 1472–1492.
- Burton, M. D., Sorensen, J. B., & Beckman, C. M. (2002). Coming from good stock: Career histories and new venture formation. In M. Lounsbury & M. Vantresca (Eds.), *Research in the sociology of organizations* (pp. 229–262). Greenwich: JAI Press.

- Capron, L., & Shen, J. C. (2007). Acquisitions of private vs. public firms: Private information, target selection, and acquirer returns. *Strategic Management Journal*, 28(9), 891–911.
- Chemmanur, T. J., & Yan, A. (2004). A theory of corporate spinoffs. *Journal of Financial Economics*, 72(2), 259–290.
- Daft, R. L., & Weick, K. E. (1984). Toward a model of organizations as interpretation systems. *Academy of Management Review*, 9(2), 284–295.
- Datta, S., Iskandar-Datta, M., & Raman, K. (2003). Value creation in corporate asset sales: The role of managerial, performance and lender monitoring. *Journal of Banking & Finance*, 27(2), 351–375.
- Davies, S., Rondi, L., & Sembenelli, A. (2001). Are multinationality and diversification complementary or substitute strategies? An empirical analysis on European leading firms. *International Journal of Industrial Organization*, 19(8), 1315–1346.
- DiMaggio, P., & Powell, W. (1991). *The new institutionalism in organizational analysis*. Chicago: University of Chicago Press.
- Dunning, J. (1980). Toward an eclectic theory of international production: Some empirical tests. *Journal of International Business Studies*, 11(1), 9–31.
- Feldman, E. R. (2014). Legacy divestitures: Motives and implications. *Organization Science*, 25(3), 815–832.
- Fisher, S. R., & White, M. A. (2000). Downsizing in a learning organization: Are there hidden costs? *Academy of Management Review*, 25(1), 244–251.
- Gatignon, H., & Anderson, E. (1988). The multinational corporation's degree of control over foreign subsidiaries: An empirical test of a transaction cost explanation. *Journal of Law, Economics and Organization*, 4(2), 305–336.
- Hamilton, R. T., & Chow, Y. K. (1993). Why managers divest—Evidence from New Zealand's largest companies. *Strategic Management Journal*, 14(6), 479–484.
- Hannan, M., & Carroll, G. (1992). *Dynamics of organizational populations*. Oxford: Oxford University Press.
- Helfat, C., & Raubitschek, R. (2000). Product sequencing: Co-evolution of knowledge, capabilities and products. *Strategic Management Journal*, 21(10–11), 961–979.
- Hennart, J.-F. (1991). The transaction costs theory of joint ventures: An empirical study of Japanese subsidiaries in the United States. *Management Science*, 37(4), 483–497.
- Hill, C. W. L., & Hoskisson, R. A. (1987). Strategy and structure in the multiproduct firm. *Academy of Management Review*, 12(2), 331–341.
- Hill, C. W. L., Hitt, M. A., & Hoskisson, R. A. (1992). Cooperative versus competitive structures in related and unrelated diversified firms. *Organization Science*, 3(4), 501–521.
- Hoskisson, R. E., & Hitt, M. A. (1990). Antecedents and performance outcomes of diversification: A review and critique of theoretical perspectives. *Journal of Management*, 16(2), 461–509.
- Johnson, R. A., Hoskisson, R. E., & Margulies, N. (1990). Corporate restructuring: Implications for organizational change and development. In R. W. Woodman & W. A. Pasmore (Eds.), *Research in organizational change and development* (Vol. 4, pp. 141–165). Greenwich: JAI Press.

- Karim, S., & Mitchell, W. (2000). Path-dependent and path-breaking change: Reconfiguring business resources following acquisitions in the U.S. medical sector, 1978–1995. *Strategic Management Journal*, 21(10–11), 1061–1081.
- Krishnaswami, S., & Subramaniam, V. (1999). Information asymmetry, valuation, and the corporate spin-off decision. *Journal of Financial Economics*, 53(1), 73–112.
- Laamanen, T., Brauer, M., & Junna, O. (2014). Performance of acquirers of divested assets: Evidence from the U.S. software industry. *Strategic Management Journal*, 35(6), 914–925.
- Lant, T. K., Milliken, F. J., & Batra, B. (1992). The role of managerial learning and interpretation in strategic persistence and reorientation: An empirical exploration. *Strategic Management Journal*, 13(8), 585–608.
- Lippman, S. A., & Rumelt, R. P. (2003). A bargaining perspective on resource advantage. *Strategic Management Journal*, 24(11), 1069–1086.
- Maksimovic, V., & Phillips, G. (2001). The market for corporate assets: Who engages in mergers and asset sales and are there efficiency gains? *Journal of Finance*, 56(6), 2019–2065.
- Markides, C., & Singh, H. (1997). Corporate restructuring: A symptom of poor governance or a solution to past managerial mistakes? *European Management Journal*, 15(3), 213–219.
- Mata, J., & Portugal, P. (2000). Closure and divestiture by foreign entrants: The impact of entry and post-entry strategies. *Strategic Management Journal*, 21(5), 549–562.
- McKendrick, D. G., Wade, J. B., & Jaffee, J. (2009). A good riddance? Spin-offs and the technological performance of parent firms. *Organization Science*, 20(6), 979–992.
- Moschieri, C. (2011). The implementation and structuring of divestitures: The unit's perspective. *Strategic Management Journal*, 32(4), 368–401.
- Mulherin, H. J., & Boone, A. L. (2000). Comparing acquisitions and divestitures. *Journal of Corporate Finance*, 6(2), 117–139.
- Pulvino, T. C. (1998). Do asset fire sales exist? An empirical investigation of commercial aircraft transactions. *Journal of Finance*, 53(3), 939–978.
- Roberts, P., & McEvily, S. (2005). Product-line expansion and resource cannibalization. *Journal of Economic Behavior and Organization*, 57(1), 49–70.
- Sanders, W. G., & Boivie, S. (2004). Sorting things out: Valuation of new firms in uncertain markets. *Strategic Management Journal*, 25(2), 167–186.
- Shane, S., & Spell, C. (1998). Factors for new franchise success. *Sloan Management Review*, 39(3), 43–50.
- Staw, B. M. (1981). The escalation of commitment to a course of action. *Academy of Management Review*, 6(4), 577–587.
- Teece, D. J., Rumelt, R. P., Dosi, G., & Winter, S. (1994). Understanding corporate coherence: Theory and evidence. *Journal of Economic Behavior and Organization*, 23(1), 1–30.
- Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, 5(2), 171–180.

24

Adapting to Working Environment Change: Effects of Mobility and Flexibility

Melissa Promes

Ideas in Brief Given the current impacted state of the BMW Group, as well as its perpetual job growth, new working forms need to be implemented in order for the company to maintain its status as a leading competitor in the automotive industry. By implementing a flexible working environment, organizations are able to accommodate continuous job growth, while maintaining sufficient building space efficiency and reducing building costs. A new workplace concept will inevitably result in the emergence of new challenges regarding satisfaction with the working environment, as well as impose significant change that can be perceived as threatening to some individuals. Therefore, the following study examines the effects that mobility and flexibility in the workplace have on perceived employee satisfaction and well-being. Research was conducted on a targeted group of employees over a two-year time period at the BMW Group in Munich, Germany. Employee responses pertaining to perceptions of mobility work and desk sharing were analyzed via questionnaire analyses in order to determine the effects on satisfaction with the working environment at the BMW Group in a specified non-territorial working environment. Structural equation modeling and content analyses via open-ended responses were conducted in order to determine the effect that the independent variables, mobile work, and desk sharing have on working environment satisfaction and employee well-being. Results indicate that mobile

M. Promes (✉)
BMW Group, Munich, Germany
e-mail: melpromes@gmail.com

work significantly predicts working environment satisfaction, and levels of satisfaction with the working environment increased over time. Furthermore, open-ended responses suggest that mobile work has a significantly positive influence on employee satisfaction. Desk sharing has a significant impact on hygiene levels and concentration abilities in the flexible working environment, influencing employee well-being. This study provides concrete evidence for the need to solve capacity issues in terms of job growth, as well as maintain a high level of employee satisfaction and well-being in today's fast-paced society.

Keywords Desk sharing • Employee well-being • Flexibility • Mobile work • Working environment

Introduction

Managing job growth in the current economic situation in Munich, Germany, is proving to be a difficult task as the BMW Group continues to develop given the impacted environment. Therefore, the lack of office space is considered to be an issue that requires immediate attention. Furthermore, the necessary space needed to accommodate the projected development of the organization will cease to exist in response to the growing work force. As a consequence, practitioners are compelled to take one of two actions: (1) develop office locations that are designated outside of the city limits, potentially disrupting collaboration, communication processes, and performance and productivity among employees and process partners, or (2) implement a more creative workplace concept. An innovative office concept includes the following three classifications: the office location (on-site work or mobile work), office layout (open layout vs. cubicle layout), and the office use (desk sharing vs. assigned desks) (De Croon et al. 2005; De Paoli et al. 2013).

With the perception of a person working from a standard desk in a typical office environment becoming outdated and inefficient (Humphrey 2014), as well as the problem of capacity and job growth, there is a need to implement a sustainable workplace solution that accounts for future changes in the external environment and workforce (Hassanain 2006). In anticipation of future job growth, the BMW Group is attempting to accommodate the density of its future workforce by implementing an alternative workplace concept, which is defined as a flexible working environment. With the application of an alternative working concept, the organization is able to continue to grow, while maintaining a high level of working environment quality. Furthermore, Kelly et al. (2011) report that most research that focuses on flexibility and mobile work concepts primarily use cross-sectional data, making it impossible

to measure long-term reactions of employees (De Croon et al. 2005) due to changes implemented in the working environment. This chapter, therefore, measures employee satisfaction and well-being regarding flexibility and mobile work in the workplace concept overtime in a mixed methods, longitudinal designed study.

The conception of a flexible working environment causes changes to occur, referring to psychological and physical elements, which require analysis in order to understand how they affect employee satisfaction and well-being (Aries et al. 2010; Brunia and Hartjes 2009). This is especially important because “changes in one system or part of a system bring about new challenges, requiring adaptation and innovative solutions” (Lewis 2010, p. 3). By measuring employee satisfaction in response to working environment changes, such as desk sharing, change management and working environment practitioners are able to determine the extent of change acceptance and adaptation based on the level of perceived satisfaction with the working environment (van der Voordt 2004b). The level of employee satisfaction and attitude toward change will furthermore indicate the level of resistance that typically emerges with the implementation of working practice change in the environment (Choi 2011; Promes 2015). Psychological responses to change should not be underestimated given the amount of damage resistance to change can have on the overall project (De Been and Beijer 2014). Since flexibility via desk sharing is the pillar of the flexible workplace concept, it is crucial to assure that all employees accept and participate in new ways of workplace behavior in the flexible working environment (van der Voordt 2004).

Since status and salary are no longer adequate enticements to retain, recruit, and satisfy employees (Mosby 2001), workplace practitioners should focus on facility design, as it has surfaced as a key indicator of the success of workplace culture and employee satisfaction (Coomber and Barriball 2007; Cummings et al. 2010; Mosby 2001). For this reason, the following hypotheses are developed: (1) Mobile work will significantly increase employee satisfaction with the working environment. (2) Employee well-being will improve over time in response to newly implemented working practices, such as desk sharing and mobile work.

Characteristics of a Flexible Working Environment

Workplace flexibility refers to the existing relationship with the organizational workspace and the changing usability and needs of employees (Arge 2005; Hassanain 2006). Herrick (2011) argues that flexible work provides employees with the needed tools and an environment that fits different working styles

and functions, as well as empowering and engaging employees. For example, in a study conducted on US workers, 79 % of employees indicate that they would like more flexible working options (Kelly and Kalev 2006), demonstrating a need to provide alternative forms of working. The flexible office concept forces change, affecting employee perceptions of the workplace (De Paoli et al. 2013; Hassanain 2006) and ultimately allows for a greater trusting culture, moving away from the outdated and central business model that focuses on employee presence in the office (De Paoli et al. 2013; Mosby 2001). Furthermore, adaptability is one of the most important elements in a flexible working environment (Arge 2005). Although workplace change is brought on by many sources, the following causes promote the most change in a flexible working environment: external change from the environment (NCPP 2004), internal pressure within the organization (NCPP 2004), implementation of an appropriate workplace concept in response to changing structures (Roelofsen 2002), and the notion that the advancement of a flexible workplace demands the support of flexible building elements (Brittain et al. 2004).

Workplace concepts refer to the layout and design of an office, as well as the functional use of the workspace (De Been and Beijer 2014). Traditional office types refer to individual and shared room offices that have a singular cell and/or small shared rooms. Although office typologies differ somewhat from one another depending on the layout of the building, the most common office type is an open, shared room. Additionally, executive level managers are assigned an individual office in this type of workplace concept. Some of these offices are also characterized by temporary and portable barriers that look similar to a cubicle, serving the purpose of providing privacy and an acoustic barrier.

A flexible working environment concept allows organizations to maintain their workspace more efficiently and effectively with the use of flexible and shared workspace (Khamkanya and Sloan 2009). With the implementation of a flexible office design, the quality of the workspace in general is predicted to improve, influencing employee satisfaction and well-being (De Been and Beijer 2014). Furthermore, a flexible workspace enables enhanced interaction and communication among colleagues (Felstead et al. 2005), potentially leading to greater innovation, as well as facilitating a more attractive and efficient workspace (Oksanen and Ståhle 2013).

Workplace flexibility refers to the modern office concept that promotes desk sharing (Khamkanya and Sloan 2009). Desk sharing is characterized by the way in which desks are assigned to employees (De Croon et al. 2005). In a flexible office, employees are not assigned to their own individual desks, but rather a pool of desks that “belong” to a group of employees (Felstead et al. 2005; Humphrey 2014). In addition to the implementation of shared desks,

the purpose of a flexible working environment is to promote collaboration and knowledge exchange among colleagues (Peponis et al. 2007). Additional flexible workspace possibilities include areas such as lounges, cafés, tea kitchens, terraces, as well as others. A flexible working environment provides a more sustainable use of space and resources, greater flexibility, better work-life balance, and at least the same or elevated levels of employee satisfaction (van der Voordt 2004; Blok et al. 2011). The flexible working environment is an evolution of past hierarchical models of workplace concepts that represents a bottom-up and less hierarchical approach to workplace culture by emphasizing collaboration and the breakdown of office barriers (Mosby 2001; Shoemaker et al. 2011). Furthermore, by implementing mobile work into the working environment, a greater level of flexibility can be achieved. Employees can design their working hours and location, potentially leading to greater employee satisfaction and better work-life balance (Hill et al. 2010; Khamkanya and Sloan 2009).

Mobile Work

Since the 1970s organizations have seen a shift in business models, changing from a centralized working behavior model to a decentralized model of knowledge work, which includes the concept of an “anytime, anywhere” working approach (Humphrey 2014; van Meel 2011). Kleinrock (2005) supports the notion of an “anytime, anywhere” working concept by highlighting the following benefits that are promoted by a flexible office: improved efficiency and productivity, maximizing opportunities through continuous contact, more flexibility and autonomous work, and an improved work-life balance (Humphrey 2014, p. 354). Therefore, mobile work reflects the notion of working where employees are no longer expected to be present in the workplace in order to perform well and be productive, eliminating the office presence culture that is common in centralized workplace concepts (Humphrey 2014). The Chiat experiment, which was conducted in 1994, is one of the first flexible office experiments to take place in the promotion of organizational mobility and flexibility in a working environment concept (Berger 1999; Humphrey 2014). The familiarity of cubicles and desks of 300 employees were taken away in an attempt to force employees to implement more creative ways of working. Employees were equipped with mobile phones and PowerBooks and told to work wherever they preferred. Employees were given the flexibility to sleep later than usual, work from home or from other unconventional remote locations, highlighting the characteristic of flexible working

time and places (Berger 1999). Unfortunately, the experiment was not successful, resulting in a sharp decrease of productivity. Employees also began to reflect kindergarten like behavior and management bullying in response to the vast amount of unstructured mobility (Berger 1999; Humphrey 2014). Although the Chiat experiment was unsuccessful, it is considered to be a pillar in the promotion of flexible office. The Chiat experiment represents the essence of the continuously changing workplace concept, while promoting mobility through aspects such as technology and media (Humphrey 2014). Additionally, the “work anytime, anywhere” concept is regulated in the studies included in this chapter. BMW employees who clock in (based on their contractual agreement) are required to work a specific amount of hours per week and are, therefore, regulated on the amount of hours allowed to work per week. In this sense, mobile work allows employees to design their working times and location, but does not allow employees to work more hours than those that are required and agreed upon in their contract.

Mobile work includes aspects such as flexible working time (ability to designate the start and stop time of one’s working hours), compressed work weeks, telecommuting/home office (employees work from a remote site that does not include their typical workplace), and so forth (Kelly and Kalev 2006). Flexibility in the workplace is additionally used to describe characteristics of work-life balance, affecting both men and women in the workplace (Hill et al. 2010; Smithson and Stokoe 2005). Issues promoting the need for mobile work regarding work-life balance can be understood by the incompatible requirements that are placed on an individual in reference to his or her work life and personal life (Kelly et al. 2011). Work-life balance is portrayed through the various adjustments and roles that a person inhibits in order to organize his or her required actions and behaviors through the positive balance of roles within one’s life (Greenhaus et al. 2003; Grandey et al. 2007; Hill et al. 2010). Role balance is “the tendency to become fully engaged in the performance of every role in one’s total role system, to approach every typical role and role partner with an attitude of attractiveness and care...” (Marks and MacDermid 1996, p. 421).

Work-life Balance

Work-life balance conflicts are well known (Kelly et al. 2011) and potentially lead to job dissatisfaction and employee turnover (Smith and Gardner 2007). Although Earle (2003) states that “the companies with the happiest employees are the ones that take an interest in not just the professional lives, but also the personal lives, of their people” (p. 252), about 70 % of men and women in a

study conducted in the US, for example, report having difficulties balancing work life and private life (Kelly et al. 2011). Organizational policy, as well as specific individual drive regarding material, monetary, and personal motivation, is responsible for the imbalance that occurs in work-life balance among employees (White et al. 2003). Furthermore, the separation between work life and personal life is no longer clear and separate and is becoming blurred as work and personal lives merge (Earle 2003; Glavin and Schieman 2011). Therefore, a greater level of flexibility and mobility is necessary to accommodate both the personal and work lives of an organization's employees (Earle 2003; Hill et al. 2010).

Various work-life balance initiatives are found to have a profound impact on employee satisfaction (Earle 2003), which are vital when 61 % of participants in a US represented study, for example, prefer to have reduced working hours (Kelly and Kalev 2006). Work-life balance initiatives enable employees to balance work tasks with nonwork commitments and are characterized by strategic initiatives for the organization regarding recruitment and retaining employees (Hobson et al. 2001; Smith and Gardner 2007). For instance, with the implementation of mobility in a workplace concept, work-life balance initiatives can reduce employee turnover by 50 %, while raising efficiency and performance by 20 % (Earle 2003). Work-life balance initiatives include the following aspects: flexible working arrangements, leave arrangements (e.g. parental leave), on-site day-care assistance for children, and other services to aid in alleviating family-work conflict (Smith and Gardner 2007). Without the option of organizationally promoted mobile work, employees are forced to take drastic measures that could potentially lead to a decrease in employee satisfaction levels. For example, in order to incorporate work and family obligations, individuals are sometimes forced to succumb to a decrease in pay or intensify work in order to complete assignments in advance (Callan 2007; Kelliher and Anderson 2009; Kelly et al. 2011; Lewis 2010).

Outdated business models could have a devastating effect on employee satisfaction levels, especially considering that time spent on one's personal life is correlated with his or her job satisfaction levels (Grandey et al. 2007). Various researchers additionally argue that, overall, the workplace environment has a negative effect in predicting conflict, in comparison to one's personal or family environment (Carlson 1999; Grandey and Cropanzano 1999; Grandey et al. 2007). Furthermore, obsolete organizational policies are unsatisfactory for profound change and could therefore have an adverse influence on employee perceptions (Lewis 2010). Employees need to perceive that they are receiving practical support needed for something that they value. Moreover, perceived support is vital for employee satisfaction, ultimately driving the success of the workplace concept (Forsyth and Polzer-Debruyne 2007).

Employee Well-Being in the Working Environment

Subjective well-being refers to an individual's awareness and satisfaction with life. Individuals who report higher levels of well-being are generally happy with their social and family lives, are less aggressive, less focused, and are less likely to be affected by disease (Clements-Croome 2006; Myers and Diener 1995). Well-being is conceptualized through personal-life endeavors (i.e. social, spiritual, family, and so forth), job-related satisfaction (i.e. promotion, salary, colleagues, and so on), and general health (Cooper and Marshall 1978; Danna and Griffin 1999; Harter et al. 2003; Helliwell and Huang 2010; Smith et al. 1995). Moreover, individuals with an elevated level of well-being feel a greater sense of control over their lives, regardless of the social context (e.g. work life vs. personal life) (Myers and Diener 1995; Clements-Croome 2006; Myers and Diener 1995). Consequences regarding the failure to meet one's responsibilities in the workplace and in family life lead to the following issues: higher stress and disease from stress, lower general satisfaction, family issues, and substance abuse (Hobson et al. 2001), therefore leading to the various domains of employee well-being in the workplace. Those who experience poor well-being will tend to be less productive, make bad decisions, be absent from working tasks, and ultimately make fewer contributions to the organization (Danna and Griffin 1999), leading to the notion that employees experience well-being in the workplace physically, emotionally, and psychologically (Danna and Griffin 1999).

The work setting is another factor that affects employee well-being (Danna and Griffin 1999) and plays a momentous role in a person's life (Harter et al. 2003). For instance, job satisfaction is argued to make up a fifth or more of general satisfaction in adults (Grawitch et al. 2006). Flexibility in the workplace provides employees with enhanced control and choice, which is believed to have a positive influence on well-being (Joyce et al. 2010). Organizations who "maximize the integration of worker goals for well-being and company objectives for profitability and productivity" (Sauter et al. 1996, p. 250) is considered to be a healthy workplace (Grawitch et al. 2006). The application of working practices promotes employee well-being and improves changes in behavior, creating an environment that enhances flexibility and mobility (Grawitch et al. 2006).

A meta-analysis review from 1970 to 2003 carried out by De Croon et al. (2005) on the effects of office layout, office location, and office use resulted in inconsistent results regarding the effects of desk sharing on employee health

and well-being. However, strong evidence was found in reference to the negative effect that an open office has on job satisfaction. Additionally, Taylor et al. (2003) conducted a study on UK employees working in a call center in Scotland regarding health and well-being. The researchers found that desk sharing should be minimized or even eliminated in order to maintain a high quality of employee health. Taylor et al. (2003) also found that the room atmosphere has a significant effect on employee health and well-being through elements such as lighting, air quality, temperature, stimulation, and so forth. The findings of these studies provide inconclusive results, indicating the need for further research pertaining to how the working environment affects employee well-being and health.

The Role of Change Management in a Flexible Working Environment

A change in workplace solutions that actively promotes flexibility and mobility can significantly decrease issues emerging from work- and personal-life conflicts (Kelly et al. 2011). A flexible working environment solution stimulates a change in working culture by promoting a culture of trust (Vos and van der Voordt 2002). Furthermore, successful working environment concepts prevail through organizational culture change (Kötter 2003), allowing researchers to determine the appropriate workplace concept that should be implemented based on employee satisfaction (van der Voordt 2004). Change management initiatives are therefore considered to be a supportive function in attempt to achieve the successful application of a flexible working environment. Initiating positive perceptions and supporting employees in flexible workplace culture change will in turn prevent cultural change resistance (Khamkanya and Sloan 2009). Emotional responses to change are portrayed by various behavioral and cognitive reactions that affect one's attitude when faced with change (Oreg 2003, 2006; Piderit 2000; van den Heuval and Schalk 2009). Employee resistance can be devastating when attempting to implement transformational change within an organization (Avey et al. 2008). Although previous studies have reported positive outcomes of flexibility in reference to work-life balance and room atmosphere, the effects of flexibility are not the same for all organizations (Khamkanya and Sloan 2009), therefore requiring the need for additional research.

The aim of applying change management initiatives in a flexible and mobile work environment study is to assist employees in promoting and adopting flexible and mobile work practice. Khamkanya and Sloan (2009) carried out

a study on a flexible workplace, including 100 Scottish public office authorities. Results of the study indicate that 30 % of respondents believe that a non-territorial office environment could lead to resistance regarding cultural change. Additionally, 15 % report that management is inadequate for a flexible office solution, suggesting the need to optimize managerial practice in the flexible working environment. The study conducted by Khamkanya and Sloan (2009) furthermore suggests issues of trust in the workplace regarding working performance monitoring. Of the respondents, 80 % indicate that targets and output should be measured for monitoring purposes of employees, while 40 % report that mobile work time should be tracked. Khamkanya and Sloan (2009) have demonstrated the need to implement change management initiatives in a flexible working environment in order to successfully transform the culture in the alternative working environment. A flexible and mobile workplace concept requires an extraordinary level of trust among managers and colleagues regarding performance and accessibility (De Paoli et al. 2013; Vos and van der Voordt 2002). Explicit rules of the flexible working concept need to be enforced to guarantee the success of the flexible working concept. Moreover, “promoting the best practice and encouraging staff to perceive the benefits of flexible working by level of adoption, including individual, work-group, department, intra-, and inter-organization, is a crucial step for minimizing potential problems, such as discontent in staff, cultural change effects, and unsuitable management system” (Khamkanya and Sloan 2009, p. 50).

Since change is complicated and multidimensional (Paton and McCalman 2008), change management practitioners need to provide support for employees working in a flexible working environment (Maarleveldt et al. 2009). In order to determine whether or not the flexible working environment is an optimal workplace concept, employee perceptions concerning satisfaction measurements should be taken into consideration and regarded as the driving success factor of the flexible office concept implementation.

Methodology

Study Setting

The research study was carried out in a trial flexible office environment at the BMW Group in Munich, Germany. The office building was a preexisting workplace that was redesigned to fit the new working environment project named *M51*. Furthermore, there is a significant difference between the flexible working environment and the standard workplace in the organization.

For example, a typical office within the BMW Group is distinguished by a large room and open-office design. Each employee is assigned to his or her individual desk, while only executive managers receive an individual office. Additionally, there is little to no privacy for employees, as well as limited areas for collaborative or project-based work.

The flexible office concept at the BMW Group is characterized by an open-office floor plan, but does not include any form of barriers. Offices are provided to executive managers, but it is termed a “manager-meeting room,” meaning that it is an office when the executive is present, but also doubles as a meeting room for employees when the executive is not present. Manager-meeting rooms are symbols of a less hierarchical workplace concept that promotes flexibility and collaboration between the managers and employees. Additionally, a flexible office is symbolized by shared workspaces and alternative workplace possibilities that include areas such as lounges, cafés, tea kitchens, terraces, and so forth. Since a clean desk policy is integrated into the flexible workplace concept, employees are also assigned individual lockers where they can store their items and documents.

Research Design

The flexible working environment trial study took place over a three-year period, although the mixed methods, longitudinal data analyses spanned over a two-year time period between April of 2012 and May of 2014. Employees were asked to participate in an array of three anonymous and voluntary online questionnaires, although only questionnaires two and three include questions pertaining to mobile work and workplace flexibility. Therefore, only questionnaires two (Study: Time 1) and three (Study: Time 2) will be included. The questionnaires included in Studies 2 and 3 are composed of five repeated Likert scale questions regarding work-life balance and support for mobile work; 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly agree. The questions were originally asked in German and then translated into English for publication purposes. The conceptualization of the mobile work variables can be seen in Table 24.1.

The five-point Likert scale questions regarding satisfaction with the working environment were first analyzed with confirmatory factor analysis (CFA) and followed up with a structural equation model (SEM) using the analysis of moment structures (AMOS) software program. In addition to quantitative analyses, employees were asked to answer two open-ended questions in Studies 2 and 3 concerning flexibility and mobility. Cohen’s kappa analysis

Table 24.1 Conceptualization of mobile work variables

Item & question #	Items	Derived/adapted from
Support for mobile work		
SMW 1	My manager allows me to use the full flexibility of mobile work.	IBM global work & life issues survey (1996)
SMW 2	I have agreed with my manager, how I will concretely implement mobile work (frequency, lead time, availability, etc.).	IBM global work & life issues survey (1996)
SMW 3	We have discussed and agreed on our accessibility – including the availability during mobile work with our team	IBM global work & life issues survey (1996)
Work-life balance		
WLB 1	With the option of mobile work, I can balance professional and personal interests better	IBM global work & life issues survey (1996)
WLB 2	With the use of mobile work, I feel more balanced	IBM global work & life issues survey (1996)

was calculated between two coders in order to assess the inter-rater reliability scores for questionnaires two and three using IBM's Statistical Package for the Social Sciences (SPSS). Additionally, an analysis of employee well-being is analyzed over time as well.

With the application of a longitudinal design, results of the questionnaires are analyzed, allowing for monitoring of change acceptance, resistance, and adaptation over time, including changes made between questionnaires to achieve a high level of employee satisfaction. Participant information was kept anonymous and only recognizable based on the following demographics: department, age, and level of employment. Furthermore, in response to data protection regulations of the BMW Group, individual codes were not assigned and departments were only analyzed if they included five or more participants. All departments with less than three individuals participating in the questionnaires were classified in the department demographic, "other."

Study: Time 1

A total of 234 internal BMW Group employees participated in the questionnaire, making up a response rate of 65 %. This includes 205 employees, 22 managers, and 7 non-categorized individuals, from real estate management, corporate security, and human resource strategy. Participant ages were cat-

egorized in the following way: younger than 30 years (16 %), 30–40 years (36 %), 41–50 years (31 %), and older than 50 years (18 %). Furthermore, three cases were deleted because of violation assumptions of the SEM, leaving 231 cases as the final data set applied in Study Time 1.

A CFA, maximum likelihood estimation was carried out in order to determine the model fit of the questionnaire used in Study 2 indicating that the model was a good fit ($\chi^2/df = 1.87$; TLI = 0.97; CFI = 0.98; RMSEA = 0.06) (Hu and Bentler 1999). The variables in the model resulted in a high level of internal consistency (Kline 2005): work-life balance ($\alpha = 0.85$) support for mobile work ($\alpha = .80$). Furthermore, discriminant validity was measured for and established for the mobile work SEM in Study 1 based on the recommendations of Hair et al. (2010), and can be seen in Table 24.2.

Moreover, necessary assumptions were fulfilled before the SEM was carried out regarding linearity analysis, univariate normality analysis, multivariate normality analysis, outlier analysis, common method bias, and multicollinearity analysis.

SEM was conducted to determine the connection between the endogenous and exogenous variables and content analysis by means of Cohen's kappa analysis was used in order to evaluate the question, "do you have any further comments regarding the topic, desk sharing?" as well as "do you have any suggestions regarding mobile work? What are your experiences regarding mobile work that are both positive and negative?" Two coders assigned specific codes to open-ended responses in order to obtain a more comprehensible collection of feedback.

Study 2

A total of 265 internal BMW Group employees participated in the questionnaire, making up a response rate of 58 %. This includes 235 employees, 24

Table 24.2 Study 1 – validity statistics for mobile work SEM

<i>Description</i>	<i>Mean</i>	<i>Loadings</i>	<i>AVE</i>	<i>MSV</i>	<i>ASV</i>	<i>CR</i>
Support for mobile work	3.74		0.620	0.052	0.052	0.826
WLB 1 (45)	4.41	0.59				
WLB 2 (47)	3.41	0.89				
WLB 3 (48)	3.42	0.85				
Work-life balance	4.19		0.740	0.052	0.052	0.846
SMW 1 (49)	4.36	0.92				
SMW 2 (50)	4.04	0.79				

Legend of validity measures: *AVE* average variance explained, *MSV* maximum shared variance, *ASV* average shared squared variance, *CR* composite reliability

managers, and 6 non-categorized individuals, from real estate management, corporate security, and human resource strategy. Participant ages were categorized in the following way: Younger than 30 years (11 %), 30–40 years (36 %), 41–50 years (35 %), and older than 50 years (20 %). Twenty-six cases were deleted due to multivariate non-normality, leaving 239 cases applied in the final data set.

A CFA, maximum likelihood estimation was carried out in order to determine the model fit of questionnaire used in Study 2 indicating that the model was a good fit ($\chi^2/df = 2.04$; TLI = 0.95; CFI = 0.97; RMSEA = 0.06) (Hu and Bentler 1999). The variables in the model resulted in a high level of internal consistency (Kline 2005): work-life balance ($\alpha = 0.77$) and support for mobile work ($\alpha = 0.65$). Additionally, discriminant validity was measured for and established for the mobile work SEM in Study 2 based on the recommendations of Hair et al. (2010), and can be seen in Table 24.3.

Required SEM assumptions were fulfilled before further analysis was carried out regarding linearity analysis, univariate normality analysis, multivariate normality analysis, outlier analysis, common method bias, and multicollinearity analysis, validity analysis, and reliability analysis.

Similar to Study 1, SEM was conducted to determine the connection between the endogenous and exogenous variables and content analysis via Cohen's kappa analysis was used in order to evaluate the question, "do you have any further comments regarding the topic, desk sharing?" as well as "do you have any suggestions regarding mobile work? What are your experiences regarding mobile work that are both positive and negative?" Two coders assigned specific codes to open-ended responses in order to obtain a more comprehensible collection of feedback.

Table 24.3 Study 2 – validity statistics for mobile work SEM

<i>Description</i>	<i>Mean</i>	<i>Loadings</i>	<i>AVE</i>	<i>MSV</i>	<i>ASV</i>	<i>CR</i>
Work-life balance	4.04		0.680	0.129	0.129	0.812
MWS 1 (50)	4.58	0.86				
MWS 2 (51)	4.22	0.79				
Support for mobile work	4.39		0.480	0.129	0.129	0.709
WLB 1 (46)	4.58	0.41				
WLB 2 (47)	3.88	0.98				
WLB 3 (48)	3.68	0.56				

Legend of validity measures: *AVE* average variance explained, *MSV* maximum shared variance, *ASV* average shared squared variance, *CR* composite reliability

Results

Study 1

The results of the SEM in Study 1 indicate that work-life balance $M = 4.19$ ($\beta = 0.24, p < 0.05$) and support for mobile work $M = 3.74$ ($\beta = 0.19, p < 0.05$) are significant predictors of satisfaction with the working environment ($M = 3.82$) and mean satisfaction scores for both variables are relatively high. Results of the SEM in Study 1 can be seen in Fig. 24.1.

Open-ended Responses: Mobile Work

In addition to the path analysis, 71 open-ended responses are reported for mobile work open-ended responses. The majority of responses concern the topics of *flexibility is positively perceived* (59 %) and *not enough acceptance of mobile work from managers* (21 %), both of which are interpreted to have a positive effect regarding the flexible working environment concept, especially regarding work-life balance. The following responses demonstrate the majority of participant response for positive perceived flexibility and not enough acceptance from managers for mobile work:

(2) Flexibility is positively perceived:

I have the opportunity to reconcile work and family life better. I have Greater flexibility more fun at work because I can arrange my tasks better. – From employee, human resource management (41–50 years)

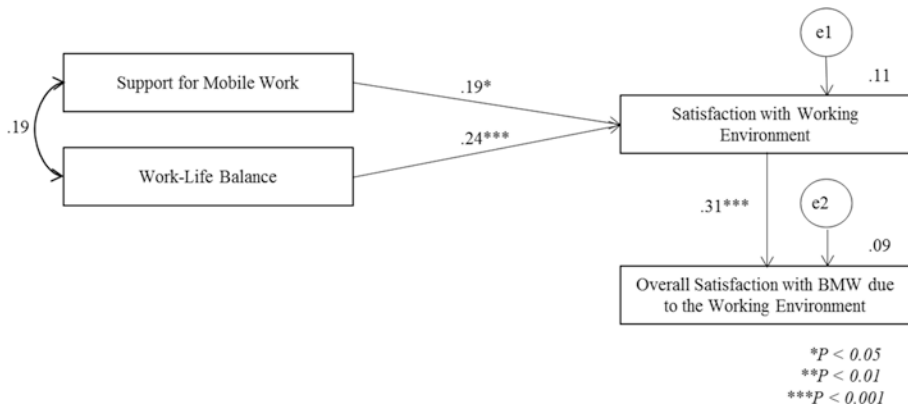


Fig. 24.1 Study 1 – structural equation model

Mobile work enables much more efficient work with perfect adjustment to private concerns such as family and career compatibility. Mobile work does not have enough acceptance among colleagues and managers. – From employee, human resource management (30–40 years)

Very positive: Mobile work allows flexibility for professional inquiries (during off-peak hours) or responding to short-term family affairs (e.g. when children are sick)... – from employee, real estate management (30–40 years)

(4.1) Not enough acceptance (or mobile work) from managers:

Managers, unfortunately, do not support mobile work. – From employee, real estate management (41–50 years)

Managers should release teleworking. No 2nd class society. – From employee, real estate management (no age)

The opportunities and conditions for mobile work, on behalf of the managers, needs to be communicated. This will motivate employees to use mobile work. – From employee, real estate management (41–50 years)

Results indicate that employees are generally satisfied with the mobile work option as part of the flexible working environment concept, but managers should support employees more in terms of mobile work. Employees also perceive the enhanced option of flexibility as being positive, providing a greater work-life balance, but that mobile devices need to be improved and the amount increased in order to optimize mobile work overall for employee satisfaction.

When I turn on my computer at home, the family is locked out and I lose myself in the work. – From employee, real estate management (older than 50 years)

The answers here are useless because I do not use telework. – From employee, human resource management (older than 50 years)

Table 24.3 indicates the amount of responses reported by participants in the study per defined code. The majority of participants perceive the flexibility provided by mobile work to be positive; however, 15 responses were reported indicating that managers do not support mobile work for their employees. Moreover, the amount of mobile devices needs to be improved in order to satisfy the needs of the participants in Study 1. Cohen's kappa analysis was cal-

culated in order to obtain an acceptable inter-rater reliability score. Based on Landis and Koch's (1977) codification, there is substantial agreement between the two coders, $\kappa = 0.64$, $p < 0.05$. Detailed information regarding the coded responses and a summary of open-ended responses are included in Table 24.4.

Open-ended Responses: Desk Sharing

In order to determine how desk sharing impacts employee satisfaction and perception of the working environment, a total of 126 open-ended responses are reported in the desk-sharing classification in reference to the question, "Do you have any further suggestions regarding the topic of desk sharing?" The majority of responses pertain to the codes: improve sound and noise and hygiene. Although various other codes are included in the overall analysis of research at the BMW Group, only hygiene and concentration classifications will be analyzed further since they have a direct impact on flexibility and well-being in the workplace. Furthermore, stress can be induced by both loud and chaotic environments, as well as unhygienic ones, potentially affecting employee well-being. The following statements provide examples from the two main classifications stated above.

Large room office is very noisy and disturbing. Thus, it is very difficult to concentrate... – From employee, human resource management (41–50 years)

Install soundproof elements. – From employee, human resource management (younger than 30 years)

Table 24.4 Results of study 1 – mobile work open-ended responses

Code	Definition	Amount of responses per code
1	Improve/increase mobile devices	13
2	Flexibility perceived as positive	42
2.1	Family–career compatibility	10
3	Optimize communication	6
4	Acceptance of mobile work from managers	2
4.1	Not enough acceptance from managers	15
4.2	Acceptance from managers for mobile work	2
5	Administration (recording of work hours, etc.)	5
6	Mobile work leads to better performance	9
7	Improve Lync (communicator)	2
8	Miscellaneous	4
9	Clear rules for mobile work are missing	6

Negative: The furniture for phone calls are rarely used, because the acoustics need to be strengthened. The loud closing of the doors is very disturbing... – From employee, human resource management (30–40 years)

The desks should be cleaned thoroughly, because of dust and the residue of colleagues. – From employee, human resource management (41–50 years)

Negative: 1. Cleanliness (desks, counter cabinets above tables in meeting round, upholstery on chairs and in meeting rounds – hair, door handles) needs to be urgently improved. Acoustics: Noise level is too high and affects efficiency. – From employee, human resource management (41–50 years)

Hygiene is inadequate for desk sharing. – From employee, real estate management (41–50 years)

Table 24.4 demonstrates the amount of responses reported by participants in the study per defined code. The majority of participants responded to issues in the new working environment regarding the sound/noise, as well as problems pertaining to hygiene (as stated in the open-ended responses). Cohen's kappa analysis was calculated in order to obtain an acceptable inter-rater reliability score. Based on the codification by Landis and Koch (1977), there is substantial agreement between the two coders, $\kappa = 0.68$, $p < 0.05$. Table 24.4 provides results regarding the open-ended responses. The codes in Table 24.5 are not in chronological order due to the fact that not all codes and definitions that are included in the original research are included here, therefore making them irrelevant to the current study.

Table 24.5 Study 1: desk-sharing open-ended responses

Code	Definition	Amount of responses per code
1	Hygiene	19
1.1	Improve odor	1
1.2	Improve cleanliness	4
2	Improve sound/noise	59
2.1	Telephone cells are too loud	5
2.2	Security door Alarm	4
5	Improve lighting	9
6	Improve ventilation	6
7	Install ceiling panels	7
19	Positive overall	8
20	Negative overall	2

Study 2

The results of the SEM in Study 2 indicate a similar trend as in Study 1. Work-life balance $M = 4.39$ ($\beta = 0.18, p < 0.05$) has resulted in being a significant predictor of satisfaction with the working environment, while support for mobile work $M = 4.04$ ($\beta = -0.02, p > 0.05$) is not a significant predictor of satisfaction with the working environment ($M = 4.15$) although the mean satisfaction scores for both variables are relatively high. Results of the SEM in Study 2 can be seen in Fig. 24.2.

Open-ended Responses: Mobile Work

Furthermore, 58 employees and 2 managers responded to the mobile work open-ended question, “Do you have any suggestions regarding mobile work? What are your experiences regarding mobile work that are both positive and negative?” composing a total of 60 open-ended responses. The majority of responses include the following codes: mobile work perceived as positive, greater flexibility, and mobile work perceived as negative. The following response represents examples of direct reactions to the mobile work open-ended responses:

Absolutely positive!!! – From employee, human resource management (30–40 years)

The concept of mobile work is very positive, – From employee, real estate management (30–40 years)

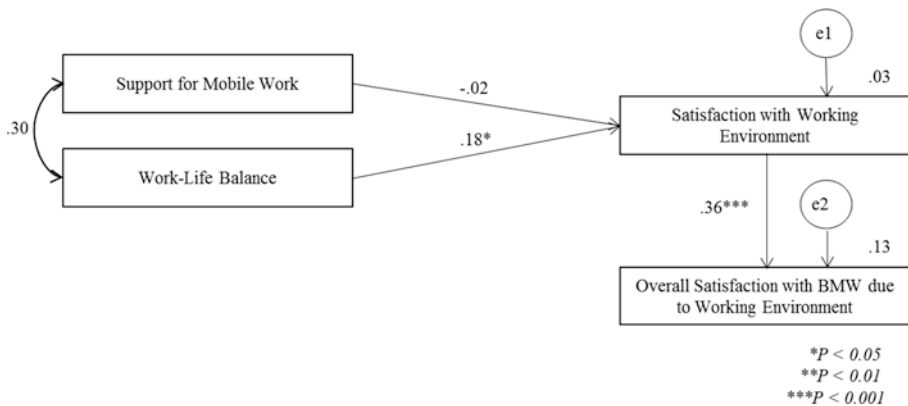


Fig. 24.2 Study 2 – structural equation model

Although the majority of results indicate a positive overall perception from employees, there are also a significant amount of negative perceptions of mobile work. Even though the positive responses significantly outperform the negative responses, negative perceptions of mobile work are also analyzed. Examples include the following responses:

Negative: I don't have any. – From employee, human Resource Management (30–40 years)

Support to purchase furniture for home? (Ex. Height adjustable desk) ... In the furniture market (Internet/furniture store) are not (much) cheaper alternatives to see which have the same standard quality. – From employee, human Resource Management (30–40 years)

Table 24.6 shows the amount of responses reported by participants in the study per defined code. The majority of participants perceive mobile work as having a positive influence due to higher flexibility, better family–career compatibility, as well as the option of having quieter working possibilities. However, a significant amount of participants report mobile work as having a negative influence, due to the lack of necessary IT equipment, issue of balancing work–family life and “switching off,” as well as other issues. Moreover, participants indicate that there is an insufficient amount of acceptance among managers regarding the allowance of mobile work. The lack of support for mobile work among managers could be influenced by the fact that the clear set of rules for mobile work, which currently exists for BMW Group employees working in Germany, may not have been clearly communicated to all members of the organization, specifically regarding managers. This lack of understanding, therefore, could contribute to the lack of support for mobile work among managers. In general, participants included in Study Time 2 find mobile work to be positive. Cohen’s kappa analysis was calculated in order to obtain an acceptable inter-rater reliability score. Based on Landis and Koch’s (1977) codification, there is a fair amount of agreement between the two coders, $\kappa = 0.39$, $p < 0.05$. Table 24.6 depicts the results of the coding analysis in Study 2.

Open-ended Responses: Desk Sharing

A total of 63 open-ended responses were reported in the desk-sharing classification in reference to the question, “Do you have any further suggestions regarding the topic of desk sharing?” Similar to Study 1, the majority of responses

Table 24.6 Results of Study 2 – mobile work open-ended responses

Code	Definition	Amount of responses per code
1	Mobile work is positive	42
1.1	Higher flexibility	23
1.2	Family and career compatibility	12
1.3	Quieter working possibilities	13
1.4	Positive impact on health	1
1.5	Allotted travel time	9
2	Mobile work is negative	18
2.1	Optimize communication with colleagues	3
2.2	Greater distraction	1
2.3	Lack of office furniture	0
2.4	Lack of IT-equipment (monitor, DS, smartphone)	9
2.5	Expansion of mobile work wished for	1
2.6	“Switching off” at home is difficult	5
3	Manager acceptance of mobile work	10
3.1	Insufficient acceptance of managers for mobile work	10
3.2	Acceptance of managers for mobile work	0
3.3	Insufficient acceptance of employees for mobile work	4
4	Administration (recording of working hours, etc.)	1
5	Mobile work leads to higher employee performance	4
6	Clear rules for mobile work are missing	10
6.1	Set time for availability	6
6.2	Mobile work rules not complied with	3
7	Other	3

regard the hygiene code, as well as the telephone boxes included in the storage system code, ultimately affecting employee concentration and speculated stress levels. For example,

Due to the limited cleaning service, hygiene levels are not optimal; when the employees don't clean the desks themselves, the number of amount of infectious diseases is greater, especially in winter. – From employee, human resource management (41–50 years)

More frequent cleaning. – From employee, human resource management (30–40 years)

Table 24.7 indicates the amount of responses reported by participants in the study per defined code. Similar to Study 1, the majority of participants in Study 2 report that there are still issues with hygiene; however, the results

Table 24.7 Results of Study 2 – desk-sharing open-ended responses

Code	Definition	Amount of responses per code
1	Hygiene	11
1.1	Clean more often	1
1.2	Clean tables more often	8
1.3	Hair on the chairs	2
2	Improve sound/noise	6
2.1	Acoustics at workstation	5
2.2	Disturbance from phone calls	2
5	Storage system	11
5.1	More telephone boxes	3
6	Desk-sharing support	9
6.1	Desk sharing is not lived	6
6.2	More support from managers	2
6.3	More support from employees	3
13	More mobile/flexible work options	4

(regarding the amount of responses per defined code) show an improvement in hygiene. For example, in comparison to the results of the open-ended responses in Study 1 (see Table 24.4), fewer participants report having issues with hygiene in Study 2, even though there are more participants involved in the study. Furthermore, significantly fewer participants ($n = 6$) indicate that the sound/noise in the new working environment needs to be improved in comparison to Study 1 ($n = 59$). This could be due to the changes made between Study 1 and Study 2 regarding acoustic and concentration opportunities carried out (i.e. telephone boxes and acoustic paneling). Cohen's kappa analysis was calculated in order to obtain an acceptable inter-rater reliability score. Based on Landis and Koch's (1977) codification, there is substantial agreement between the two coders, $\kappa = 0.85$, $p < 0.05$. Table 24.7 provides results and a general summary of results regarding desk-sharing open-ended responses for Study 2.

Employee Well-being

Employee well-being is additionally analyzed for individuals included in Studies 1 and 2 as a response to the flexible working environment because the working environment is predicted to have a direct influence on employee health and well-being in response to aspects such as desk sharing and room atmosphere elements such as lighting, air quality, temperature, stimulation, and so on (De Croon et al. 2005; Taylor et al. 2003). Figure 24.3 illustrates the trend in the employee well-being analysis regarding health. Well-being is

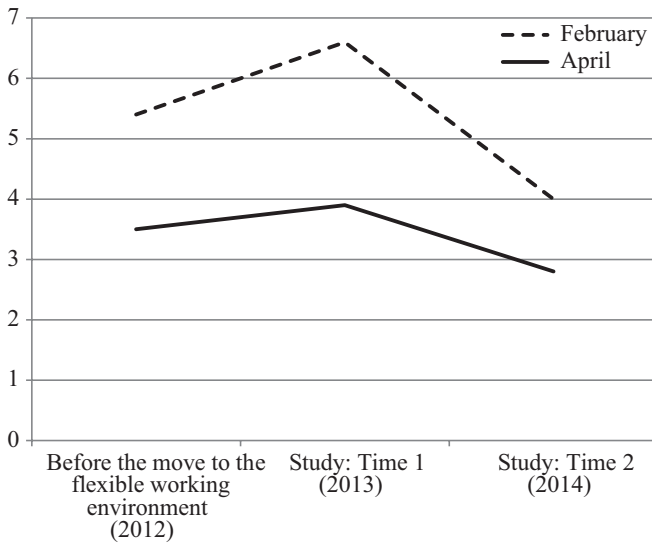


Fig. 24.3 Employee well-being analysis

measured on a scale from 0 to 7, where 0 is defined by employees who are feeling significantly well, and 7 is defined by employees who are feeling significantly unwell. The months of February and April were analyzed because February is a month when employees feel particularly unwell, whereas April is a month when employees are typically feeling very well. Results of the study show that there is a significant spike in employee feelings of wellness in 2013 during Study 1. This significant increase in employees feeling unwell can be explained by the newly implemented working practice, *desk sharing*, introduced in the Study 1. The implementation of desk sharing can be understood as affecting issues regarding well-being and health due to higher stress levels and hygiene problems as seen in the open-ended responses stated in Studies 1 and 2. Moreover, there is a significant decrease in employee feelings of being unwell in Study 2, suggesting that modifications made between Studies 1 and 2 have significantly improved the well-being and health of employees working in the flexible working environment. The hygiene modification that was made between Studies 1 and 2 concerns the cleaning service frequency in the flexible working environment. During the time of Study 1, the working environment was only being cleaned once a month. During the time of Study 2, the environment was being cleaned once a week. These results indicate that hygiene is an important factor in maintaining a high level of employee well-being and satisfaction with the working environment, and that appropriate interventions need to be implemented in supporting employee well-being.

Results of the well-being analysis should be interpreted with caution given the vagueness of the meaning behind the variable, well-being, regarding health in this study. Health is a topic that is influenced by various facets, therefore providing inconclusive results regarding direct effects that the flexible working environment has on employee well-being. Instead, it is possible to draw conclusions about the trend in data, speculating that employee well-being is directly impacted by the flexible working environment, but further research is needed to prove or disprove this theory.

Conclusion

Summary of the Results

Results of Studies 1 and 2 indicate that satisfaction with mobile work significantly predicts satisfaction with the working environment, and therefore hypothesis 1 is supported. Mobile work is conceptualized by work that takes place outside of the “assigned” workplace, leading to the conclusion that mobile work increases satisfaction with the working environment. Mobile work open-ended responses furthermore indicate that there is a significant relationship between employee satisfaction and mobile work. The mean scores of work-life balance and support for mobile work show that employees are generally satisfied with mobile work, suggesting the importance of the open-ended responses. Furthermore, satisfaction with the mobile work variables continued to increase over time, indicating the value of implementing mobile work in the new working environment concept. These results of Studies 1 and 2 support the findings of Almer and Kaplan (2002) and Kelliher and Anderson (2009) in that flexibility and mobility support employee satisfaction. However, the results of this study contradict the results of the Chiat experiment (Berger 1999; Humphrey 2014), where the lack of structure pertaining to flexibility and mobility resulted in a high level of dissatisfaction among employees. The results of the studies carried out, on the other hand, prove that the option of flexibility and mobility has a positive impact on employee satisfaction with the working environment. Still, the results of the mobile work study are somewhat vague; therefore, additional research should be conducted to determine how mobile work directly impacts employees.

Workplace flexibility, specifically regarding desk sharing, has a significant impact on the hygiene and concentration abilities of employees in the flexible working environment, which is demonstrated in the content analyses of the open-ended responses in Studies 1 and 2. Change management allows

practitioners to identify areas that need attention when implemented in a trial flexible working environment. In order to achieve desirable employee satisfaction levels with the working environment, leading to successful flexible working environment results, problematic elements such as concentration abilities and cleanliness need to be attended to. By monitoring various changes made between Studies 1 and 2, employee satisfaction with the working environment significantly increased over time.

Health is a topic that is influenced by an abundant amount of variables, and although hypothesis 2 is supported, results regarding the direct effects that the flexible working environment has on employee well-being are inconclusive. These results are aligned with the findings in current literature in that flexibility and mobility in the workplace provide contradicting conclusions regarding employee well-being (Gajendran and Harrison 2007). For example, mobile work reduces work-family conflict; however, it can also generate stress and time pressure, which can have adverse effects on employee well-being (Demerouti et al. 2014; Peters and Van der Lippe 2007; Powell and Greenhaus 2010). In this study, it is possible to draw conclusions about the trend in data, speculating that employee well-being is directly impacted by the flexible working environment and possibly satisfaction with mobile work, but further research is needed to prove or disprove this notion. Since subjective well-being is directly influenced by employee satisfaction and health (Clements-Croome 2006; Cooper and Marshall 1978; Danna and Griffin 1999; Harter et al. 2003; Helliwell and Huang 2010; Myers and Diener 1995; Smith et al. 1995), additional research could provide valuable information for change management and flexible working environment practitioners for the future design of workplace development and how the working environment affects employee well-being.

Implications of the Research

As working environment structure and behavior continues to evolve, organizations are required to adapt and transform their workplace culture in order to keep up and survive given various external pressure placed on the organization (Mosby 2001). Flexibility and mobility allow the integration of a larger workforce without necessarily needing additional space to accommodate them, which allows the organization to save its resources while continuing to grow. Moreover, organizations need to adopt innovative and new ways of working in order to remain competitive in a continuously changing society (Chang and Lui 2008; Oksanen and Stähle 2013). By implementing a flexible and mobile working environment, the BMW Group is able to not only

continue growing as a company but also allow the organization to establish itself as an attractive employer. Since individuals spend a large amount of time in their working environment, a change in working environment or working culture practice will consequently affect perception and attitude, such as employee satisfaction and well-being. Choi (2011) argues that organizational change, specifically regarding flexible working environments, can intensify dissatisfaction among employees, therefore providing the need to measure and track employee satisfaction over a certain amount of time in order to achieve satisfactory results regarding changes implemented in the flexible working environment (i.e. desk sharing, flexibility, and mobile work).

Although there is a clear need for the implementation of a flexible working environment and an adequate amount of research currently exists regarding flexible office, mobile work, and well-being (Brunia and Hartjes 2009; De Been and Beijer 2014), the variables measured are unclear, leading to inconclusive results (Vischer 2007, 2008). Moreover, a large amount of research regarding flexible working environments exists primarily in the Netherlands from researchers, such as Brunia and Hartjes-Gosselink (2009), Maarleveld et al. (2009), van der Voordt (2004a, b); Volker and van der Voordt (2005), Vos and van der Voordt (2001). Therefore, the research carried out in this study provides a more global perspective by implementing flexible office research in an automotive industry in Germany.

Limitations of the Research

There are several limitations that need to be addressed regarding the research carried out at the BMW Group. The instrument applied to Study 1 and Study 2 was self-report questionnaires, which do not necessarily portray an individual's perception or attitude toward a given situation (Hill et al. 2010; Stone et al. 1999). Furthermore, previous research suggests that variables affecting flexibility, mobility, and well-being such as health (exercise and sleep), various social and temporal structures (Kelly et al. 2011), job effectiveness (Grant et al. 2013), job demands, job resources, physical and psychological needs (Demerouti et al. 2014), age, gender (Moen et al. 2011), contractual conditions and compensation (Robone et al. 2011), as well as others have an impact on general satisfaction with the working environment; however, due to the fact that the studies carried as a basis for this chapter were a part of a larger body of empirical research, additional variables were not applied. Moreover, additional questions, demographic variables, and individually assigned codes were also limited in this research due to restrictions set by the BMW Group's policy regarding questionnaire assessments. Finally, generalizability of this

research should not be assumed, suggesting the need for additional research in difference populations regarding workplace flexibility, desk sharing, mobile work, and the effects on employee well-being. Therefore, additional research should be conducted in order to assess how flexible working environments and mobile work affect employee satisfaction regarding demographics not included in this study, as well as to determine how additional variables affect employee satisfaction and well-being.

Bibliography

- Almer, E. D., & Kaplan, S. E. (2002). The effects of flexible work arrangements on stressors, burnout, and behavioral job outcomes in public accounting. *Behavioral Research in Accounting*, 14(1), 1–34.
- Arge, K. (2005). Adaptable office buildings: Theory and practice. *Facilities*, 23(3/4), 119–127.
- Aries, M. B., Veitch, J. A., & Newsham, G. R. (2010). Windows, view, and office characteristics predict physical and psychological discomfort. *Journal of Environmental Psychology*, 30(4), 533–541.
- Avey, J. B., Wernsing, T. S., & Luthans, F. (2008). Can positive employees help positive organizational change? Impact of psychological capital and emotions on relevant attitudes and behaviors. *The Journal of Applied Behavioral Science*, 44(1), 48–70.
- Blok, M., Groenesteijn, L., Van Den Berg, C., & Vink, P. (2011). *New ways of working: A proposed framework and literature review, Ergonomics and health aspects of work with computers* (pp. 3–12). Berlin/Heidelberg: Springer.
- Berger W (1999) Lost in space. *Wired* 7(02). Available at: <http://www.wired.com/wired/archive/7.02/chiat.html> (accessed April 2015).
- Brunia, S., & Hartjes-Gosselink, A. (2009). Personalization in non-territorial offices: A study of a human need. *Journal of Corporate Real Estate*, 11(3), 169–182.
- Brittain, J., Jaunzens, D., & Davies, H. (2004). Designing for flexible building services in office-based environments: understanding client needs. The Chartered Institution of Building Services Engineers, London.
- Callan, S. (2007). Implications of family-friendly policies for organizational culture: Findings from two case studies. *Work, Employment & Society*, 21(4), 673–691.
- Carlson, D. S. (1999). Personality and role variables as predictors of three forms of work–family conflict. *Journal of Vocational Behavior*, 55(2), 236–253.
- Chang, L. C., & Liu, C. H. (2008). Employee empowerment, innovative behavior and job productivity of public health nurses: A cross-sectional questionnaire survey. *International journal of nursing studies*, 45(10), 1442–1448.
- Choi, M. (2011). Employees' attitudes toward organizational change: A literature review. *Human Resource Management*, 50(4), 479–500.
- Clements-Croome, D. (2006). Consciousness, well-being and the senses. In D. Clements-Croome (Ed.), *Creating the productive workplace* (pp. 14–21). Oxon: Taylor & Francis.

- Coomber, B., & Barriball, K. L. (2007). Impact of job satisfaction components on intent to leave and turnover for hospital-based nurses: a review of the research literature. *International journal of nursing studies*, *44*(2), 297–314.
- Cooper, C. L., & Marshall, J. (1978). *Understanding executive stress*. London: Macmillan.
- Cummings, G. G., MacGregor, T., Davey, M., Lee, H., Wong, C. A., Lo, E., et al. (2010). Leadership styles and outcome patterns for the nursing workforce and work environment: A systematic review. *International journal of nursing studies*, *47*(3), 363–385.
- Danna, K., & Griffin, R. W. (1999). Health and well-being in the workplace: A review and synthesis of the literature. *Journal of management*, *25*(3), 357–384.
- De Been, I., & Beijer, M. (2014). The influence of office type on satisfaction and perceived productivity support. *Journal of Facilities Management*, *12*(2), 142–157.
- De Croon, E., Sluiter, J., Kuijer, P. P., & Frings-Dresen, M. (2005). The effect of office concepts on worker health and performance: A systematic review of the literature. *Ergonomics*, *48*(2), 119–134.
- De Paoli, D., Arge, K., & Hunnes Blakstad, S. (2013). Creating business value with open space flexible offices. *Journal of Corporate Real Estate*, *15*(3/4), 181–193.
- Demerouti, E., Derks, D., Lieke, L., & Bakker, A. B. (2014). New ways of working: Impact on working conditions, work–family balance, and well-being. In *The impact of ICT on quality of working life* (pp. 123–141). Dordrecht: Springer.
- Earle, H. A. (2003). Building a workplace of choice: Using the work environment to attract and retain top talent. *Journal of Facilities Management*, *2*(3), 244–257.
- Felstead, A., Jewson, N., & Walters, S. (2005). *Changing places of work*. New York: Palgrave Macmillan.
- Forsyth, S., & Polzer-Debruyne, A. (2007). The organisational pay-offs for perceived work–life balance support. *Asia Pacific Journal of Human Resources*, *45*(1), 113–123.
- Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about tele-commuting: meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology*, *92*, 1524–1541.
- Glavin, P., & Schieman, S. (2011). Work–family role blurring and work–family conflict: The moderating influence of job resources and job demands. *Work and Occupations*, 1–28, 0730888411406295.
- Grandey, A. A., & Cropanzano, R. (1999). The conservation of resources model applied to work–family conflict and strain. *Journal of Vocational Behavior*, *54*(2), 350–370.
- Grandey, A. A., Cordeiro, B. L., & Michael, J. H. (2007). Work-family supportiveness organizational perceptions: Important for the well-being of male blue-collar hourly workers? *Journal of Vocational Behavior*, *71*(3), 460–478.
- Grawitch, M. J., Gottschalk, M., & Munz, D. C. (2006). The path to a healthy workplace: A critical review linking healthy workplace practices, employee well-being, and organizational improvements. *Consulting Psychology Journal: Practice and Research*, *58*(3), 129.

- Grant, C. A., Wallace, L. M., & Spurgeon, P. C. (2013). An exploration of the psychological factors affecting remote e-worker's job effectiveness, well-being and work-life balance. *Employee Relations*, 35(5), 527–546.
- Greenhaus, J. H., Collins, K. M., & Shaw, J. D. (2003). The relation between work–family balance and quality of life. *Journal of Vocational Behavior*, 63(3), 510–531.
- Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River: Prentice-Hall, Inc.
- Harter, J. K., Schmidt, F. L., & Keyes, C. L. (2003). Well-being in the workplace and its relationship to business outcomes: A review of the Gallup studies. *Flourishing: Positive psychology and the life well-lived*, 2, 205–224.
- Hassanain, M. A. (2006). Factors affecting the development of flexible workplace facilities. *Journal of Corporate Real Estate*, 8(4), 213–220.
- Helliwell, J. F., & Huang, H. (2010). How's the job? Well-being and social capital in the workplace. *Industrial & Labor Relations Review*, 63(2), 205–227.
- Herrick, C. (2011). Commonwealth Bank shifts to activity-based work culture, swanky new headoffice. *CIO*. http://www.cio.com.au/article/401530/commonwealth_bank_shifts_activity-based_work_culture_swanky_new_head_office/. Accessed Aug 2015.
- Hill, E. J., Erickson, J. J., Holmes, E. K., & Ferris, M. (2010). Workplace flexibility, work hours, and work-life conflict: Finding an extra day or two. *Journal of Family Psychology*, 24(3), 349.
- Hobson, C. J., Delunas, L., & Kesic, D. (2001). Compelling evidence of the need for corporate work/life balance initiatives: Results from a national survey of stressful life-events. *Journal of Employment Counseling*, 38(1), 38–44.
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, 6(1), 1–55.
- Humphry, J. (2014). Visualising the future of work: Myth, media and mobilities. *Media, Culture & Society*, 36(3), 351–366.
- International Business Machines. (1996). We the people @ IBM: Valuing diversity. Armonk: Author.
- Joyce, K., Pabayo, R., Critchley, J. A., & Bambra, C. (2010). Flexible working conditions and their effects on employee health and wellbeing. *The Cochrane Library* 2, 1–88.
- Kelliher, C., & Anderson, D. (2009). Doing more with less? Flexible working practices and the intensification of work. *human relations*, 63(1), 83–106.
- Kelly, E. L., & Kalev, A. (2006). Managing flexible work arrangements in US organizations: Formalized discretion or 'a right to ask'. *Socio-Economic Review*, 4(3), 379–416.
- Kelly, E. L., Moen, P., & Tranby, E. (2011). Changing workplaces to reduce work-family conflict schedule control in a white-collar organization. *American Sociological Review*, 76(2), 265–290.
- Khamkanya, T., & Sloan, B. (2009). Flexible working in Scottish local authority property: Moving on to the highest flexibility level. *International Journal of Strategic Property Management*, 13(1), 37–52.

- Kleinrock, L. (1996). Nomadicity: anytime, anywhere in a disconnected world. *Mobile networks and applications*, 1(4), 351–357
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford.
- Kötter, W. (2003). Organizational culture as a critical success factor for quality of work & products. In H. Strasser, H. Kluth, H. Rausch, & H. Bubb (Eds.), *Quality of work and products in enterprises of the future/qualität von arbeit und produkt in unternehmen der zukunft* (pp. 891–894). Stuttgart: Ergonomia Verlag.
- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33, 159–174.
- Lewis, S. (2010). *Reflecting on impact, changes and continuities. Restructuring workplace cultures: The ultimate work-family challenge?* (thesis). Retrieved from http://eprints.mdx.ac.uk/6504/1/Lewis-reflecting_on_impact.pdf
- Maarleveld, M., Volker, L., & Van Der Voordt, T. J. (2009). Measuring employee satisfaction in new offices-the WODI toolkit. *Journal of Facilities Management*, 7(3), 181–197.
- Marks, S. R., & MacDermid, S. M. (1996). Multiple roles and the self: A theory of role balance. *Journal of Marriage and the Family*, 417–432.
- Moen, P., Kelly, E. L., Tranby, E., & Huang, Q. (2011). Changing work, changing health can real work-time flexibility promote health behaviors and well-being? *Journal of Health and Social Behavior*, 52(4), 404–429.
- Mosby, S. (2001). Bridging the gap: from town square to copy room as the knowledge-based worker evolves in the 21st century, companies are collaborating with property managers to develop a new, less traditional workplace. *Journal of Property Management*, 66(3), 26–31.
- Myers, D. G., & Diener, E. (1995). Who is happy? *Psychological Science*, 6, 10–19.
- Oksanen, K., & Stähle, P. (2013). Physical environment as a source for innovation: Investigating the attributes of innovative space. *Journal of Knowledge Management*, 17(6), 815–827.
- Oreg, S. (2003). Resistance to change: Developing an individual differences measure. *Journal of applied Psychology*, 88(4), 680–693.
- Oreg, S. (2006). Personality, context, and resistance to organizational change. *European Journal of Work and Organizational Psychology*, 15(1), 73–101.
- Paton, R. A., & McCalman, J. (2008). *Change management: A guide to effective implementation* (3rd ed.). London: Sage Publications Ltd..
- Peponis, J., Bafna, S., Bajaj, R., Bromberg, J., Congdon, C., Rashid, M., Warmels, S., Zhang, Y., & Zimring, C. (2007). Designing space to support knowledge work. *Environment and Behavior*, 39(6), 815–840.
- Peters, P., & Van der Lippe, T. (2007). The time-pressure reducing potential of telehomework-ing: The Dutch case. *International Journal of Human Resource Management*, 18, 430–447.
- Piderit, S. K. (2000). Rethinking resistance and recognizing ambivalence: A multidimensional view of attitudes toward an organizational change. *Academy of management review*, 25(4), 783–794.

- Powell, G. N., & Greenhaus, J. H. (2010). Sex, gender, and the work-to-family interface: Exploring negative and positive interdependencies. *Academy of Management Journal*, 53, 513–534.
- Promes, M. (2015). Monitoring change in a new working environment: The importance of employee satisfaction analysis. *Change Management: An International Journal*, 15(3), 1–16.
- Robone, S., Jones, A. M., & Rice, N. (2011). Contractual conditions, working conditions and their impact on health and well-being. *The European Journal of Health Economics*, 12(5), 429–444.
- Roelofsen, P. (2002). The impact of office environments on employee performance: The design of the workplace as a strategy for productivity enhancement. *Journal of facilities Management*, 1(3), 247–264.
- Sauter, S. L., Lim, S. Y., & Murphy, L. R. (1996). Organizational health: A new paradigm for occupational stress research at NIOSH. *Japanese Journal of Occupational Mental Health*, 4(4), 248–254.
- Shoemaker, J., Brown, A., & Barbour, R. (2011). A revolutionary change: Making the workplace more flexible. *The Solutions Journal*, 2(2).
- Smith, J., & Gardner, D. (2007). Factors affecting employee use of work-life balance initiatives. *New Zealand Journal of Psychology*, 36(1), 3.
- Smith, K. K., Kaminstein, D. S., & Makadok, R. J. (1995). The health of the corporate body: Illness and organizational dynamics. *The Journal of applied behavioral science*, 31(3), 328–351.
- Smithson, J., & Stokoe, E. H. (2005). Discourses of work–life balance: Negotiating ‘genderblind’ terms in organizations. *Gender, Work & Organization*, 12(2), 147–168.
- Stone, A. A., Bachrach, C. A., Jobe, J. B., Kurtzman, H. S., & Cain, V. S. (Eds.). (1999). *The science of self-report: Implications for research and practice*. Psychology Press.
- Taylor, P., Baldry, C., Bain, P., & Ellis, V. (2003). A unique working environment: Health, sickness and absence management in UK call centres. *Work, Employment & Society*, 17(3), 435–458.
- The National Center for Partnerships and Performance (NCPP). (2004). Adaptability and adjustment to change in the workplace. Paper presented at the EU Presidency conference, February 26–27, Dublin.
- van den Heuvel, S., & Schalk, R. (2009). The relationship between fulfilment of the psychological contract and resistance to change during organizational transformations. *Social Science Information*, 48(2), 283–313.
- van der Voordt, T. J. (2004a). Costs and benefits of flexible workspaces: Work in progress in The Netherlands. *Facilities*, 22(9/10), 240–246.
- van der Voordt, T. J. (2004b). Productivity and employee satisfaction in flexible workplaces. *Journal of Corporate Real Estate*, 6(2), 133–148.
- van Meel, J. (2011). The origins of new ways of working: Office concepts in the 1970s. *Facilities*, 29(9/10), 357–367.

- Vischer, J. C. (2007). The effects of the physical environment on job performance: Towards a theoretical model of workspace stress. *Stress and Health*, 23(3), 175–184.
- Vischer, J. C. (2008). Towards an environmental psychology of workspace: How people are affected by environments for work. *Architectural Science Review*, 51(2), 97–108.
- Volker, L., & van der Voordt, D. J. M. (2005). An integral tool for the diagnostic evaluation of non-territorial offices. In *Designing social innovation. Planning, building, evaluating* (pp. 241–250). Göttingen: Hogrefe and Huber Publishers.
- Vos, P., & van der Voordt, T. (2002). Tomorrow's offices through today's eyes: Effects of innovation in the working environment. *Journal of Corporate Real Estate*, 4(1), 48–65.
- White, M., Hill, S., McGovern, P., Mills, C., & Smeaton, D. (2003). 'High-performance' management practices, working hours and work–life balance. *British Journal of Industrial Relations*, 41(2), 175–195.

25

The Changing Role of Leaders for the Digital Age

Peter Boggis, Frank Dannenhauer, and David Trafford

Ideas in Brief This chapter explores how the role of leaders needs to change, given the profound impact that digital technology has, and is continuing to have, on organisations. It is based on a longitudinal review of the experiences gained by the authors in advising and supporting organisations across a range of industries to become more ‘digital’. It concludes that many organizations have yet to recognise the fundamental shift in the primary role of leaders— together with the process of leadership—that is required if they are to become truly digitally enabled enterprises. It suggests five leadership principles for the digital age.

Keywords Default future • Digital transformation • Leadership • Organisational trajectory • Organisational capabilities

P. Boggis (✉) • D. Trafford (✉)
Formicio Limited, London, UK
e-mail: peter.boggis@formicio.com;
david.trafford@formicio.com

F. Dannenhauer (✉)
troisval SA, Geneva, Switzerland
e-mail: frank.dannenhauer@troisval.ch

Introduction

The past 20 years have seen unprecedented advances in science, communications and transportation. As a result, people enjoy a better life, have easier access to information and have a longer life expectancy than ever before. Chances are that the changes we have seen in the recent past will be significantly outpaced by changes yet to come. One reason for this is digital technology. Opinions vary about how exactly the ‘Digital Revolution’ and the ‘Internet of Things’ will impact our lives. But few people doubt that they will have a profound impact and that, 20 years from now, the way we work, communicate, drive, manage our health and are entertained will be significantly different from today (Anderson and Rainee 2014; Westermann et al. 2012).

Much has been written about the technological aspects and the business consequences of those changes. Recent developments have also proven that the societies we live in will not stay the same. The Arab Spring (Howard 2015) showed us how mass movements are empowered by the digital world and the ease of connectivity and global reach. Obama’s election campaigns (Rutledge 2013) have demonstrated to what extent politics has gone online. And companies that have been attacked on the Web for neglecting their social or environmental responsibilities had to learn the hard way about the power of online crowds (Pekka 2010).

‘Digital’ in Companies Today

Companies around the globe are now acutely aware about those developments. Many corporate strategies now take account of the need to deal with the emerging digital world around us and, more specifically, to look out for ways how their business model could benefit from new technology-driven opportunities. But despite all these plans and efforts, the actual pace and depth of the transformation towards digital business in established companies is rather limited in most industry sectors. The number of digitally mature companies ranges from 38 % in High Technology to as low as 7 % in Pharmaceuticals according to one study (Westermann et al. 2012).

The pace of change so far has been characterised less by strategic foresight, and more by a passive reaction to market forces. For example, much of the media industry waited too long to move to digital (El Gamal 2012). Only after their old business model broke down and there was no other choice did those—who survived long enough—embrace the change. Industry by industry, we now see similar patterns. Companies only address the issues more fundamentally when ‘digital’ becomes unavoidable, not when strategic foresight tells them to do so.

Even when companies start to address the digital challenge early, the depth of the change we see is rather limited (Aginam 2015; Westermann et al. 2012). Most companies now have some form of digital initiative in place (Solis 2014). In many cases, they started pilot projects or created small innovation teams who are allowed to test things out in parallel to the ‘real’, that is, traditional, business. Such an approach is not a bad idea in itself; however, it is not sufficient in most cases. The forthcoming changes will require a fundamental shift in how organisations operate and the organisational capabilities that enable this change (McKinsey 2015). Pilot projects or innovation teams will not have sufficient impact on the entire organisation to bring the required changes about across the enterprise. If your overall organizational capabilities do not evolve alongside your strategy, it is highly likely that your digital strategies and programmes will fail.

An Organisation’s Capabilities Ultimately Define Its Trajectory

Organizational capabilities are more than the sum of individual skills and competencies (Formicio 2015a). They are formed from a combination of shared mental models, common language, mindsets, processes, established practices, conventions and shared experiences and skills. They are not lost if key individuals leave, as those remaining in the organisation will sustain them. Once developed, they shape the ‘way we work around here’. However, organisational capabilities can also ‘anchor’ you to the present and prevent you successfully implementing your digital strategy. There are two main reasons for this (Formicio 2015b).

Firstly, you may lack critical digital capabilities. How can you outperform competitors in digital projects if you rely on teams operating with the skills and mindsets of a pre-digital era? How can you develop an excellent digital strategy in the first place if the organisation is not able to think ‘digital’?

Secondly, your existing capabilities might hold you back. As much as the organisation needs to learn new things, it also needs to unlearn old ways of working to be able to proceed. If not, your pilot projects and agile innovation teams will be increasingly blocked by the organisation, which creates ‘antibodies’ against new ways of working. People may have been focused on efficient execution or consolidation for years. Why should they let go of what they are good at overnight and move outside their comfort zone? Don’t they also have a point when they say that many aspects of the established ways of ‘doing things around here’ still remain highly relevant?

Our observation is that if the organisational capabilities are aligned with the target organisational trajectory, they can increase the chances of project success by ‘pulling’ the organisation to its target future. Equally, if they are not aligned, they can ‘anchor’ an organisation to its current trajectory and thereby increase the chances of project failure.

Given the limited pace and depth of the move to digital in many companies today, their default future is to face big competitive challenges due to the digital revolution (Ernst and Young 2015). Moreover, once the ‘digital wake-up call’ has truly arrived, they will find it difficult to overcome these challenges as the required shift in their capabilities portfolio will take time and cannot be easily copied from competitors.

The Changing Role of Leaders

It is intriguing to observe how leaders across industries have failed to adapt to the new world. However, if we take a closer look at the underlying leadership challenges, it becomes more understandable. This is not the type of challenge leaders are used to confronting. The developments mentioned above threaten companies with disruptive change. The required response from leaders is not only to reflect this change in their strategies and plans, but also to adapt as the expectations about how their individual role needs to change. As much as the change is disruptive for companies, so, equally, it is also disruptive for leaders—individually and collectively.

A lot has been said about the new, ‘digital generation’ and the need for executives to adapt their leadership style to the expectations of ‘digital natives’. Some of this is potentially true, but in itself, this does not constitute a fundamental change. Executives have always had to adapt to changes in context, and generational preferences are just one of many factors—and probably not even the most important one—influencing their choice of leadership styles and behaviours. Leaders will need to adapt, but not primarily due to the generational change. In essence, they need to adapt to the new digital age by changing both their primary role as leaders and the process by which they lead.

The Primary Role of Leadership

When a company is impacted by the digital revolution, developing a vision for the improved future of the organisation and orchestrating a trajectory to this future become the primary role—and legacy—of its leaders. The remainder of what we do as executives is management.

The primary role of industry leaders in times of disruptive change is to understand the driving forces of change, assess their impact and determine those that can be influenced in order to make informed choices about the type of change that will move their organisation from its default future to an improved future (Formicio 2012). This role, however, is highly challenging and requires confronting people with a frightening outlook on the future. Instead of addressing this primary role, leaders have continued to stay in the comfort zone of what they are good at managing. Their main leadership experience has evolved in times where steadily working towards improvements was a fair response to competitors. In times of significant business model changes and new competitors from outside the industry, this is no longer the case.

A good example of this is how far and how fast automobile industry leaders have gone on their path to digital transformation (IBM 2011). The driverless car can be looked at in two ways: for many managers in the automobile sector, it is just a new feature built into luxury cars. The basic assumption is that over time it will become cheaper and therefore available in more cars, as other technologies have in the past. If this view of the world is true, the automobile industry stays essentially the same. An alternative perspective is, however, that the very concept of car ownership will be challenged and people will prefer to buy mobility on the spot from the likes of Uber or Google, which operate mobility platforms and connect them to fleets of driverless cars. To the extent to which this is true, the automobile industry needs to move from an engineering and production business to a service company and mobility platform operator that sells mobility based on a fleet of conceptually completely different cars.

As the degree and pace of change have reached new levels, executives need to become more confident with confronting the need to transform the organisations they are accountable for, rather than just continuously optimising their performance (Markides 2003).

The Changing Process of Leadership

Together with the rise of the digital age, the expectations towards the process of leadership are changing significantly. Defining an improved future involves more than describing a vision with audacious goals. It involves facilitating a discussion in the company about the impact on the current organisation and the choices about what it is possible to achieve, based upon a joint understanding of the influence of the driving forces discussed above. It also involves engaging relevant stakeholders from within as well as from outside

the company in the process. The more compelling the improved future and the better it is understood by employees, customers and other external partners, the greater the discretionary energy of everybody involved to actually travelling the journey.

The customer-driven innovation at 3M, a multinational technology conglomerate, illustrates this nicely (Osak, Mitchellosak.com 2010). 3M is opening up their research significantly in 22 customer innovation centres. One of 3M's innovation and product development strategies is to uncover new synergies between their platform technologies and their customers' needs by vertical sector. So far, 3M has leveraged its technical expertise in a portfolio of products, including transportation systems, dental and medical devices and electronics. This innovative way of working has had a significant impact on the traditional expectations of research and development (R&D) and the role of R&D leaders.

Another example for this more networked way of working is FedEx, a global logistics company (Osak, [Financial Post](http://FinancialPost) 2013). At FedEx, a new digital operating model allows customers to initiate changes to their shipments and other orders previously viewed as strictly internal operations. The new operating model also allows business partners to create new services using FedEx information. FedEx has engaged medical staff and suppliers in the development of a sophisticated logistics technology and process to ensure on-time, zero-defect delivery of live tissues for organ donation. Obviously, this necessity to co-create solutions with multiple partners impacts the role expectations for leaders at FedEx.

The role of leaders moves gradually from directing the organisation from the top to orchestrating a leadership process. In our increasingly fast-changing, complex and networked world, it is less and less likely that leaders 'know best' where to go. The type of talent needed to do this work will be increasingly scarce, and high-performing professionals are demanding the opportunity to co-create the future together with their leaders. Digitisation will further increase the gap between scarce, highly educated global professionals and a huge number of less qualified and adaptable employees who may become obsolete as the next big wave of automation kicks in. The change to a more complex leadership model—rather than the still-prevailing, hierarchy-dominated approach—has been heralded by management theory for quite some time. It is now turning into a reality, as we can observe companies that have truly embarked on embracing the digital world, shifting the role expectations for their leaders. These companies no longer allow leaders to rely primarily on hierarchical processes, but rather engage top talent, research-partners, customers and strategic suppliers—all of whom demand to have their say in the creation of the visions and principles that will guide them into the future. Leaders who are able to

facilitate a complex process of co-creation will increasingly replace leaders who stick to setting targets and controlling their execution.

Leaders will increasingly focus on creating the conditions for success for their teams rather than managing execution. Like successful gardeners, the leaders of the digital age know that certain conditions need to be in place in order for their garden to flourish; fertile soil being the most obvious. They know that some plants need to be pruned in spring and others in autumn. As mentioned above, one of the most critical conditions of success for an organisation to move to digital is having the capabilities in place that will ‘pull’ the organisation into its improved future. Building organisational capabilities is exactly this: taking care so that the necessary conditions for success for an organisation are in place, and subsequently investing some trust in the garden and its plants (i.e. the various internal and external teams that host those capabilities) to produce the desired outcomes.

Beyond just being a new management technique, the personalities who will be most successful in this type of ‘gardening’ will be more at ease in connecting to the people they lead as well as to other relevant partners inside and outside the company. They will have an authentic interest in developing organisational capabilities for the long term. Those descriptions are no longer the distant dreams of leadership development gurus; they have become the job description for leaders in the most admired digital companies.

If you are looking for evidence of this change in the real world, look for example at leadership at Google. Laszlo Bock, senior vice president of people operations for Google—the person in charge of hiring leaders for one of the world’s most successful digital companies—noted in an interview in *The New York Times* (Friedman 2014) that ‘when faced with a problem and you’re a member of a team, do you, at the appropriate time, step in and lead? And just as critically, do you step back and stop leading, do you let someone else? Because what’s critical to be an effective leader in this environment is you have to be willing to relinquish power’.

Those changes imply a significant, adaptive challenge for leaders (Kegan and Laskow Lahey 2009). For example, leaders who decide to embrace the new digital world by giving digital teams more entrepreneurial freedom may—on the face of it—be willing to accept early stage failures in projects. But at the same time, they often feel out of place and somewhat obsolete in the way digital project are run. All too often their old mode of leading that focuses on maintaining control, avoiding errors and eliminating waste takes over and, if not appropriately controlled, cause conflict with team and stifles innovation. Their dedication to stay in control is a hidden, competing commitment, which sabotages their desire to adapt to the new world (Kegan and Laskow Lahey 2009). Ultimately, many leaders end up micro-managing

against their own, original intent. For leaders, the digital challenge is not just a question of learning new skills but a personal and adaptive challenge, which normally requires a more profound and sustained development effort.

Leadership Principles for the Digital Age

To be an effective leader in the digital age requires a new way of operating, where conscious choices need to be made on priorities, areas of focus and, most importantly, where leaders spend their time. We believe that adopting the following five principles will help leaders become more effective in the digital age.

1. **Immerse yourself in the digital world:** where your new competitors, potential partners and tech-savvy customers live. It is well accepted that intelligent, highly educated and experienced people learn most from what they experience—rather than what they are told. It's therefore important for those who want to lead their organisation to a digital future to experience it, reflect on these experiences, conceptualise a digital future that's relevant to their context and experiment in creating that target digital future. There are many ways to gain these experiences, including:
 - a. **Experiential learning journeys:** ideally where a group of leaders from the same company visit organisations who are willing to share their experiences of being digital. Such organisations could include customers, partners, suppliers, technology vendors and research centres. The aim is to identify the digital principles these organisations are applying so that they can be applied within your own organisation, thereby establishing digital practices that are relevant to your context. Experiential learning journeys are an effective way of developing shared insights and collective leadership (Formicio 2015c).
 - b. **Executive exchanges:** where leaders in different parts of the organisation, or across different organisations, exchange roles for a period of time. For example, this could be with a strategic business partner who is further along the digital journey. Equally, it could be with a research centre developing a digital technology relevant to your industry. The aim is to understand—first-hand—how an organisation that is more digitally mature operates. How its leaders spend their time and the organisational capabilities they have in place.
 - c. **Create a digital cell:** by bringing people in the organisation who think digitally together. These digital cells could work on formulating digital

strategies, delivering pilot projects or helping existing initiatives become more digital. Whatever role they play, their primary aim is to help the organisation become more digitally capable through the experiences they create and facilitate.

- d. **Acquire a digital organisation:** that is seen as a model for the digital future. This can be an effective way of getting quick access to digital capabilities and thereby giving leaders in the acquiring company the opportunity to learn from a more developed digital organisation. The risk is that the acquiring company inhibits further development in the acquired company due to their lack of understanding and appreciation of what they have access to.

The aim with all these approaches—and others—is to experience the digital future sooner rather than later, not only from within your industry but also from outside. You will undoubtedly learn more from digital champions and next-generation customers than from your current environment. Being digital is becoming ever more pervasive, and in the words of William Ford Gibson, ‘The future is already here – it’s just not very evenly distributed’ (Gibson 1999).

2. **Shift your focus:** from managing your organisation today to creating a context to become more digital. Start by understanding the current trajectory of your organisation and the (default) future that will result. Equally importantly, identify and assess the driving forces that are defining and controlling the trajectory. Some of these driving forces are comparatively easy to observe, like legacy technology and regulation, while others, like mindsets, values and culture, are often not apparent at first sight. If your ‘default future’ is acceptable (which is unlikely), then little leadership is required; simply manage the journey. More likely, you will need to shift your focus to defining a future that is more digitally enabled—one that can be informed by immersing yourself in the digital world (principle 1 above). Map out how your organisation’s trajectory needs to change and, more importantly, how to influence the forces driving your current trajectory. Above all, develop a habit of stepping back from daily operations to reflect. Look at the situation from the balcony rather than staying on the dance-floor (Heifetz et al. 2009).
3. **Manage your organisational capabilities:** as a dynamic portfolio. Start by understanding the organisational capabilities you currently have in place and the influence they are individually and collectively having on defining and controlling your organisation’s current trajectory. Treat

this as your current portfolio of organisational capabilities. Then map out the organisational capabilities needed to ‘pull’ your organisation on to a trajectory that will take you to your target digital future. Some of the target organisational capabilities will focus on digital technologies like data analytics, service-orientated architectures and the internet of things, while others will focus more on the ability to develop and operationalise digital strategies. Treat these as your target portfolio. Then develop strategies to reshape your current portfolio to your target. As with all portfolios, some of its contents will be new and need acquiring, some will need to be de-emphasised over time and others will need to be maintained. It’s important to remember that if your portfolio of organisational capabilities is not actively managed and its profile not changed in line with the target, the trajectory of your organisation is unlikely to change and your digital future will not be realised. The aim is have in place those organisational capabilities needed to ‘pull’ your organisation to its digital future.

4. **Be agile where it’s needed:** and accept that the journey will not turn out as you originally planned. The implications of becoming more digital is that some parts of your business model will become more digitally automated but not radically changed, while other parts of your business model will be radically transformed. This is particularly the case in larger multi-business organisations operating across different markets. Digital projects that focus on automating existing business models can and should be managed using well-proved software development and project management methodologies, while other, aimed at transforming—and in some cases inventing new—business models need a more agile approach. In the latter case, accept that the future is unlikely to turn out as you originally planned and that it’s as much a learning journey as it is a project. As a result, different methods are required depending on what the primary focus is: in areas that need reliability and efficiency, stick to the established methods. In areas where responsiveness and fast adaptation to market forces is required, adapt your methodology to that target. The aim is not to be agile everywhere, but to match your approach and governance to the primary targets you want to achieve.
5. **Adapt the way you execute leadership:** to the new role expectations. If you are a senior leader today, chances are you have grown up in a pre-digital age. What made you successful moving up the ranks will not necessarily make you successful moving forward. Over the years, you have developed an idea about how organisations function and what the role of a leader is, but those parameters have changed. Play the role you should

be playing rather than what you think is expected from you based on past experience. One way of achieving this is to be coached by someone who understands what it takes to lead an organisation to a digital future and how the capabilities and the culture of an organisation needs to evolve to become digital. This person could come either from within your organisation or from outside, typically an experienced consultant who appreciates the challenges you face. Accept that experimenting with new behaviours takes courage and that you and your organisation will need time to adapt.

Conclusion

All organisations have a default future: it's the place they will end up if no action is taken, other than that currently planned. The primary role of leaders is to ask: what impact will the developments in digital technologies and business models have on my organisation's default future? Do we fully understand the 'digital' forces that are determining our current trajectory and are we in a position to make informed choices about the actions we need to take in order to change this trajectory? How can we lead the transformation of the company and create the required, organisational capabilities? If leaders fail to focus on those questions and stick to their operational management role, they and their organisations are likely to become digital casualties. Successful digital leaders are individuals who enjoy co-creating the future together with people inside and outside the company. The legacy they want to leave behind is not only a series of quarterly results, but also a company whose organisational capabilities are well suited to weather the challenges of the digital future.

The role of leaders has always been about creating a better future, and in doing so risking the present for that future (Goss et al. 1993). The challenge has never been greater than now in the digital age; however, the opportunities are equally as great.

Bibliography

- Aginam, E. (2015). We're not ready for digital future, business leaders admit. Retrieved September 10, 2015, from <http://www.vanguardngr.com/2015/06/were-not-ready-for-digital-future-business-leaders-admit/#sthash.1ObxGOS3.dpuf>
- Anderson, J., & Rainee, L. (2014). The internet of things will thrive by 2025. Retrieved September 10, 2015, from <http://www.pewinternet.org/2014/05/14/internet-of-things/>

- El Gamal, A. (2012). The evolution of the music industry in the post-internet era. Retrieved September 14, 2015, from http://scholarship.claremont.edu/cmcs_theses/532
- Ernst & Young. (2015). Is your corporate strategy fit for a digital world? Retrieved November 20, 2015, from [http://www.ey.com/Publication/vwLUAssets/EY-is-your-corporate-strategy-fit-for-a-digital-world/\\$FILE/EY-is-your-corporate-strategy-fit-for-a-digital-world.pdf](http://www.ey.com/Publication/vwLUAssets/EY-is-your-corporate-strategy-fit-for-a-digital-world/$FILE/EY-is-your-corporate-strategy-fit-for-a-digital-world.pdf)
- Formicio. (2012). Beyond default – Moving your organisation to an improved future. Retrieved September 14, 2015, from <http://formicio.com/index.php/archives/5077>
- Formicio. (2015a). ‘Being digital’ as an organisational capability. Retrieved September 14, 2015, from <http://formicio.com/index.php/archives/6425>
- Formicio. (2015b). The impact of organisational capabilities on project success. Retrieved September 14, 2015, from <http://formicio.com/index.php/archives/6529>
- Formicio. (2015c). Experiential learning journeys: A source of shared insights and collective leadership. Retrieved December 07, 2015, from <http://formicio.com/index.php/archives/6774>
- Friedman, T. L. (2014). How to get a job at Google. *New York Times*, p. 11.
- Gibson, W. F. (1999). The science in science fiction. Retrieved October 8, 2015, from <http://www.npr.org/templates/story/story.php?storyId=1067220>
- Goss, T., Pascale, R., & Athos, A. (1993). The reinvention roller coaster: Risking the present for a powerful future. *Harvard Business Review*, 71(6), 97–108.
- Heifetz, R., Grashow, A., & Linsky, M. (2009). *The practice of adaptive leadership*. Boston: Harvard Business Press.
- Howard, P. N. (2015). Opening closed regimes: What was the role of social media during the Arab spring? In: *papers.ssrn.com*. Retrieved September 10, 2015, from <http://ssrn.com/abstract=2595096>
- IBM. (2011). Digital transformation in the automotive industry. In *IBM.com*. Retrieved September 10, 2015, from <http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=PM&subtype=XB&htmlfid=GBE03409USEN>
- Kegan, R., & Lahey, L. (2009). *Immunity to change: How to overcome it and unlock the potential in yourself*. Boston: Harvard Business Press.
- Markides, C. D. (2003). Responses to disruptive strategic innovation. *MIT Sloan Management Review*, 44(2), 55–63.
- McKinsey. (2015). Raising your digital quotient. Retrieved September 14, 2015, from http://www.mckinsey.com/insights/strategy/raising_your_digital_quotient
- Osak, M. (2010). Putting customers at the center of product development. Retrieved September 10, 2015, from <http://mitchellosak.com/2010/04/18/putting-customers-at-the-center-of-product-development/>
- Osak, M. (2013). How co-creation is taking crowd sourcing to a whole new level. Retrieved September 10, 2015, from [financialpost.com: http://business.financialpost.com/executive/strategy/how-co-creation-is-taking-crowdsourcing-to-new-heights](http://business.financialpost.com/executive/strategy/how-co-creation-is-taking-crowdsourcing-to-new-heights)

- Pekka, A. (2010). Social media, reputation risk and ambient publicity management. *Strategy & Leadership*, 38(6), 43–49.
- Rutledge, D. P. (2013). Media psychology: How Obama won the social media battle in the 2012 presidential campaign. In: *mprcenter.org*. Retrieved September 10, 2015, from <http://mprcenter.org/blog/2013/01/how-obama-won-the-social-media-battle-in-the-2012-presidential-campaign/>
- Solis, B. (2014). The 2014 state of digital transformation. In: *Alimetergroup.com*. Retrieved September 10, 2015, from <http://www.altimetergroup.com/2014/07/the-2014-state-of-digital-transformation/>
- Westermann, G., Tannou, M., Bonnet, D., Ferraris, P., & McAfee, A. (2012). *The digital advantage*. Capgemini: Paris.

Index

A

Accenture, 6, 7, 158–60
accommodation property, 419, 424,
425, 428–30, 432
accounting system, 465, 474, 483
accreditation, 356, 360
adaptation, 9, 11, 77, 262, 338, 382,
383, 388, 394, 555, 564, 594
Africa, 365
agile innovation, 587
Airbnb, 146
Airbus, 325, 328
Alexa, 105
Alibaba, 146, 164
Amazon, 157, 208, 209
analytics, 146, 154, 177, 182, 251–3,
260, 267, 284, 356, 357, 361,
371, 385, 391, 394–6, 400–3,
405, 594
anonymity, 300, 440
Apple, 101, 157, 183, 192, 207, 209,
214, 408, 505
artificial intelligence (AI), 103–5, 134,
142
Asia, 162, 365, 409
asset divestment, 534–9

augmented reality, 107
automobile industry, 47, 308, 330, 589
autonomous operation, 253

B

balanced centricity, 185
balanced scorecard, 495–508
banking
home, 179
internet, 179
mobile, 155, 156, 161, 179
Barney, Jay B., 221, 500, 501, 504
Basel III, 156, 159, 160, 162
Berkshire Hathaway, 195
Big Data, 123, 128, 154, 246, 251–3,
268, 405, 406
Biogen Idec, 514
Blackberry, 206
blended learning, 356, 357, 361, 371
BMW Group, 554, 562–5, 569, 572,
577, 578
Boehringer Ingelheim, 83
booking.com, 419, 428
Boston Consulting Group, 6, 26, 41
boundlessness, 254, 255

- brand
 - extension, 214, 215, 218
 - image, 203, 286, 290
 - loyalty, 290, 295, 299, 301, 303
 - management, 291, 308
 - personality, 291, 306
 - positioning, 290, 306
- Brundtland Report, 514
- budgeting, 472, 478
- Buffet, Warren, 195
- Business and IT alignment, 377, 379–83, 386
- business architecture, 77, 84, 90
- business model, 4, 7, 51–3, 68, 70, 71, 73, 74, 77–90, 100, 101, 111, 140, 145, 146, 152, 154, 156–9, 189–209, 246, 249, 250, 253, 258, 270, 274, 283–5, 287, 288, 290, 389, 514, 515, 522, 525, 527, 556, 557, 559, 586, 589, 594, 595
- business paradox, 517–19
- business performance, 7, 8, 500, 501
- business process outsourcing (BPO), 165
- business transformation
 - continuous, 3–15
 - incremental, 8, 288
 - trigger, 4, 15
 - types of transformation, 8–11
- business value, 97, 268, 525
- BYD, 290

- C**
- car industry, 70, 290, 293
- car-related factors, 294, 299, 302, 306
- car sharing, 283
- Caterpillar, 182, 183
- Chambers, John, 96
- change
 - agent, 69, 147, 463, 467, 478, 481, 482, 484, 487–8
 - continuous, 5, 19–55, 265, 461–88, 505–7, 246
 - management, 85, 249, 261–2, 264–7, 269–71, 402, 426, 555, 561–2, 576, 577
 - radical, 8, 165, 246, 260, 462–8, 473–6, 479, 484, 485, 487, 488
- channels, 13, 74, 81, 155, 158, 159, 161, 181, 203, 275, 284, 384, 394, 398, 420, 422, 423, 425, 430, 524
- China, 159, 160, 163, 289–308, 338
- CIO magazine, vii, xv, xxvi
- Cisco, 96
- civil service, 470, 474, 480
- client centricity, 189–209
- client experience, 145, 193, 195–8, 203, 206, 207
- cloud computing, 103, 142, 251, 252, 260, 376, 384, 385, 391, 396, 397, 400, 402, 405, 406
- co-creation, 180, 185, 318, 591
- co-development, 318–20, 322–7, 329–31
- collaboration, 82, 83, 135, 146–8, 201, 250, 258–60, 361, 370, 378, 506, 524, 554, 557, 563
- comfort zone, 506, 587, 589
- Commerzbank, 158, 166
- communication
 - external, 427
 - internal, 110, 426, 429
 - strategy, 426–7, 472, 481
- comparative advantage
 - theory, 41–3
- competition
 - competitive advantage, 4–6, 12, 15, 41, 42, 73, 74, 76–89, 152, 159, 166, 217, 262, 500, 504–5, 508, 521, 540
 - competitive arena, 74, 76–9, 83, 86, 89, 90
 - competitive disadvantages, 289

competitive landscape, 68, 152, 154, 159, 519
 competitiveness, 144, 154, 264, 376, 377, 379, 380, 382, 384, 386, 388–91, 394–7, 399, 401, 403, 406, 499, 501, 506, 519, 520, 522, 525, 527, 550
 competitor analysis, 68
 complaints, 181, 191, 318
 complexity, 11, 80, 104, 106, 130, 140, 141, 154, 215, 225, 226, 230, 253, 256, 260, 275, 316, 318–20, 325, 329, 449, 505, 506, 515, 516, 518, 520, 523, 526, 527
 computerization, 116, 118–20, 123–30, 132, 134
 conflict, 278, 280, 282, 316–20, 322–31, 393, 558, 559, 561, 577, 591
 connected things, 104
 Connective Knowledge, 355
 connectivity, 102–4, 110, 252, 253, 274, 282, 385, 586
 consumer
 preferences, 69, 177, 224, 225
 protection, 438, 439, 449, 453, 454, 456
 contractual law, 451
 core technologies, 102, 104–8
 corporate citizen, 521, 525, 527
 corporate identity, 77, 80, 81, 90, 499
 Corporate Knights, 514
 corporate social responsibility (CSR), 520–3, 525, 527
 corporate strategy, 11, 544, 586
 cost leadership, 72
 cost reduction, 41, 45, 156, 158, 197–9, 206, 208, 246
 country-of-origin effects, 289–308
 Coursera, 362–5, 369
 critical infrastructure, 335–51, 451
 customer
 abilities, 320–2

behavior, 110, 154, 192
 centric/centricity, 110, 175–86, 196, 206
 contribution, 319, 321, 322, 329
 engagement, 110, 180–2, 186
 focus, 199, 206
 integration, 315–31
 involvement, 316–21, 324, 329, 330
 loyalty, 69, 155–6
 needs, 4, 25, 36, 49, 68, 112, 178, 183, 214, 218, 256, 266
 preferences, 69, 154, 224
 relationship, 155, 177, 253, 258, 324, 429
 segment, 4, 7, 74, 78, 225
 service, 119, 158, 162, 181, 183, 207, 384, 397, 404, 405
 customer-driven innovation, 590
 customer relationship management (CRM), 155, 182, 184, 388, 398, 401, 429, 430
 customization, 177, 179–80, 186, 199, 206, 208, 253, 277, 410, 451
 cyber physical systems (CPS), 246, 249, 251, 253–4, 260
 cybersecurity, 335–51

D

Darwin, Charles, 195
 data
 collection, 21, 216, 296–7, 377, 386, 388–90, 403, 436, 441, 469–72
 controller, 438–40, 444, 448
 minimization principle, 440–2, 448
 platforms, 440, 455
 protection, 128, 198, 356, 361, 400, 403, 438–49, 456, 457, 564
 protection directive, 438–40, 442–8
 storage, 443, 455
 transmission, 441, 442
 decentralization, 254, 255

- deception, 99, 101, 521
 declining industry, 87, 535, 538, 543
 default future, 588, 589, 593, 595
 Defense Advanced Research Projects Agency (DARPA), 105, 106
 deinstitutionalization, 466
 delusion, 191, 195–9, 205, 208, 209
 dematerialization, 100, 101
 democratization, 100, 101, 354, 355
 demographics, 74, 192, 564, 579
 demonetization, 100, 101
 design thinking, 183, 248, 249, 262–7, 269–71
 desk sharing, 554–6, 560, 561, 565, 566, 569–70, 572–6, 578, 579
 Destination Management Organization (DMO), 418, 425, 432, 433
 Deutsche Bank, 54, 158, 159, 164, 166
 development process, 78, 316, 318–27, 329, 363, 474, 517
 diagnosis, 11, 12, 119, 447
 diffusion of innovations, 22, 23
 digital
 business, 146, 154, 357, 418–22, 426, 430, 432, 433, 586
 campaign, 429, 433
 cell, 592–3
 disruption, 421, 422
 generation, 588
 revolution, 586, 588
 strategy, 157, 430, 587, 594
 technology, 129, 132, 145, 153, 154, 178, 246, 250, 253, 254, 259, 260, 376, 378, 383, 586, 592, 594, 595
 transformation, 69, 70, 83, 84, 89, 145–7, 273–88, 417–33, 589
 digitalization, 68, 69, 89, 97, 99, 115–35, 142, 146, 246, 248, 252, 256, 257, 268, 274, 282, 389, 432, 433
 disagreement, 320
 disengagement, 86, 87
 disentanglement process, 87
 disruption, 99, 192, 261, 284, 342, 421, 422, 451
 disruptive change. *See* disruption
 distributed computation, 103–4
 distributors, 454–5, 524
 diversification
 international, 537
 market, 7
 product, 221, 534
 divestitures, 533–50
 divestment, 72, 86–8, 534–40, 542, 543, 547
 division of work, 124, 127, 130
 dominant design, 26, 39–41, 71
 Dongfeng Motor Corporation, 290
 dragonfly energy sector espionage, 339–40
 Drucker, Peter F., 176
 due diligence, 535, 546
 dynamics
 contextual, 464–6, 485, 486
 intra-organizational, 462, 464–6, 470, 485–6
 technological,
- E**
 easyGroup, 88
 economic cycles, 140–3
 education, 116, 117, 125, 133, 134, 256, 293, 297, 298, 346, 354, 355, 357, 358, 362, 363, 370, 371, 398, 406, 407, 409, 430, 432, 433
 educational community, 357
 edX, 358, 362–5, 367–9
 e-leadership, 375–410
 e-learning, 363
 embedded IT, 435
 emerging markets, 290, 307, 308, 354
 employee well-being, 555, 560–1, 564, 569, 574–7, 579
 enabling technologies, 102–4, 437
 Encyclopedia Britannica, 203, 204
 enterprise systems, 252, 378

- entry mode, 534, 535, 539–40, 548
 e-Privacy Directive, 439, 442–3
 equity value, 547
 EU-Regulations, 438
 European Credit Transfer System (ECTS), 358, 370
 European Economic Area (EEA), 356
 European Network Information Security Agency (ENISA), 336, 341, 349
 evolution, 9, 10, 20–4, 26, 30, 34, 35, 42, 44–6, 48, 70, 90, 96, 116, 133, 143, 176–9, 186, 226, 249, 250, 355, 358, 377, 402, 436, 517, 523, 524, 557
 execution, 5, 11–12, 119, 143–5, 147, 280, 282, 346, 378, 386, 387, 391, 587, 591
 executive exchanges, 592
 exit follows entry theory, 45–8
 exit option, 534, 535, 539
 experfy, 109
 experimenters, 322
 exponential
 growth cycles, 99, 101
 organizations, 108–11
 patterns, 97–8
 technologies, 97–108, 110
 externalities, 518
- F**
- Facebook, 96, 103, 132, 181, 214, 349, 396, 397
 Family Educational Rights and Privacy Act (FERPA), 356
 federal agency, 463, 465, 468, 469, 473, 474, 486
 Federal Employment Office (FEO), 463, 469, 470, 472, 474–7, 480–2, 484–6
 Federal Ministry of Labor and Social Affairs, 469
 Federal Office for Information Security (BSI), 340, 450
 FedEx, 52, 590
 financial crisis, 152, 155, 191, 462
 Fintechs, 157
 firm-specific advantage, 537
 First Microfinance Bank, 165
 flexibility, 69, 73, 77, 79, 81, 87, 90, 128, 156, 207, 226, 254, 256, 258, 260, 386, 397, 404, 499, 505, 506, 508, 553–79
 flipped classroom, 356, 357
 foreign direct investment (FDI), 536
 foreign products, 292, 293
 4Ps framework, 178
 Four Rooms of Change model, 13
 framing, 338, 467, 468, 476, 479–86
 France, 31–3, 296, 297, 306, 307
 fuzzy-goal programming, 226, 233, 236, 237
 fuzzy multi-objective decision making (FMODM), 227
- G**
- gamification, 140, 147–9
 Gartner Group, 6, 7
 Gartner Hype Cycle, 358
 Geely, 290
 General Motors, 193
 general purpose technology (GPT), 116
 geo-economic complexity, 518, 520
 German Civil Code, 450–5
 Germany, 31–3, 80, 83, 122, 124, 126, 127, 132–4, 142, 151–66, 255, 293, 294, 296, 297, 306–8, 326, 339–41, 359, 362, 370, 440, 449–50, 456, 469, 473, 554, 562, 572, 578
 global architecture, 518
 globalization, 97, 117, 221, 270, 420, 515–20, 526, 527

- Google, 5, 96, 103, 125, 132, 157, 359, 360, 371, 420, 439, 505, 589, 591
- governance, 248, 257, 275, 280, 281, 325, 384–6, 388, 391, 392, 400, 402, 465, 474–6, 485, 547, 594
- government, 192, 218, 290, 337–9, 341, 343, 348, 349, 407, 470, 473–9
- Grameen Bank, 166
- growth cycle, 99, 101
- guiding policy, 11, 12, 15
- H**
- Habib Bank, 165
- Hackett Group, 5, 6
- Hambrick-Frederickson Diamond, 74
- Hartz legislation, 475
- Harvard School, 21
- hazard function, 46
- HDFC Bank, 160
- health-care services, 447
- higher education, 125, 293, 354, 358, 371, 406
- holistic marketing, 513–28
- home automation, 438, 446
- Hong Kong, 160, 191
- hotel-chains, 183, 419, 422
- Huawei, 6–8
- human capital management, 499, 504
- human resource management, 77, 90, 567–73
- human resources, 12, 384, 478, 499
- hypercompetition, 74
- hyperconnectivity, 83
- hyperspecialization, 132
- I**
- IBM, 105, 125, 134, 183, 564, 589
- ICICI Bank, 164, 165, 194
- implementation, 15, 39, 81, 109, 117, 124, 126, 128, 134, 161, 248, 261, 266, 277, 281, 343, 357, 362, 368, 376, 385, 386, 390–4, 398, 399, 430, 433, 451, 467, 468, 474–9, 486, 487, 496, 498, 499, 507, 521, 524, 534, 538, 548, 550, 555, 556, 559, 562, 575, 578
- improvement levers, 144–9
- inattentive blindness, 193, 195, 196, 208
- India, 151–66, 177, 214–16, 227, 290, 291, 308, 449
- industrial dynamics, 20, 22, 28, 46, 49
- industrial internet, 275
- industrial revolution, 105, 140, 142, 246, 249, 256, 436
- Industry 4.0, 104, 245–71, 275, 279, 281
- industry boundaries, 71, 73, 75, 89
- industry life cycle, 19–55, 68, 71, 73, 77, 87, 143
- industry shift, 289
- information asymmetry, 329, 535, 540–2, 548
- information sharing, 102, 342, 347–51
- informed consent, 440, 441, 444, 445
- Infosys, 6, 7
- ING Bank, 164
- innovation process, 30, 256, 258, 262, 270, 276–82, 287, 403, 406
- innovation team, 396, 587
- innovative gamble, 37, 39
- institutional
- crisis, 466, 475–6
 - embeddedness, 462
 - entrepreneur, 463, 465–8, 475, 477, 479–82, 484, 486–8
 - entrepreneurship, 462, 485
 - theory, 461
- institutionalism
- new, 462
 - old, 462
- instructor, 357, 358, 363, 368, 371, 372, 430
- integrated marketing, 524

integration
 continuous, unspecific, 319–20
 stage specific, 319–20

internal marketing, 524

International Financial Report System (IFRS), 156, 161

Internet of Things (IoT), 103, 104, 142, 249, 251, 252, 274–6, 350, 376, 405, 406, 435–57, 586, 594
 devices, 436–8, 440–2, 444–9, 451–6

internet technologies, 154, 249

investments, 7, 41, 84, 85, 110, 122, 127, 131, 141, 153–6, 164, 177, 534, 537, 539, 548

Invisible Gorilla Experiment, 195

iPortal, 147, 148

Iran, 338, 340

IT-based services, 315–31

IT-security standards, 450

J

Jakarta Consulting Group, 5, 6

Janssen, C. F., 13

jobless recoveries, 122

K

Kaggle, 109

Kaplan, Robert S., 10, 12, 14, 496, 500, 501, 508

Kass, Doug, 195

Keynes, John M., 116

key performance indicators (KPI), 361, 432, 483, 497, 500, 501, 503, 505–8

Klepper, Steven, 20–37, 39, 42, 43, 47, 50, 71, 143

Knowledge management, 85, 357, 500

Know Your Customer (KYC), 161

Kodak, 101, 193, 206

Kondratieff cycle theory, 140

Kotak Mahindra Bank, 164

L

labor market, 115–35, 469, 470, 474–7, 543, 549

leadership
 challenges, 588
 principles, 592–5
 process, 590

lead user, 180, 321, 322

lean, 110, 111, 145, 147, 223, 396, 401, 470, 502

learner authentication, 356, 369, 371

learning journeys, 592, 594

legacy business, 535, 538, 543, 544, 549

legal
 authorization, 440, 441
 framework, 439, 456
 obligations, 442–3

Lehman Brothers, 193

leverage, 95–112, 131, 218, 253, 256, 259, 376, 377, 379, 391, 502, 541, 548

Levi & Strauss, 199, 200

liability, 153, 155, 348–50, 438, 439, 449–56, 539, 540, 548

LIBOR scandal, 159

lifecycle methodology, 8

line extension, 214, 217, 219, 220, 223, 225

Lohmann GmbH, 80

long wave, 140, 143

M

Machine to Machine (M2M), 251, 252, 274, 282, 284

management accounting, 469, 474, 475, 478, 481–3

management consulting, 5, 6, 52, 408

manufacturing excellence, 275
 market dynamics, 77, 86, 90, 215, 222
 marketing
 budget, 425, 430
 decisions, 218, 290
 mix, 178
 market segmentation, 290, 306, 308
 massive open online courses (MOOC),
 125, 353–72
 massive transformation purpose
 (MTP), 108–11
 master-keyed system, 79
 material science, 102
 McCarthy, John, 104
 McGrath, Rita G., 68, 73, 74, 76–9,
 81, 82, 84–9
 McKinsey, 6, 104, 587
 Mergers and Acquisitions (M&A), 32,
 48, 155, 159, 162, 164–6
 middle management, 125, 475
 mobile
 technologies, 396, 397, 400
 work, 554, 555, 557–9, 561–9,
 571–3, 576–9
 mobility, 78, 105, 251, 252, 283, 371,
 405, 406, 438, 553–79, 589
 modularity, 254
 modularization, 179
 MOOC. *See* massive open online
 courses (MOOC)
 Moore's law, 97–8, 127
 M&S Consulting, 5, 6
 MTR, 191
 multi-attribute decision making
 (MADM), 227
 multi-criteria decision making
 (MCDM), 227
 multi-market competition (MMC),
 217, 220–4, 226, 227, 230,
 232, 237
 multi-objective decision making
 (MODM), 227, 231, 232
 myopia, 24

N

Narasimham Committees, 160
 Nash-equilibrium, 327
 National Institute of Standards and
 Technology (NIST), 253, 336,
 341–3, 345, 347
 national law, 439, 447, 449, 456
 new globalization, 517
 new public management (NPM), 463,
 465, 473–6, 488
 Nokia, 193, 206
 non-routine tasks, 119, 133
 Norton, David P., 10, 12, 14, 496, 500,
 501, 508
 nuclear facilities, 336

O

Oculus, 96, 107
 Ohno, Taiichi, 145
 Okun's law, 122
 online education, 355
 Oracle, 6, 7, 408
 organizational
 capabilities, 4, 587–8, 591–5
 culture, 8, 10, 191, 262, 376, 381,
 495–508, 522, 561
 infrastructure, 382, 384–8, 390,
 392, 399
 semiotics (OS), 376, 380–2
 trajectory, 587–8
 transformation, 86, 192, 197–203,
 521
 ownership
 advantage, 534, 535, 539–40
 structure, 534, 535, 539–40, 548

P

PAC, 275, 277, 280, 285
 Pakistan, 165
 paradigm shift, 21, 51, 89, 140, 143,
 149, 204, 209, 515, 517

- PayPal, 157
- perceptions, 177, 200, 275, 282–7,
290, 291, 293, 295, 298, 302,
306, 317, 329, 359, 361, 467,
545, 547, 554, 556, 559, 561,
562, 569, 572, 578
- performance orientation, 474, 475
- personal data, 356, 439, 440, 442–8
- PESTEL framework, 192
- pilot project, 358, 369, 587, 593
- polarization, 117–22, 129
- portals, 192, 418, 420, 422
- Porter, Michael E., 24, 35, 44, 49,
71–3, 86, 87, 89, 203, 274,
276, 436, 522, 525, 526
- power structures, 463, 468, 487
- price consciousness, 290, 295, 299,
301, 304
- problem-centered interviews (PCI), 470
- process efficiency, 197
- Procter & Gamble (P&G), 216, 217
- product
- centric, 176, 199, 200, 207
 - evaluation, 291–5
 - focus, 191, 197, 206–8
 - life cycle (PLC), 26, 27, 69, 143,
218, 228, 230, 232–4
 - line selection, 213–37
- product-related factors, 294
- profitability, 43, 46–8, 71, 145, 147,
155, 158, 196, 199, 206, 218,
219, 222, 316, 500, 507, 519,
537, 560
- PROKON, 159
- psychographic factors, 290, 294–5,
299–300, 305, 307
- public administration, 461
- public organization, 462, 464–6, 469,
481, 484, 488
- purchase intention, 294–8, 305
- purchasing behavior, 294, 297
- purpose limitation principle, 440,
441, 444
- R**
- recession, 122, 140, 141
- reconfiguration, 79, 81, 86, 536, 539
- reconstruction, 9, 10
- Red Queen Effect, 68
- regulation, 128, 129, 134, 156–7,
159–61, 163, 191, 192, 195,
218, 329, 330, 438, 449, 456,
524, 564, 593
- regulatory framework, 4, 156, 166, 449
- relationship marketing, 524
- renewal, 13, 14, 68, 69, 73, 74,
82–4, 90
- reorganization, 534, 547
- reputation, 292, 293, 295, 302, 305,
306, 323, 339, 345, 349, 360,
361, 504, 522, 527, 543
- Reserve Bank of India (RBI), 160–2
- resource allocation, 9, 81, 102
- restructuring, 465, 473, 475, 476,
533–50
- revenue generation, 198, 199
- revolution, 9, 10, 105, 140, 142, 246,
249, 256, 436, 586, 588
- risk assessment, 337, 342, 345
- Ritz-Carlton, 183
- robotics, 106, 124, 142, 371
- robots. *See* robotics
- routinization hypothesis, 118, 122, 133
- Russia, 160, 308, 338, 339, 409
- S**
- SaaS-Fee, 418, 424, 425, 429
- Saastal Marketing AG (SMAG), 418,
424, 426, 429, 430, 432
- SAIC, 290
- Schumpeter, Joseph A., 20, 21, 37, 38,
49, 51, 131, 141
- Security policy, 336
- security standards, 448–51, 453
- sell-off, 534–6, 540–2, 548

- sensors, 104, 110, 124, 274, 281, 338, 445, 448
- service development, 316, 318–21, 326–8
- service-dominant logic, 51, 52, 318
- service engineering, 318
- service experience, 177, 179
- seven levers of growth model, 285–7
- 7Ps framework, 178
- shakeouts, 20, 29, 34–48, 50, 54
- shared value, 520–3, 525, 527
- sharing economy, 110
- Silicon Valley, 97, 111
- silo mentality, 201, 202, 208
- Singapore, 160, 191, 192, 362
- single-sourcing, 328
- Siri, 105
- 6D framework, 99–101
- Six Sigma, 145, 147
- ski, 417–33
- SMAC technologies, 154
- small and medium enterprises (SMEs), 83, 163, 164, 375–410
- small private online courses (SPOCs), 355, 356
- smart
 - business, 251, 253
 - devices, 70, 438–40
 - machines, 125, 129, 131–4
 - product, 257, 281, 282, 436, 437
 - services, 253, 257, 281
- social
 - media, 142, 159, 162, 181–3, 186, 214, 256, 376, 391, 395, 396, 398, 400, 401, 424, 429
 - platforms, 429, 439, 440
 - system, 100, 377, 378, 380–4, 402, 518
 - technologies, 111, 378, 402
- socio-demographic factors, 292–4, 298–300
- Software as a service (SaaS), 252, 283
- software engineering, 318
- Sony, 214
- S&P, 96
- spin-off, 534–6, 540–3, 548, 549
- stakeholder
 - impact analysis, 521, 524
 - management, 267, 513–28
 - symbiosis, 521
 - theory, 520
- strategic
 - agents, 514
 - alignment model, 376, 383
 - challenge, 515, 520, 527
 - management, 22, 24, 26, 41, 44, 70, 84, 86–9, 156, 402, 403, 515, 519, 520, 525–7
 - model, 516, 526, 528
 - renewal, 68, 73, 82–4, 90
 - solution, 527
- strategy, 3, 8, 15, 26, 51, 55, 70–6, 80, 87, 159, 161, 196, 205, 223, 224, 291, 308, 336, 337, 338, 341, 381, 382, 385, 394, 399, 400, 401, 430, 472, 487, 488, 508, 515, 517, 543, 586, 587, 588, 590, 593, 594
- structure-conduct-performance (SCP) model, 21
- Stuxnet worm, 336
- supplier-customer relations, 316
- sustainability, 73, 77, 81, 90, 515, 516, 519–23, 527, 528
- sustainable
 - business, 514, 516–19, 526
 - business practices, 519
 - competitive advantage, 71–4, 86, 500, 504–5, 508
 - development, 514, 516–19, 521, 526, 527
- Switzerland, 32, 418–20, 422, 423, 428
- SWOT, 360, 361, 394
- Symantec, 339
- SyNAPSE, 105
- synthetic biology, 108

T

target group selection, 290, 306
 Taylor, Frederick, 197
 Taylorism, 198
 Technical University Munich (TUM),
 354, 357–9, 361–72
 technological
 change, 34, 36–7, 39, 42, 43, 50,
 52, 79, 376, 401
 innovation, 36, 39, 49, 50, 134
 technology, 4, 19, 68, 95, 115, 139,
 153, 175, 192, 218, 245, 274,
 290, 336, 357, 375, 426, 435,
 499, 535, 558, 585
 technology-driven opportunities, 586
 3D printing, 105–6, 108
 3M Company, 590
 Tinbergen, Jan, 116
 tourism office, 192
 Toyota Production System (TPS), 145
 training, 83, 105, 107, 131, 196, 207,
 208, 256, 287, 361, 385,
 390–2, 394, 402, 406, 407,
 430, 432, 433, 442, 443, 445,
 481, 482, 507, 524
 transformational shift, 153
 transformation levers, 141, 143–6
 travel industry, 421, 422, 430
 trigger event, 278
 triple bottom line, 520–3, 526, 527
 triple performance, 526
 trust, 80, 82, 90, 156, 159, 307, 316,
 330, 331, 346, 347, 349, 350,
 487, 500–2, 508, 561, 562, 591
 Turkey, 338–40
 TÜV Rheinland India, 495
 Twitter, 181, 214, 349, 396, 397

U

Uber, 146, 589
 uncertainty, 36, 40, 43, 46, 47, 109,
 153, 156, 204, 218, 227, 235,
 248, 264, 316, 329, 438,
 505–7, 518

unemployment, 116, 128, 469, 474, 475
 unicorns, 96, 97, 112
 unintentional contributors, 514
 United States of America (USA), 26,
 30–4, 46, 52, 122, 124–6,
 134, 155, 156, 160, 163, 207,
 290, 291, 336–40, 342, 348,
 350, 356, 358–60, 422, 454,
 465
 University, 104, 192, 263, 354–6, 358,
 361–3, 367, 370, 391, 419
 unlearning, 190
 Upwork, 109
 U-shaped polarization, 120

V

value chain, 76, 83, 265, 275–7, 397,
 401, 402
 value commitment, 463, 466–7, 481,
 484, 487, 488
 value creation, 76, 249, 256, 257, 316,
 323, 523, 525, 533–50
 video tutorial, 430
 Villeroy & Boch (V&B), 246, 248–61,
 267–70
 virtual reality (VR), 107
 vision, 12, 107, 109, 146, 147, 190,
 193, 195, 196, 201, 205, 208,
 250, 256, 260, 282, 356, 361,
 365–7, 378, 381, 388, 394,
 395, 400, 424, 467, 487, 497,
 503, 504, 506, 526, 588–90
 VRIO model, 504
 VUCA, 505–8

W

Washington Mutual, 193
 WATSON system, 105
 WhatsApp, 96
 WHU-Otto Beisheim School of
 Management, vii, xv, xvi, xliii
 Wikipedia, 203, 204
 Wipro, 6, 7

Working environment, 84, 379,
553–79

work-life balance, 502, 557–9, 561,
563–8, 571, 576

Y

YES bank, 160, 161

Yunus, Muhammad,
166