Michael Hülsmann
Nicole Pfeffermann
Editors

Strategies and Communications for Innovations

An Integrative Management View for Companies and Networks

Springer

Strategies and Communications for Innovations

Michael Hülsmann • Nicole Pfeffermann
Editors

Strategies and Communications for Innovations

An Integrative Management View for Companies and Networks

Springer

Editors
Prof. Dr. Michael Hülsmann
Systems Management
International Logistics
School of Engineering and Science
Jacobs University Bremen
Campus Ring 1
28759 Bremen
Germany
m.huelsmann@jacobs-university.de

Dipl. Oec. Nicole Pfeffermann
Systems Management
International Logistics
School of Engineering and Science
Jacobs University Bremen
Campus Ring 1
28759 Bremen
Germany
Nicole.Pfeffermann@googlemail.com

ISBN 978-3-642-17222-9 e-ISBN 978-3-642-17223-6
DOI 10.1007/978-3-642-17223-6
Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2011922054

Cover design: eStudio Calamar S.L.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Introduction

The Purpose of This Book

> Management's job is to see the company not as it is ... but as it can become.
>
> John W. Teets (1933 –)

Scenarios represent one way to communicate future directions and can foster awareness of new ways for business development (e.g., Hill and Jones 2008; Lindgren and Bandhold 2009; Ringland 2006). However, global business today is more complex, dynamic and decentralized than ever. Strategic management in particular has to deal with the effects of globalization such as required downsizing, mergers, world-wide collaborative arrangements, inter-cultural communication networks, new forms of communication, and innovation in rapidly changing environments (e.g., Ayoko et al. 2004; Babcock and Babcock 2001; de Wit and Meyer 2005; Hitt et al. 2005; Lynch 2009; Prandelli et al. 2008). There is less room for failure in strategic decision-making, considering for instance the effects of corporate scandals that capture print and online attention very quickly. As a result, interest has been raised in communicating corporate issues (e.g., Cornelissen 2008; Ingenhoff and Röttger 2008; Oliver and Adams 2010), scenarios for business development in complex environments (e.g., Kosow and Gaßner 2008; Lindgren and Bandhold 2009), innovations and the organization behind a corporation's innovation portfolio (e.g., Daschkovska et al. 2010; Mast et al. 2005; Zerfaß and Möslein 2009).

Thus, this book covers the complexity and dynamics of world business environment today in contributing to two central research fields *strategic management of innovation and communication of innovation.*

The key term innovation implies both challenges and opportunities for organizations of all sizes. Apart from the broad spectrum of influencing factors for innovation success (e.g., Rogers 2003; Strecker 2009), innovation represents a key success factor for corporations in the twenty-first century. New forms of collaborative arrangements in product development processes, short product life

cycles, innovative business models in emergent B2B and B2C markets, and novelties in information and communication technologies (ICT) support the dynamism of developing innovations (Davenport et al. 2006). The so-called innovation economy sets new standards for business and requires efficient innovation management to plan, execute and evaluate activities and coordinate resources and capacities, which are spread over the globe (e.g., Afuah 2002; Davenport et al. 2006; Tidd and Bessant 2009). As a result, the magnitude of recent changes requires focusing on innovative approaches such as Open Innovation (e.g., Chesbrough 2003, 2006; Gassmann et al. 2010), systematic and effective management concepts (e.g., Strebel 2007; Tidd and Bessant 2009), and applications in operations and in particular in strategiy (e.g., Afuah 2002; Tidd and Bessant 2009). Thus, *strategic management of innovation* gains increasing interest in business and science.

In this context, one crucial impact factor on innovation success and strategic management of innovation represents *communication of innovations* (e.g., Mast and Zerfaß 2005; Mast et al. 2005, 2006; Trommsdorff 1991, 1995; Trommsdorff and Binsack 1997; Trommsdorff and Steinhoff 2007; Zerfaß et al. 2004; Zerfaß 2007; Zerfaß and Ernst 2008; Zerfaß and Möslein 2009). On the one hand, all market-related processes, tools, and activities in innovation management have to be coordinated across innovation processes over a period of time (e.g., Hofbauer et al. 2009; Trommsdorff and Binsack 1997; Trommsdorff and Steinhoff 2007). Innovation marketing is thus a central function in corporations and collaborative networks to present novelties to customers and launch innovations into markets successfully. On the other hand, the company behind an innovation has to present itself systematically to strengthen its corporate reputation (van Riel and Fombrun 2008). As one communication field in organizational communication, innovation communication continuously and purposefully manages communication activities on a corporate level to present ideas, innovations and innovative capability to known and unknown stakeholders in the innovation economy (e.g., Daschkovska et al. 2010; Pfeffermann et al. 2008; Zerfaß and Möslein 2009). Consequently, business and science invest in developing new integrated management concepts, theoretical approaches and communication management tools to deal with the requirements of communicating innovations and presenting the corporation behind an innovation.

Linking *strategy and communication for innovation*, communicating innovations and presenting the innovative capability of a company or a collaborative network can lead to a common understanding of innovation and create a culture of innovation in the long run (Daschkovska et al. 2010). These changing organizational and network processes can result in a strategic management perspective of innovation communication (Pfeffermann 2010). As a future direction, *innovation communication* may represent an organizational dynamic capability to re-configure, create and extend the valuable resource base of an enterprise in rapidly changing environments. Moreover, communication of innovation strategy or corporate strategy can be surveyed using the integrated view (e.g., Argenti 2007; Cornelissen 2008). As one essential functional task in corporate communication, communication of strategy can support presenting the future direction of business including its mission, values, products and services to stakeholders (e.g., Cornelissen 2008;

O'Rourke 2010). Through dialog situations and information exchanges with stakeholders within organizations and partnerships, as well as outside in other sectors and industries, communication can also lead to receiving important feedback regarding strategy formulation and implementation (Cornelissen 2008). Strategies for innovative marketing (e.g., Belz et al. 2007; Belz 2007) and communication in collaborative innovation are also topics (e.g., Donaldson et al. 2010), that can be pointed out to demonstrate the relationship between strategy and communication for innovation. Creative means of communication in organizational communication highlight corporate issues and innovative thinking in companies through new and intelligent combinations of strategic communication planning and operational communication tools (e.g., Belasen 2008; Cornelissen 2008). On the other hand, interaction in collaborative innovation can support idea sharing. Dialogs can form knowledge transfer, but also require communication strategies in order to use the power of communication in collaborative innovation (Donaldson et al. 2010). Thus, the linkage between strategy and communication for innovation requires investigating frameworks and developing new integrated approaches, methodologies and practically oriented applications for organizations in the innovation economy.

Hence, this book contributes to the two cutting-edge topics *strategic management of innovation* and *communication of innovation* including integrated perspectives on strategy and communication for innovation. The specific book chapters highlight different aspects in these areas to provide an up-to-date overview regarding research in these fields and to identify topics for future research agendas. Moreover, worthwhile insights and practical experiences for business should be given. Thus, this book presents a scope of different aspects in the two main fields of interest and a closer look at the literature and practical case studies.

Target Groups and Major Aims of the Book

The book *Strategies and Communications for Innovations* serves scientists, students, managers, consultants, and professionals of organizations who design, implement and manage innovation and communication/marketing of innovations. With an international orientation, this book provides a comprehensive, well-structured and multiple perspective treatment for strategically managing and communicating/marketing innovations, covering several research fields and addressing organizations of all sizes in different industries.

The major aims of this book are:

- To collect and disseminate information on new and advanced developments as well as emerging issues and key aspects in the central research fields of interest *strategic management of innovation* and *communication of innovation, as well as integrated perspectives on strategy and communication for innovation.*
- To encourage further progress in basic research, methodology and applications.

- To cover a broad spectrum of aspects in the two main research fields with a research focus and application-oriented focus in terms of best practices including key learnings.
- To provide material for training and education in up-to-date specific fields such as Open Innovation, Strategic Innovation, Knowledge Management for Innovation, Innovation Clusters, Strategic Communication of Innovations, Innovation Communication, Marketing of Innovations, Integrated Marketing Communication for Innovations, Innovative Communication, and Communication Management for Innovations via the Web.

The Content Structure of the Book

After the introduction, which encompasses the reasoning for the book and the book profile, *Part I "Strategic Perspectives on Innovation"* emphasizes several research topics related to innovation under current internal and external environmental circumstances for companies or collaborative arrangements. Strategic aspects of open innovation, the development and visualization of new business models, impact factors of the organization's innovative capability, accessible knowledge in innovation clusters, and social innovation effects on strategic management are considered in more detail in this part to consider the opportunities and challenges in strategically managing innovation.

The purpose of *Part II "Communicative Perspectives on Innovation"* is to depict some aspects of communicating innovations. Topics of the main research areas in this field of interest are provided, such as innovation marketing, the communicative perspective in diffusion research, integrated communication in the innovation process, and the management concept and management communication of innovations. These specialized aspects show the broad spectrum of approaches in communicating innovations from a multiple research perspective (marketing research, diffusion research, corporate communication research, and management research).

Part III "Integrated Perspectives on Innovation" is dedicated to specific research topics that focus on the linkage between strategy and communication related to innovation. Contributions include strategy aspects such as internal and external communication strategies for technological innovations; relational communication strategy for collaborative innovation; and strategies for innovation communication. Strategic management aspects are also presented, for instance, strategic planning for communication of innovations; achieving marketing leadership for innovation through communication; and elements of the dynamic innovation communication capability and its integration in the strategic management process.

Worthwhile experiences and insights from science and practice at international level are presented in *Part IV "Best Practices – Insights from Science and Practice"*. By describing and highlighting practical managerial concepts (DHL Open Innovation concept, Siemen's holistic approach of communicating innovations; User Driven Innovation approach at Deutsche Telekom Laboratories) and

state-of-the-art applications (DFG Science TV; ICOM Compass; RWE mobility; high-tech innovation *ParcelRobot*), valuable information and key learnings are accentuated.

Figure 1 illustrates the structure of the book with its four main parts including the key issues in the multiple perspectives on innovation. After Part I and Part II the integrated perspectives on innovation (Part III) are presented and finally several

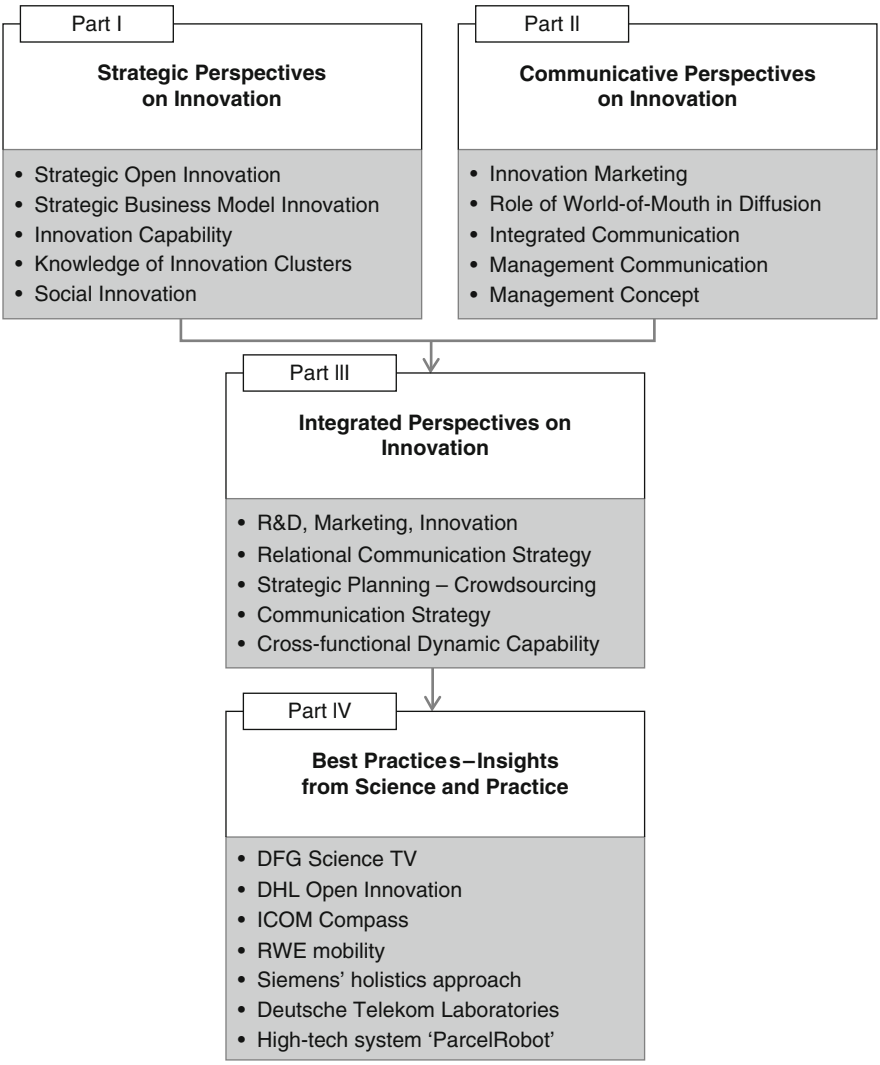


Fig. 1 Structure of the book
Source: authors

best practices (Part IV) bring forward exemplary theoretical approaches and managerial concepts in science and business.

References

Afuah, A. (2002). *Innovation Management: Strategies, Implementation, and Profits*. New York: Oxford University Press.

Argenti, P.A. (2007). *Corporate Communication*. (4th ed.). New York: Mc-Graw Hill.

Ayoko, O., Härtel, C., Fisher, G., & Fujimoto, Y. (2004). Communication competence in cross-cultural business interactions. In D. Tourish, & O. Hargie (Eds.), *Key Issues in Organizational Communication* (pp. 157–171). New York: Routledge

Babcock, R.D. & Babcock, B.D. (2001). Language-based communication zones in international business communication. *The Journal of Business Communication*, 38(4): 372–441.

Belasen, A.T. (2008). *The Theory and Practice of Corporate Communication. A Competing Values Perspective*. Thousand Oaks, CA: Sage.

Belz, C. (2007). Übersicht: Akzente im innovativen Marketing. In C. Belz, M. Schögel, & T. Tomczak (Eds.), *Innovation Driven Marketing. Vom Trend zum innovativen Marketing*. Wiesbaden, Germany: Gabler.

Belz, C., Schögel, M., & Tomczak, T. (2007). *Innovation Driven Marketing. Vom Trend zum innovativen Marketing*. Wiesbaden, Germany: Gabler.

Chesbrough, H.W. (2003). The era of open innovation. *MIT Sloan Management Review*, 44(3): 35–41.

Chesbrough, H.W. (2006). Open innovation: a new paradigm for understanding industrial innovation. In H.W. Chesbrough; J. West, & W. Vanhaverbeke (Eds.), *Open Innovation: Researching a New Paradigm* (pp. 1–14). Oxford: Oxford University Press.

Cornelissen, J. (2008). *Corporate Communication: A Guide to Theory and Practice*. Los Angeles: Sage.

Daschkovska, K., Pfeffermann, N., Meyer-Larsen, N., & Hülsmann, M. (2010). Adoption framework for innovations in logistic transport chains. In W. Kersten, T. Blecker, & C. Lüthje (Eds.), *Pioneering Solutions in Supply Chain Management. A Comprehensive Insight into Current Management Approaches* (pp. 347–364). Berlin: Erich Schmidt.

Davenport, T.H., Leibold, M., & Voelpel, S. (Eds.) (2006). *Strategic Management in the Innovation Economy. Strategy Approaches and Tools for Dynamic Innovation Capabilities*. Erlangen: Publics Publishing and Wiley-VCH.

de Wit, B. & Meyer, R. (2005). *Strategy Synthesis: Resolving Strategy Paradoxes to Create Competitive Advantage*. (2nd ed.) London: Thomson Learning.

Donaldson, B., O-Toole, T., & Holden, M. (2010). A relational communication strategy for successful collaborative innovation in business-to-business markets.

In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin, Germany: Springer.

Gassmann, O., Enkel, E., & Chesbrough, H.W. (2010). The future of open innovation. *R&D Management*, 40(3): 213–221.

Hill, C.W.L. & Jones, G.R. (2008). *Strategic Management Theory: An Integrated Approach*. Boston: Houghton Miffin.

Hitt, M.A., Ireland, R.D., & Hoskisson, R.E. (2005). *Strategic Management. Competitiveness and Globalization*. Mason, Ohio: South Western, Thomson.

Hofbauer, G., Körner, R., Nikolaus, U., & Poost, A. (2009). *Marketing von Innovationen. Strategien und Mechanismen zur Durchsetzung von Innovationen*. Stuttgart, Germany: Kohlhammer.

Ingenhoff, D. & Röttger, U. (2008). Issues Management. Ein zentrales Verfahren der Unternehmenskommunikation. In M. Meckel, & B.F. Schmid (Eds.), *Unternehmenskommunikation : Kommunikationsmanagement aus Sicht der Unternehmensführung* (pp. 323–354). Wiesbaden, Germany: Gabler.

Kosow, H. & Gaßner, R. (2008). *Methods of Future and Scenario Analysis: Overview, Assessment, and Selection Criteria*. Bonn, Germany: Deutsches Institut für Entwicklungspolitik, 39.

Lindgren, M. & Bandhold, H. (2009). *Scenario Planning. The Link Between Future and Strategy* (2nd ed.). Basingstoke: Palgrave Macmillan.

Lynch, R. (2009). *Strategic Management* (5th ed.). Harlow, England: Pearson Education.

Mast, C. & Zerfaß, A. (2005). *Neue Ideen erfolgreich durchsetzen. Das Handbuch der Innovationskommunikation*. Frankfurt am Main, Germany: F.A.Z.-Institut für Management-, Markt- und Medieninformation.

Mast, C., Huck, S., & Zerfass, A. (2005). Innovation communication. Outline of the concept and empirical findings from Germany. *Innovation Journalism*, 2(7): 1–14.

Mast, C., Huck, S., & Zerfaß, A. (2006). *Innovationskommunikation in dynamischen Märkten. Empirische Ergebnisse und Fallstudien*. Berlin, Germany: Lit.

O'Rourke, J.S. (2010). *Management communication: a case-analysis approach*. Upper Saddle River, NJ: Prentice Hall.

Oliver, G.R. & Adams, B.N. (2010). Strategic issue management: the right mindset is as important as the right tool. In P. Alvintzi, & H. Eder (Eds.), *Crises Management* (pp. 331–341). New York: Nova Science Publishers.

Pfeffermann, N. (2010). Innovation Communication as a Cross-Functional Dynamic Capability: Strategies for Organizations and Networks. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin, Germany: Springer.

Pfeffermann, N., Hülsmann, M., & Scholz-Reiter, B. (2008). Framing Innovations to Grasp Stakeholders' Attention: A Dynamic Capability-based Conception of Innovation Communication. *Research Report 2007/08 International Graduate School for Dynamics in Logistics*, Vol. 01, 2008, pp. 40–44.

Prandelli, E., Sawhney, M., & Verona, G. (2008). *Collaborating with Customers to Innovate. Conceiving and Marketing Products in the Networking Age*. Northampton, MA: Edward Elgar.

Ringland, D. (2006). *Scenario Planning, Managing for the Future* (2nd ed.). Chichester: Wiley.

Rogers, E.M. (2003). *Diffusion of Innovations* (5th ed.). New York: The Free Press.

Strebel, H. (2007). *Innovations- und Technologiemanagement* (2nd ed.). Wien, Facultas.

Strecker, N. (2009). *Innovation Strategy and Firm Performance: An Empirical Study of Publicly Listed Firms*. Wiesbaden, Germany: Gabler.

Tidd, J. & Bessant, J. (2009). *Managing Innovation: Integrating Technological, Market and Organizational Change* (4th ed.). Chichester, England: Wiley & Sons.

Trommsdorff, V. (1991). Innovationsmarketing. Querfunktion der Unternehmensführung. *Marketing – Zeitschrift für Forschung und Praxis* (ZFP), 13(3): 178–185.

Trommsdorff, V. (1995). *Fallstudien zum Innovationsmarketing*. München, Germany: Vahlen.

Trommsdorff, V. & Binsack, M. (1997). Neue Märkte Wie Marketing Innovationen durchsetzt. *Absatzwirtschaft*, 40(11): 60–65.

Trommsdorff, V. & Steinhoff, F. (2007). *Innovationsmarketing*. München: Franz Vahlen.

van Riel, C. & Fombrun, C. (2008). *Essentials of Corporate Communication. Implementing Practices for Effective Reputation Management*. New York: Taylor & Francis.

Zerfaß, A. (2007). Unternehmenskommunikation und Kommunikationsmanagement: Grundlagen, Wertschöpfung, Integration. In M. Piwinger, & A. Zerfaß (Eds.), *Handbuch der Unternehmenskommunikation* (pp. 21–70). Wiesbaden, Germany: Gabler.

Zerfaß, A. & Ernst, N. (2008). *Kommunikation als Erfolgsfaktor im Innovationsmanagement. Ergebnisse einer Studie in deutschen Zukunftstechnologie-Branchen*. Leipzig: Universität Leipzig.

Zerfaß, A. & Möslein, K.M. (2009). *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation*. Wiesbaden, Germany: Gabler.

Zerfaß, A., Sandhu, S., & Huck, S. (2004). Innovationskommunikation: Strategisches Handlungsfeld für Corporate Communications. In G. Bentele, M. Piwinger, & G. Schönborn (Eds.), *Kommunikationsmanagement. Strategien, Wissen, Lösungen* (August 2006; 1.24, 1–30) München: Luchterhand.

Bremen, Germany Michael Hülsmann
Nicole Pfeffermann

Acknowledgments

Writing book chapters is especially challenging when submission deadlines compete directly with other academic, professional and social tasks. Therefore, we would like to thank all contributors for taking the time to write a book chapter. This book presents relevant knowledge in the research fields *strategic management of innovation* and *communication management of innovation,* as well as managerial expertise in terms of worthwhile insights in *innovation management* and *innovation marketing*.

Special thanks go to the responsible representatives of the publishing house Springer-Verlag Thomas Lehnert, Senior Editor Engineering at Springer-Verlag, and Ulrike Butz, Editorial Assistant to Thomas Lehnert, for their early commitment to the idea of this book and admirable support that brought this book to fruition.

Last but not least, we would like to thank Julie Gould for her professional proofreading, which was invaluable. She supported us by providing native-speaker improved texts within tight deadlines at the end of this book project.

Finally, many thanks to relatives and friends for their encouragement, support, and sympathy in completing this book project.

Bremen, Germany

Michael Hülsmann
Nicole Pfeffermann

Contents

Contributors

Dr. Grit Mareike Ahlers is Managing Director of Prof. Bruhn & Partner AG, a strategy and marketing consulting firm with its registered office in Zurich, as well as being assistant professor at the University of Basel and a lecturer at other higher education establishments. She studied business administration in Bayreuth and Madrid, before joining the Department of Marketing and Corporate Management at the University of Basel in 2001 as a research assistant. Her PhD thesis deals with the optimization of organizational structures in marketing with regard to consistent external and internal communications. At the marketing department, besides her scientific work she was also responsible for various consulting projects and worked as lecturer for numerous EMBA-programs. From 2006 until 2009 Mareike Ahlers worked for HUGO BOSS AG as Team Leader Business Development for the brand lines BOSS Orange & Green, responsible for brand strategies, cross-functional process management and the relaunch of the brand BOSS Orange.

Bastian Bansemir graduated from the Technical University of Munich with a Master in business administration (Dipl.-Kfm.). He gained international research and practical experiences at Tongji-University in Shanghai, China and Eurocopter in Marignane, France. Since he joined the Chair for Information Systems I – Innovation and Value Creation at the University Erlangen-Nürnberg his research, teaching and consulting focuses on open innovation, leadership and organizational design and specializes in innovation communities in his dissertation. Multiple methods, spanning ethnographic long-term studies as well as quantitative experiments are applied to address research questions. Results were presented at several international colloquia (e.g., doctoral colloquia of Euram 2008 and Euram 2009, as well as Euram Early Career Colloquium) and conferences (e.g., award-winning article at the 9th conference on business informatics and Euram 2010). In addition, several projects were conducted successfully (e.g., federal ministry of education and research funded projects like InSider, Genie and Open-I).

Dr. Alexander Brem received his Diploma in Business Administration from the University of Erlangen-Nuremberg, Germany in 2004 and earned his PhD there in 2007. From 2004 to 2007, he was Senior Research and Teaching Assistant at the

Chair of Industrial Management, University of Erlangen-Nuremberg, where he now works as Senior Lecturer. Moreover, he is founder and partner of VEND consulting GmbH, Nuremberg. His current research interests include idea and innovation management, and strategic management in SMEs. He is a reviewer and editorial board member of various international journals, e.g., Technovation and the International Journal of Innovation Management.

Dr. Henning Breuer is managing director of the consulting company Bovacon – Designing Business Interaction. He set up the Project Field User Driven Innovation at Deutsche Telekom Laboratories together with Dr. Fee Steinhoff, and with a focus on Disruptive Innovations. Henning Breuer teaches strategic user research at the University for Applied Sciences Potsdam. As Visiting professor at Waseda University Tokyo his research focuses on human-centred innovation for informal learning environments.

Prof. Dr. Manfred Bruhn is a full professor for Business Economics, in particular for Marketing and Corporate Management at the Center for Economic Sciences of the University of Basel, as well as holding an honorary professorship at the Technische Universität München. He conducts research on Strategic Marketing, Services Management, Communications Management, Brand Management, and Non Profit Marketing. Many of his publications belong to the standard repertoire in marketing science and practice. He is adviser to various companies and member of numerous organizations and juries. Manfred Bruhn is editor of the Swiss magazine "Die Unternehmung" and director of the Master Program "Marketing Management and Business Administration" in Germany and Switzerland. He studied business administration at the University of Münster, qualified as a professor in 1985 and was a full professor for Marketing at the European Business School until 1995.

Philip Cordes is a research associate and Ph.D. student of Prof. Dr. Michael Hülsmann in the department "Systems Management" in the School of Engineering and Science at the Jacobs University Bremen. He completed his diploma in business sciences at the University of Bremen in 2008. Since may 2008 Philip Cordes is working for the collaborative research centre 637 "Autonomous Cooperating Logistics Processes – A Paradigm Shift and its Limitations" funded by the German research foundation (DFG). Philip Cordes' exploratory focuses are autonomous co-operating logistic systems, strategic management in the music industry and complexity science-based organization theory. He deals, e.g., with complexity-based theories of Complex Adaptive Systems, Dynamic Capabilities as well as Dominant Management Logics and Path Dependencies.

Rani J. Dang is a Doctoral Researcher in Management at CNRS, (GREDEG Management Department, University of Nice Sophia-Antipolis, France). Her main research interest is Knowledge Management in regional clusters. Currently she studies the process of SMEs' insertion into innovation projects within regional clusters by examining the micro foundations of territorial innovation dynamics. Her research is conducted in partnership with a pôle de compétitivité: The "Pôle SCS".

Rani is also a Visiting Researcher at the Centre for Technology Management at the IfM, University of Cambridge (UK) in 2008 and 2010.

Bill Donaldson (PhD) has taught, practised and researched in marketing for over 30 years. One time marketing manager, lecturer and consultant he is now Professor of Marketing and responsible for research in marketing within the Aberdeen Business School, Robert Gordon University. After more than a decade in industry he joined the University of Strathclyde in 1983 as a lecturer where he obtained his doctorate in marketing in 1993. He is author of "Sales Management: Principles, Process and Practice" 3rd edition, Palgrave, 2007; The Busy Manager's Guide to Marketing Goodfellow, 2009; and "Strategic Market Relationships, 2nd edition" (with Tom O'Toole) published by Wiley, 2007. In addition he has published many refereed journal articles, conference papers and consultancy reports. His research interests continue in the area of sales management and relationship marketing. Bill has taught marketing at undergraduate, post graduate and extensively on MBA programmes both home and overseas and acted as principal supervisor for more than ten successful doctoral students.

Dr. Ulrich Eberl, who was born in 1962, is the head of Siemens' worldwide innovation communication team and Editor-in-Chief and publisher of the award-winning research and innovation magazine Pictures of the Future. He studied physics and earned a doctoral degree with "summa cum laude" on the influence of electric fields on the first picoseconds of photosynthesis at Technical University of Munich in 1992. As a science and technology journalist, Eberl has been contributing hundreds of articles for a wide range of publications since 1988, reporting on topics ranging from nanotechnology and space technology to evolutionary biology and the archaeological excavations in Troy. After working for Daimler's technology publications from 1992 to 1995, Eberl joined Siemens Corporate Communications in 1996. He also heads the SciPress editorial office, a communication service for the fields of technology, business, and science, and is the author of two books, Innovative Minds and Our Life in 2050. Contact: ulrich.eberl@siemens.com.

Prof. Dr.-Ing. Wolfgang Echelmeyer (research area "logistics/material flow"), born in 1967, is head of the research area "logistics/material flow" at the Reutlingen University. He studied production engineering at the University of Bremen. From 2002 to 2009 he was a research assistant at the chair for planning and controlling of technical systems in the institute BIBA at University of Bremen. His focus was the development and integration of automated logistics systems. Furthermore he was a lecturer in several lectures in the area of production engineering. In 2006 he attained a doctorate to the doctor of the engineering sciences. In the year 2005 he became department manager in the BIBA within the research area "intelligent production and logistics systems" and led independently the group of researchers "Logistikfabrik". Within these years he has invented the ParcelRobot in cooperation with several industrial partners. From 2006 to 2009 he introduced the ParcelRobot into the market and he established a new sector "robotics-logistics" within the company ThyssenKrupp Krause. He was project manager in a multiplicity of

projects in the ranges of material and information flow optimization particularly in automation- and AutoIdent-technologies. In 2009 he received a full professorship at the ESB-Business School at Reutlingen University, where he actively continues to develop his own research area ESB-Logistikfabrik.

Prof. Dr. Martin J. Eppler is a full professor of media and communication management at the University of St. Gallen (HSG), where he is also a director of the institute for media and communication management. He conducts research on knowledge management, knowledge visualization, and knowledge communication. He has been a guest professor at various universities in Asia and Europe. He has been an advisor to organizations such as the United Nations, Philips, UBS, the Swiss Military, Ernst & Young, KPMG, Swiss Re, Daimler and others. Martin Eppler studied communications, business administration and social sciences at Boston University, the Paris Graduate School of Management, and the Universities of Geneva and St.Gallen. He has published more than 80 academic papers (in journals such as Organization Studies, LRP, Harvard Business Manager, TIS, EMJ, IV, and others) and eight books, mostly on knowledge communication, management, and visualization.

Sherry Devereaux Ferguson (PhD) is a senior professor and former Chair and Director of Graduate Studies for the Communication Department, University of Ottawa, Canada. In recent years, she chaired the Public Relations Division of the International Communication Association, which later elected her to the position of Board Member-at-Large for the Americas. She also chaired the Internationalization Committee for that organization. While acting as chair of the Public Relations division, she established the Global Task Force, a research initiative involving scholars from many countries. Research projects have included three books on organizational communication, two on public opinion and strategic planning in communication, two on speech communication, and a book on civic discourse and cultural politics in Canada. She has published 27 articles in refereed journals and made 43 conference presentations.

Dr. Jörn Grapp is a Postdoctoral Fellow at Jacobs University Bremen, Systems Management (Prof. Dr. Michael Hülsmann). In 2009 Jörn Grapp founded the company "Grapp Consulting – Strategic Consulting for Creative Business". From 2004 to 2008 the graduated economist worked as Research Associate for Prof. Hülsmann in his Work Group "Management of Sustainable Systems Development" at the Faculty of Business Studies and Economics, University of Bremen. Dr. Grapp's research focus is Strategic Management for Movie and TV-Productions, Service Logistics, International Logistics Networks and Autonomous Cooperation of Logistic Processes (Collaborative Research Center 637, University of Bremen). His dissertation topic is "Competence-oriented Potentials for Movie Production Logistics Management – Identification of Strategic Problems and Tools" (published in German). Dr. Jörn Grapp has published and presented diverse papers on conferences worldwide (e.g., in Thailand, Russia, China, Portugal) and is regularly invited as guest speaker. He edited the collection book entitled "Strategic

Management for Movie and TV Productions – Challenges, Options, Competences" (published in German). Currently, he gives lectures in Project Management and Management at the University of Bremen.

Friederike Hoffmann is a PhD candidate at the University of St.Gallen, at the Institute for Media and Communication Management. She holds a degree in Political Science from Freie Universität Berlin. She also studied at Sabanci University, Istanbul, and worked as a research assistant at the San Francisco State University. After finishing her diploma thesis on agenda setting, she worked as a research assistant at the Herbert Quandt Foundation, Berlin, and later as a project manager for the Charité Foundation in Berlin. Her research focuses on the use of knowledge visualization tools in strategic management processes, and especially on business model innovation.

Mary T. Holden (BSA, MBS, H.Dip Stats, PhD) has over 20 years of business experience. Her research interests involve the governance of inter-organisational relationships – especially the role of communication in governance, and frictionless knowledge transfer in inter-organisational networks. Mary is co-chair and co-founder of the Research in Innovation, Knowledge, and Organisational Networks (RIKON) Group in the School of Business, Waterford Institute of Technology. She is a member of several professional associations: Academy of Management, American Marketing Association, European Marketing Association, International Communication Association, and the Marketing Institute of Ireland. Mary has published in the Journal of Marketing Management, Marketing Review, Industrial Marketing Management and Irish Marketing Review. She has also presented her work at numerous national and international conferences and has been a reviewer for many international conferences as well as the journals Industrial Marketing Management and the European Journal of Marketing.

Prof. Dr. Michael Hülsmann studied Business Administration at the University of Bayreuth. Then he continued as a Research Assistant at the University of Bayreuth and at the University of Bremen. He earned a PhD degree on the topic "Management im Orientierungsdilemma – Notwendigkeit eines Managements rationalitätsbezogener Widersprüche von Effizienz und Nachhaltigkeit" (Orientational Dilemma in Management – The Need for a Rationality Driven Contradiction Between Efficiency and Sustainability in Management) with "summa cum laude" and received the second award for studies of the Förderverein für Mittelstandsforschung e.V. (Association for Scientific Development of Small and Medium Enterprises). In his business career Prof. Hülsmann worked for notable companies. Between 2003 and 2009 Prof. Hülsmann was in charge of the "Management nachhaltiger Systementwicklung" (Management of Sustainable Systems Development) field of studies in the Economics department of the University of Bremen. Since January 2004 he has been in charge of sub-project A3 "Monitoring der Selbststeuerung" ("Monitoring of Autonomous Control") and a leading member of SFB 637 "Selbststeuerung logistischer Prozesse – ein Paradigmenwechsel und eine Grenzen" (Autonomous Logistics Processes – a Change in Paradigm and

Constraints) which is already in its second research level as the kernel of the scientific cluster "Dynamics in Logistics". In 2007 Prof. Hülsmann was invited as a visiting researcher at the University of California, Los Angeles, USA. In March 2009 he took over the "System Management" field of studies at the School of Engineering and Science at Jacobs University Bremen. He focuses on Strategic Management of Logistics Systems. Prof. Hülsmann teaches and does research mainly in the fields of competence and technology based positioning, accomplishing of technological change in value-adding networks and setting-up of interorganizational coordination mechanisms.

Annegret Jäger, born 1954, is Senior Consultant in IT-based management for global companies (e.g., Vorwerk Group, Friedhelm Loh Group) at EBI Jäger e.K. She is responsible for the development and implementation of integrated, individual, global-oriented IT solutions. She is also IT coach for group seminars and individual management seminars at EBI. With her expertise in programming and operating systems, Annegret Jäger has been contributing to this field by publishing text books (Redmonds Publishing House; Ikon Publishing House) and also MS Office books as well as course materials for teaching purposes. More than 12 years she was responsible for software tools and standards for system software development at ZEDA, IT subsidiary of Vorwerk Group. E-Mail: annej@ebi-Jaeger.de; annej@icom-compass.de.

Hans-Werner Jäger is managing director at EBI Jäger e.K. and is specialized in IT administration, hardware and software implementation, and IT strategy development. He focuses on business ideas and emerging issues such as knowledge and enterprise document management. He initiates and sets up projects and is responsible for the partnerships with ELO Digital Office and Microsoft. In 1991 EBI was the first Microsoft Authorized Training Center in Germany. He had previously worked at ZEDA, IT subsidiary of Vorwerk Group, and was responsible for IT tools for mainframe computers and IT strategy development for the implementation of personal computers. E-Mail: wernerj@ebi-Jaeger.de; wernerj@icom-compass.de.

Liora Katzenstein has been involved with early-stage technology enterprises for more than two decades, with such roles as investor, advisor, board member and founder of a number of successful ventures. She is the founder and President since 1996 of The Institute for the Study of Entrepreneurship and Management of Innovation (ISEMI), Tel Aviv, Israel. She holds a Master in Law and Diplomacy from Tufts University, USA and a PhD in International Economics from the University of Geneva, Switzerland. She was awarded a visiting doctoral scholarship to Harvard Graduate School of Business Administration. Katzenstein serves on numerous boards of technology-related companies in Israel and around the world.

Dr. Ralf Kopp (born 1961) is senior researcher at Sozialforschungsstelle Dortmund (sfs), central scientific unit at Technical University Dortmund. Since 2001, he coordinates the research area "Organisational Development and Human Resources Management in the Network Economy". His workscope contains network

management, knowledge management, and advanced forms of innovation management (f.e. in context from Enterprise 2.0).

Dominique Marcel Lammer recently graduated in Politics and International Relations at the University of Sheffield, UK, specialising in European Union Politics. He won the NALGO prize for best performance in Politics. Currently, he is doing a Master in Management at the London School of Economics and Political Science, where he focuses on Innovation, Strategic and Cross-Cultural Management.

Claudia Mast (PhD) is a professor of Communication Science, Journalism Studies and Public Relations at the University of Hohenheim in Stuttgart. She qualified as a university lecturer at the University of Munich with a postdoctoral thesis on the structural change of communication systems in our society. Claudia Mast was a lecturer at the universities of Munich and Eichstätt (Germany) and Zürich (Switzerland) for several years. Claudia Mast studied Communication Science, Political Science and Romance Languages at the University of Munich. She attended the German School of Journalism (Deutsche Journalistenschule) in Munich where she got her training in press, radio and TV journalism. After some time working for newspapers and in broadcasting, she joined the international company Siemens and was responsible for management information and training. Her main areas of interest are professionalism and innovation in journalism. In this field, she is best known for her handbooks on media coverage of economic topics and techniques for handling news stories. She is the author of several other books – dealing with the principles and practice of journalism, corporate communication, especially crisis communication, and the role of values in communication strategies. Claudia Mast is a member of the advisory board of Germany's international broadcaster Deutsche Welle. E-Mail: sekrkowi@uni-hohenheim.de.

Tim Mazzarol (PhD) is Winthrop Professor of Marketing, Entrepreneurship and Strategy at the Business School of the University of Western Australia, Perth, and an Affiliate Professor at the Burgundy School of Business, Groupe ESC Dijon Bourgogne, France. He was formerly the Director of the UWA Centre for Entrepreneurial Management and Innovation (CEMI), then Director of Doctoral Programs at the Business School. Prior to joining UWA he was at Curtin University where he was a Research Fellow with the Institute for Research into International Competitiveness (IRIC) and Executive Director of the Small Business Unit. He has 15 years experience of working with small entrepreneurial firms as well as large corporations and government agencies. This has included strategic management, marketing and support to commercialization. His research into small business management has been published internationally. He holds a Bachelor of Arts with Honours, a Bachelor of Education, an MBA with distinction and a PhD in Management.

Dr. Tim Minshall is a Senior Lecturer in Technology Management at the Centre for Technology Management at the Institute of Manufacturing, University of Cambridge (UK). His research interests include technology enterprise, funding of technology enterprises, university technology transfer and open innovation. He is a member of the Board of St John's Innovation Centre. Before joining the Centre,

he was a Project Manager and Board Member at St John's Innovation Centre Ltd where he worked on a series of projects to support industry/academic collaboration focused around new technology ventures. Prior to working at St John's Innovation Centre, he worked as a teacher, consultant, plant engineer and freelance writer in the UK, Australia and Japan. Tim has B.Eng. from Aston University and a PhD from Cambridge University Engineering Department.

Dr. Letizia Mortara is a Research Associate at the Centre for Technology Management at the Institute of Manufacturing, University of Cambridge (UK) since 2005. Her current research interests include open innovation and technology intelligence. Prior to joining IfM Letizia gained a Degree in Industrial Chemistry at the University of Bologna in Italy. After spending 3 years working as a Process/Product Manager in a chemical industry, she moved to the UK where she gained her PhD in Processing and Process Scale-up of Advanced Ceramic Materials at Cranfield University.

Prof. Dr. Kathrin Möslein holds the Chair for Information Systems I – Innovation and Value Creation at the University Erlangen-Nürnberg. She is also a member of the team of directors of the Center for Leading Innovation and Cooperation (CLIC) at HHL – Leipzig Graduate School of Management (HHL). She has been researching, teaching and consulting in the field of strategic innovation and innovation systems since the early 1990s. Her current research focuses on innovation, cooperation and leadership systems. Her teaching covers topics like innovation design, interactive value creation as well as the implementation of innovation strategies and technologies as well as leadership systems in organizations. She is a founding member of the European Academy of Management (EURAM) and since 2007 a member of EURAM's Executive Committee, a member of the Executive Committee of the German National Research Group for Computer-Supported Cooperative Work (CSCW) within the German Compute Society (GI) and a representative at large of the Special Interest Group on "Innovation and Knowledge" of the Strategic Management Society (SMS). In addition she is a member of several scientific and professional organizations in the field of strategic management and information systems.

Dr. Thomas O'Toole is Head of the School of Business at Waterford Institute of Technology. His research interest is in the area of managing market relationships and networks, specifically, the governance of inter-organisational relationships. On a theoretical level the research uses social exchange theory to examine collaborative governance modes and the strength of inter-firm cooperation. Current research themes include close relationship governance structures across a range of contexts, networks, and regional policy. The second edition of his co-authored book (with Bill Donaldson) entitled Strategic Market Relationships was published by Wiley in 2007. Dr. O'Toole is a current editorial board member of the European Journal of Marketing and is a director of numerous boards of organizations in the community and voluntary sector. He was elected Fellow of the Marketing Institute of Ireland in 2005 for his contribution to the advancement of the profession.

Nicole Pfeffermann is a Postdoctoral Fellow at Jacobs University Bremen, Department *Systems Management*. Her research interests cover strategic management, entrepreneurship/innovation, and organizational communication focusing on innovation communication. Since March 2009 she is also a management consultant at NP Pfeffermann Consulting. From 2005 to 2008 she was a research associate at BIBA GmbH at the University of Bremen. She planned and executed communication activities within the research project 'ParcelRobot' in cooperation with DP DHL, EADS ST, and ThyssenKrupp Krause, and other short-time partners to communicate the high-tech innovation from idea to launch. Moreover, she developed a strategic concept of innovation communication for scientific innovations in the state of Bremen for the University of Bremen/InnoWi GmbH funded by the German Federal Ministry of Economics and Technology (BMWi). In 2007 and 2008 she was a visiting doctoral student at SKEMA Business School, Nice and CNRS GREDEG UMR 6227 Research Center, University of Nice Sophia-Antipolis, France. Nicole Pfeffermann studied Business Economics at the University of Wuppertal. During and after her studies she gained international work experience as a consultant in brand management for global companies and as a coach for IT and management seminars. E-Mail: npfeffermann@icom-capability.com; Nicole.Pfeffermann@googlemail.com.

Carsten Rasch, 41, after having studied mechanical engineering in Hanover and Edinburgh, worked as a system engineer in the glass industry for 5 years. Since 2000 he has been employed with ThyssenKrupp System Engineering. As a project leader and account manager for Assembly Systems, Carsten Rasch realized automation projects in USA and Mexico. In 2008 he took over the business field of Robotic Logistics. Under his responsibility, the first ParcelRobots were put into operation. His aim is to develop an innovative product up to series maturity and to introduce it on the market. His challenges are the transfer of the automation technology and the realization of the customer requirements of the logistics industry.

Carolin Reichert has been Head of the Electro-Mobility Unit of RWE Effizienz GmbH since 2009. At present, her team consists of 40 employees. After studying business informatics in Mannheim and working for SAP on a freelance basis in Germany and the UK as well for Siemens, Carolin Reichert worked for Roland Berger Strategy Consultants. She managed projects in over 20 companies with a functional focus on strategy and restructuring. In 2003 she made the change to Infineon Technologies AG. In her capacity as vice-president for strategic planning and management she was responsible for strategic planning and cost reduction programmes as well as the portfolio management and control system. In 2006, Carolin Reichert joined the RWE Group as head of strategic planning and 2 years later took over the management of the New Business division of RWE AG. Here she successfully developed the electro-mobility business unit. Smart Home and Renewable Energies were an additional innovation focus.

Katja Reimann is expert consultant in the Electro-Mobility Unit of RWE Effizienz GmbH. Among other things, she manages the projects "Internet rwe-mobility.com"

and “RWE Autostrom Roadshow”. Katja Reimann studied economics with a focus on “management and corporate development” at Wuppertal University. During her studies, she did various internships in the areas of corporate development and human resources management in large and mid-sized companies in the chemicals industry and in trading. After her studies, she changed to the International Graduate Programme (IGP) of RWE AG in 2004 where she successfully completed projects in the areas of human resources, organisation, corporate development, controlling and communications of various RWE subsidiaries in Germany and abroad. After the IGP, she worked in regulation management for 2 years before she transferred to the New Business division of RWE AG. Since 2008, she has been involved with electro-mobility there and has been responsible for the business unit’s external communication since 2009.

Moritz Rohde (Dipl.-Ing.) studied production engineering and is research scientist at the Bremer Institut für Produktion und Logistik GmbH at the University of Bremen (BIBA). He works in the department of Intelligent Production and Logistic Systems. His research emphases are the development of automation technologies in logistics, robot simulation and implementation as well as the development of application-orientated expert systems. He was mainly responsible for the development and the integration of the parcel robot. In different project regarding Low-Cost-Automation-in-Logistics he developed several automatic systems.

Mostafa Hashem Sherif has been with AT&T in various capacities since 1983. He has a PhD from the University of California, Los Angeles and an MS in Management of Technology from Stevens Institute of Technology, New Jersey, both in the USA. He is a Certified Project Manager from the Project Management Institute (PMI). His book Managing Projects in Telecommunication Services (John Wiley/IEEE Press, 2006) won the best book award of the International Association of Management of Technology (IAMOT).

Dr. Fee Steinhoff, born 1974, is Project Field Manager for User Driven Innovation at Deutsche Telekom Laboratories in Berlin. She is responsible for the development and implementation of intelligent user research tools along the innovation process (e.g., ethnographic research, user clinics). Fee Steinhoff studied Business Administration (Technical University Berlin), earned a Master of Business and Engineering (Steinbeis University Berlin) and received her Ph.D. from the Technical University Berlin. Her research interests are in the area of innovation marketing, customer orientation and radical innovation – topics which she also teaches in executive programs. She co-authored the book “Innovation Marketing” together with Prof. Dr. V. Trommsdorff.

Vera Stolarski is doctoral student at the European Business School (EBS), Oestrich-Winkel. Her research interests are in the area of cognitive diversity, innovation, and team dynamics. Within her PhD thesis she focused on the complex and dynamically interacting effects of cognitive diversity in top management teams on innovation on firm level. Vera Stolarski studied psychology with a focus on “occupational and organizational psychology” at the University of Cologne. During her studies, she

did various internships in the areas of human resource consulting and a research internship at the Max Planck Institute for Human Development, Berlin.

Dr. Eva-Maria Streier has been working as head of the department for press and public relations of the Deutsche Forschungsgemeinschaft (DFG) since 1985. She holds a doctorate in American Literature and has been working as a newspaper journalist before entering the DFG. Communication of science into the larger public has always been a main target of DFG's PR-Department. Apart from lectures, the publication of the magazine "forschung" and its English version "german research", DFG has been involved from the beginning in setting up the summer science festivals and invented the Communicator Award for scientists, who are exceptionally talented in communicating the results of their research into the public. Recently, Eva-Maria Streier, together with partners from film production, Gisela Graichen and Peter Prestel, invented and started DFG- Science TV, Internet based short films about research projects funded by DFG. The target group are young people who draw their information mainly from the internet. Dr. Streier is co-editor of the publication "Communicating Science", counselor of the Volkswagen foundation in press and public relations affairs and member of the jury of the Glaxo SmithKline award for journalism.

Ruth Thomson was the Innovations Leader of Kodak European Research, Cambridge (UK) from January 2006 until June 2009. In this role Ruth established the Open Innovation and Technical Intelligence strategies for the centre and established mechanisms and tools that helped the team to identify and progress external "ideas" and technology leads from across the European region. Ruth now works as a Business Development Consultant at Cambridge Consultants, and she continues her work in Open Innovation through her role as a Visiting Industrial Fellow at IfM, Cambridge University.

Prof. Dr. Meike Tilebein, born 1966, is full Professor and Director of the Institute of Diversity Studies in Engineering at the University of Stuttgart, Germany, with an interdisciplinary background. She studied Engineering Cybernetics and earned a doctoral degree in Strategic Management with a thesis on principles of complex adaptive systems and their applications to firms and networks. She served as the DPD Endowed Assistant Professor of Innovation Management at the European Business School in Oestrich-Winkel, Germany before she joined the University of Stuttgart in 2009. She has published in the fields of Strategic Management, Complexity Science, Innovation, Team Diversity, and Service Science. Her current research interests focus on new business models, cooperative strategic foresight in firms and networks, and the effects of team diversity on innovation. Her research methods include agent-based and System Dynamics simulation. She has been teaching since 1995, covering topics like Project Management, Innovation Management, System Dynamics, and Diversity Management. Meike Tilebein is member of several scientific and professional organizations in the fields of strategic management and systems sciences and member of the executive committees of the Gesellschaft für Wirtschafts- und Sozialkybernetik and the Deutsche Gesellschaft

für System Dynamics/German Chapter of the International System Dynamics Society.

Dr. Volker Trommsdorff, born 1943, Dipl.-Ing. (Industrial Engineering Management) is professor of marketing at the Berlin Institute of Technology (TU Berlin) since1978. His main fields are consumer behavior and advertising, innovation marketing and market research methods as well as international marketing focusing China. There he is the German management department coordinator of Sino-German School for Advanced Studies (Chinesisch-Deutsches Hochschulkolleg CDHK) at the Tongji-University Shanghai. He was guest professor at the ESCP-EAP Berlin, CUBS London, ESC Toulouse, ITÜ+Marmara University Istanbul, Steinbeis University Berlin and Universidad Gabriela Mistral, Santiago de Chile. He is senior partner at trommsdorff+drüner, innovation+marketing consultants (t+d). Among other positions he was president of the German advertising science association (Deutsche Werbewissenschaftliche Gesellschaft DWG), and co-founder and faculty member of the Institute of Management and Technology IMT Berlin, origin of the European School of Management and Technology (ESMT). www.marketing-trommsdorff.de; E-Mail: v.trommsdorff@ww.tu-berlin.de.

Dr. Keith Ulrich played a central role in the creation and development of Innovation Management within Deutsche Post DHL. He is now Head of the Research and Innovation Department and responsible for company-wide technology projects, the Innovation Center and the Patent Management of DPDHL. Within the last years the DHL Innovation Center successfully developed new solutions such as the CO2 neutral shipment "Go Green", new delivery concepts for urban areas "Smart Truck" and the implementation of RFID technology. Dr. Ulrich has been working for Deutsche Post AG since 2000 and was initially responsible for the Financial Market Department. He took part to the successful Initial Public Offering and was responsible for the first rating as well as for the first bond issue of the company.

Dr. Eric Viardot is permanent professor of marketing and strategy at EADA Business School in Barcelona. He has a doctorate in management. He is a graduate of the HEC Business School, Paris, and the Institute of Political Sciences, Paris. After working in different marketing positions for Hewlett-Packard in France, Canada and the US, Dr. Viardot moved to Asia as a financial director for a large international NGO. Then he joined Bain and Company as a strategic consultant and had numerous assignments in Europe. Dr Viardot has published various books and articles on strategic management and marketing with a strong focus on Technology and Innovation Management. He is currently the co-editor of the International Journal of Technology Marketing. Professor Viardot teaches regularly in executive programs in Europe. He is an active consultant and trainer and has worked with several major multinational corporations.

Prof. Dr. Kai-Ingo Voigt is a Full Professor at the Friedrich-Alexander-University of Erlangen-Nuremberg, Germany, where he has held the Chair of Industrial Management since 1998. He received his PhD in 1991 from the University of Hamburg. His current research focuses on strategic management, innovation and technology management, and production and operations management.

Part I
Strategic Perspectives on Innovation

Chapter 1
Challenges, Approaches, and Strategic Aspects of Innovation

Michael Hülsmann and Nicole Pfeffermann

Contents

The broad range of innovation types existing in the innovation economy undercores the complexity of managing innovation in corporations over time (e.g., Baldegger 2008; Davenport et al. 2006). Consequently, new approaches and concepts have been developed in recent years to describe, investigate and manage innovation processes and innovation portfolios on the strategic and operational levels, such as the framework Open Innovation (e.g., Chesbrough 2003, 2006; Gassman et al. 2010; Herzog 2008), innovation funnel (e.g., Baldegger 2008, Schilling, 2008), lead-user concept (e.g., von Hippel 1988, 2005) or user as co-creator approaches (e.g., Davenport et al. 2006; Prahalad and Krishnan 2008). In this context, collaborative arrangements and the enterprise's innovative capability/abilities and management techniques, such as information/knowledge management, idea management, as well as patent and licence management, play a key role in managing innovation; this is especially true under strategic management view of systematic planning of innovation.

M. Hülsmann and N. Pfeffermann (✉)
Systems Management, International Logistics, School of Engineering and Science, Jacobs University Bremen, Campus Ring 1, 28759 Bremen, Germany
e-mail: m.huelsmann@jacobs-university.de, Nicole.Pfeffermann@googlemail.com

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_1,

Thus, the main **objective of Part I 'Strategic Perspectives on Innovation'** is to provide fundamental information related to current challenges, new perspectives and approaches, and strategic aspects of managing innovation.

The **six key issues** that can be pointed out in ***strategic management of innovation*** for further basic research and empirical investigations are:

1.1 Open Innovation and Key Concepts in New Product Development

The Open Innovation approach (Chesbrough 2003) advocates opening innovation processes up to external environments in order to make '. . . use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation [. . .]' (Chesbrough 2006, p. 1). Three main constellations are given in the literature to define core processes of a corporation in opening up of an innovation process: outside-in process, inside-out process and coupled process (e.g., Chesbrough and Garman 2009; Gassmann and Enkel 2004).

To understand the underlying mechanisms and the implementation of strategies in the open innovation context, Möslein and Bansemir (2011), describes three types of innovators, their functions and five tools that may foster open innovation.

Regarding future perspectives, 'the era of open innovation has just began' (Gassman et al. 2010, p. 214) and many aspects must be examined to face the challenges and opportunities in the open innovation era. For instance, even small and medium-sized corporations (SMEs) are opening their innovation processes and technology development is taking place in collaborations as a result of complex technologies and a combination of technological developments and know-how (Gassman et al. 2010).

1.2 Collaborative Arrangements

Collaborative arrangements, such as a research consortium, cross-border joint ventures, market information sharing agreements, co-development contracts, or clusters, are commonly used to provide flexibility in an entrepreneurial view of innovation and change (de Wit and Meyer 2005). In recent years, concepts not only concentrate on costs savings but on value creation through inter-organizational partnerships (Enkel 2010) as many prominent business examples show (Gassman et al. 2010). One special type of collaborative arrangement is the regional technology cluster (Schilling 2008). In general, clusters incorporate many firms that have a linkage to a common technology and consist of a group of suppliers, buyers, producers of complements, and research institutions (Schilling 2008).

Apart from the geographical aspect of clustering, empirical studies have identified characteristics of clustered innovative activities such as industry patterns (e.g., stage of industry cycle, transportation costs, availability of supplier), cultural context (e.g., labor population, customer intensity, infrastructure, research funds)

and the nature of the technology (e.g., knowledge base, patents or copyright, frequent interaction) (e.g., Schilling 2008). In particular, tacit and complex knowledge may demand frequent and close interaction and proximity to transfer knowledge which is one primary reason for the emergence of clusters (Schilling 2008).

One example of social innovation and interactive value creation is mentioned by Kopp (2011), Kopp describes the phenomenon Enterprise 2.0 and the strategic requirements for management regarding external knowledge of various different groups (open innovation) and internet-based methods to integrate information (interactive value creation), such as the information on customer needs.

1.3 Knowledge as Innovation and Knowledge as an Intangible Asset

Complex or tacit knowledge requires sharing interaction (e.g., Donaldson et al. 2011; McGee et al. 2005; Nonaka 1994; Schilling 2008). As an intangible asset (McGee et al. 2005), knowledge can be understood as both (1) an essential influence factor in collaborative innovation networks to share ideas and exchange with partners and stakeholders, and (2) an outcome of information exchange. Hence, knowledge creation as a part of knowledge management is of expanding interest in strategic management research and also in innovation management research. In the context of strategic management of innovation, knowledge can represent a part of the valuable resource base of an organization which results in competitive advantages (McGee et al. 2005) and knowledge can facilitate innovation diffusion (e.g., Rogers 2003; Theoharakis et al. 2007).

Moreover, knowledge, divided into information and know-how, is part of innovation management, for instance, in innovation marketing to plan and execute communication tools (Trommsdorff and Steinhoff 2007) and in formulating strategy on how to access external knowledge of innovation clusters (Dang et al. 2011). Thus, research in strategic management of innovation is concerned with knowledge as innovation and knowledge as an intangible asset.

Dang et al. (2011), state that technology intelligence (TI) activities facilitate open innovation in terms of systematic gathering of information regarding threats and opportunities of new developments in science and business. Thus, further investigations can lead to new approaches, strategies and management concepts to manage knowledge and the access to knowledge in innovation clusters.

1.4 Idea Management and Collective Idea Generation

Regarding an innovation funnel, empirical studies state that ‘only one out of several thousand ideas results in a successful product’ (Schilling 2008, p. 4; Baldegger 2008). As a starting point in an innovation process, idea management encompasses gathering ideas from internal and external sources, generating ideas in creative

processes, sharing ideas through interaction / dialogs in innovation communities via web forums (e.g., Jäger and Jäger 2011; Pricken 2009).

Jäger and Jäger (2011) mention that, linked to advanced web technologies, an emerging issue in idea management is the collective idea generation on web platforms through forums/communities (see also Brugger 2010; Raffel 2010).

For instance, the web platform Tchibo-ideas.de provides the opportunity for web users to post ideas, share ideas in a community and enrich existing ideas (Tchibo 2010). From a strategic perspective, idea management is a success factor because ideas can result in successful innovations (e.g., Schilling 2008). A systematic enriched idea collection can represent a valuable knowledge basis for organizations, for new product developments/marketing or patent management (e.g., Burr et al. 2007; Pricken 2009). Thus, in particular for web-based collective idea generation, new concepts and applications for efficient idea management have to be developed in research and practice.

1.5 Patent and License Management

To analyze the state-of-the-art of technology development, the history of technical patented aspects of the technology as well as their legal status is an essential prerequisite for innovation (e.g., Haxel 2002; de Passemar 1980). The patent information can be used for strategic planning processes in technology management (Ernst 2003) and for strategic management of intellectual property (Mittelstaedt 2009). A systematic, institutionalized, constant use of patent data in strategic decision-making may lead to the strategic value of patent information and can address two crucial recipients: (1) senior management in technology management and (2) external stakeholders (e.g., shareholder and analyst) to provide valuable information regarding the technology competence of an organization (Ernst 2003). In this context, the topic *strategies regarding patents related to business processes* is of expanding interest in science and business (Möhrle and Walter 2009); patent management has likewise attracted attention in business and science (Gassmann and Bader 2007). Related to open innovation, patent management can also focus on licensing strategies to exploit patents and make commercial use of innovation/technology developments under consideration of collaborative networks (Gassmann and Bader 2007).

Rohde et al. (2011) describes key learnings regarding the patent strategy for the high-tech innovation *ParcelRobot*, for instance, the impact of the patent strategy on the license contract.

1.6 Innovation Capability

In changing environmental conditions organizational resources and capabilities are one means for growth and renewal of corporations in the long run (e.g., Grant 2008; McGee et al. 2005; O'Conner et al. 2008). Research approaches seek to explain the

development and management of resources and capabilities (e.g., Grant 1991; Prahalad and Hamel 1990) as well as also the re-configuration, creation and extension of resources and capabilities through dynamic capabilities (e.g., Ambrosini and Bowman 2009; Teece 2007; Helfat et al. 2007). Related to strategic management of innovations, in both the literature and empirical research studies, innovative capability has been investigated to identify determinants, to develop new concepts, and to deduce managerial implications how to create, implement and manage the innovative capability (e.g., Guan and Ma 2003; Hottenrott and Peters 2009; O'Conner et al. 2008; Quintana-García and Benavides-Velasco 2004; Sher and Yang 2005; Zhao et al. 2005).

For instance Hülsmann et al. (2011) state that the cognitive diversity of top management teams has been identified as a competence-based driver for the innovative capability (see Hülsmann et al. 2011; in this book). Among others, agent-based models can be used to examine in more detail the questions of how and under which conditions diversity can be an enabler for innovative capability.

Moreover, Eppler and Hoffmann (2011), mention that the ability to innovate also encompasses the challenging aspect of developing new enterprise business models with the focus on changing processes of current business models, development processes of new business models and the visual solutions of strategic business model innovation (Fig. 1.1).

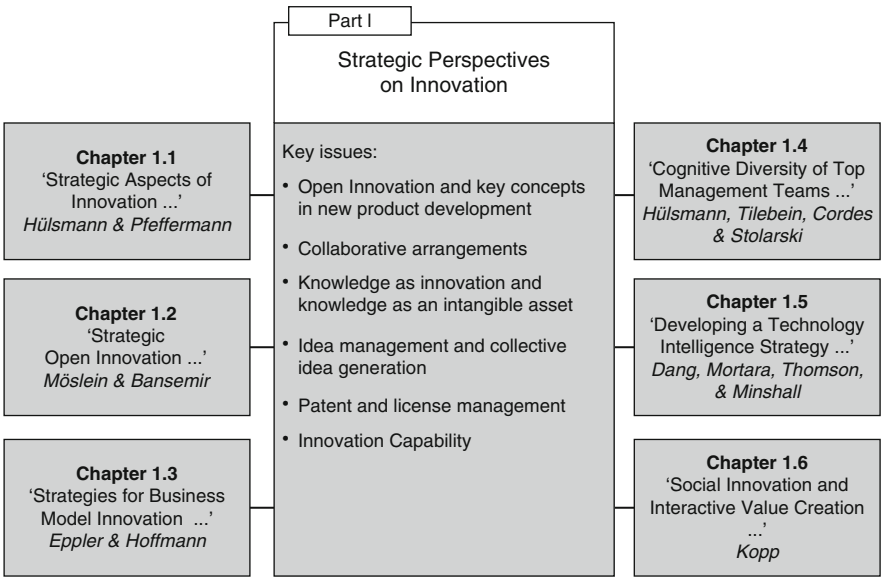


Fig. 1.1 Structure of part I 'Strategic perspectives on innovation'
Source: authors

Bibliography

Ambrosini, V. & Bowman, V. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, 11(1): 29–29.

Baldegger, R.J. (2008). *Entrepreneurial strategy and innovation*. Fribourg: Growth Publisher.

Brugger, J. (2010). Neue Wege im Ideenmanagement: Kollaborative Ideenentwicklung bei der Schweizerischen Post. *Ideenmanagement. Zeitschrift für Vorschlagswesen und Verbesserungsprozesse (Erich Schmidt Verlag)*, 3: 77–78.

Burr,W., Stephan, M., Soppe, B., & Weisheit, S. (2007). *Patentmanagement. Strategischer Einsatz und ökonomische Bewertung von technischen Schutzrechten*. Stuttgart: Schäffer-Poeschl.

Chesbrough, H.W. (2003). The era of open innovation. *MIT Sloan Management review*, 44(3): 35–41.

Chesbrough, H.W. (2006). Open Innovation: A New Paradigm for Understanding IndustrialInnovation. In H.W. Chesbrough; J. West, & W. Vanhaverbeke (Eds.), *Open Innovation:Researching a New Paradigm* (pp. 1–14). Oxford: Oxford University Press.

Chesbrough, H.W. & Garman, A.R. (2009). How Open Innovation can help you cope with lean times. *Harvard Business Review*, 87: 68–76.

Dang, R.J., Mortara, L., Thomson, R., & Minshall, T. (2011). Developing a Technology Intelligence Strategy to Access Knowledge of Innovation Clusters. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin: Springer.

Davenport, T.H., Leibold, M., & Voelpel, S. (Eds.) (2006). *Strategic Management in the Innovation Economy. Strategy Approaches and Tools for Dynamic Innovation Capabilities*.Erlangen: Publics Publishing and Wiley-VCH.

de Passemar, B. (1980). Patent information as a management tool. *World Patent Information*, 2: 67–68.

de Wit, B. & Meyer, R. (2005). *Strategy Synthesis: Resolving Strategy Paradoxes to Create Competitive Advantage*. (2nd ed.) London: Thomson Learning.

Donaldson, B., O-Toole, T., & Holden, M. (2011). A Relational Communication Strategy for Successful Collaborative Innovation in Business-To-Business Markets. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin: Springer.

Enkel, E. (2010) Attributes required for profiting from open innovation in networks. *International Journal of Technology Management* (in press).

Eppler, M.J. & Hoffmann, F. (2011). Strategies for Business Model Innovation – Challenges and Visual Solutions for Strategic Business Model Innovation. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin: Springer.

Ernst, H. (2003). Patent information for strategic technology management. *World Patent Information*, 25: 233–242.

Gassmann, O. & Enkel, E. (2004). Towards a theory of open innovation: three core process archetypes. *Proceedings of The R&D Management Conference*, Lisbon, Portugal, 6–9.

Gassmann, O. & Bader, M.A. (2007). *Patentmanagement. Innovation erfolgreich nutzen und schützen*. (2nd ed.) Berlin: Springer.

Gassmann, O., Enkel, E., & Chesbrough, H.W. (2010). The future of open innovation. *R&D Management*, 40(3): 213–221.

Grant, R.M. (1991). The resource-based theory of competitive advantage. Implications for strategy formulation. *California Management Review*, 33(3): 114–135.

Grant, R.M. (2008). *Contemporary strategy analysis* (6th ed.). Oxford: Blackwell.

Guan, J. & Ma, N. (2003). Innovative capability and export performance of Chinese firms. *Technovation*, 23: 737–747.

Haxel, C. (2002). Patent information at Henkel: from documentation and information to collaborative information commerce. *World Patent Information*, 24: 25–30.

Helfat, C.E., Finkelstein, C., Mitchell, W., Peteraf, M.A., Singh, H., Teece, D.J., & Winter, S.G. (2007). *Dynamic Capabilities: Understanding Strategic Change In Organizations*. Malden, MA: Blackwell.

Herzog, P. (2008). *Open and Closed Innovation: Different Cultures for Different Strategies*. Wiesbaden: Gabler.

Hottenrott, H. & Peters, B. (2009). Innovative capability and financing constraints for innovation more money, more innovation? *ZEW Discussion Papers 09-081*. Available at http://hdl.handle.net/10419/29637 [2010-08-01].

Hülsmann, M., Tilebein, M., Cordes, P., & Stolarski, V. (2011). Cognitive Diversity of Top Management Teams as a Competence-Based Driver of Innovation Capability. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin: Springer.

Jäger, H.-W. & Jäger, A. (2011). Communication Management via Web – The Web-based Tool *ICOM Compass*. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin: Springer.

Kopp, R. (2011). Social Innovation and Interactive Value Creation as Strategic Demand for Management. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin: Springer.

McGee, J., Thomas, H., & Wilson, D. (2005). *Strategy: analysis and practice*. New York: McGraw Hill.

Mittelstaedt, A. (2009). *Strategisches IP-Management – mehr als nur Patente Geistiges Eigentum schützen und als Wettbewerbsvorsprung nutzen*. Wiesbaden: Gabler Verlag.

Möhrle, M.G. & Walter, L. (Eds.) (2009). *Patentierung von Geschäftsprozessen. Monitoring - Strategien – Schutz*. Berlin: Springer.

Möslein, K.M. & Bansemir, B. (2011). Strategic Open Innovation: Basics, Actors, Tools and Tensions. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin: Springer.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1): 14–37.

O'Conner, G.C., Paulson, A.S., & DeMartino, R. (2008). Organisational approaches to building a radical innovation dynamic capability. *International Journal of Technology Management*, 44 (1/2): 179–204.

Prahalad, C.K. & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, 4/5: 79–91.

Prahalad, C.K. & Krishnan, M.S. (2008). *The New Age of Innovation: Driving Co-Created Value Through Global Networks*. New York: McGraw-Hill.

Pricken, M. (2009). *Clou : strategisches Ideenmanagement in Marketing, Werbung, Medien und Design; wie innovative Ideenschmieden die Alchemie der Kreativität nutzen*. Mainz: H. Schmidt.

Quintana-García, C. & Benavides-Velasco, C.A., (2004). Cooperation, competition, and innovative capability: a panel data of European dedicated biotechnology firms. *Technovation*, 24: 927–938.

Raffel G (2010). Ideenmanagement im Web 20 Ideenmanagement. Zeitschrift für Vorschlagswesen und Verbesserungsprozesse (Erich Schmidt Verlag), 2: 46–47.

Rogers, E.M. (2003). *Diffusion of Innovations* (5th ed.). New York: The Free Press.

Rohde, M., Pfeffermann, N., Echelmeyer, W., & Rasch, C. (2011). The High-Tech Innovation 'ParcelRobot' – Patent Strategy and Communication Tools. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations*. Berlin: Springer.

Schilling, M.A. (2008). *Strategic Management of Technological Innovation* (2nd ed.). New York: McGraw Hill.

Sher, P.J. & Yang, P.Y. (2005). The effects of innovative capabilities and R&D clustering on firm performance: the evidence of Taiwan's semiconductor industry. *Technovation*, 25: 33–43.

Tchibo (2010). Available at https://www.tchibo-ideas.de/ [2010-08-01]

Teece, D.J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13): 1319–1350.

Theoharakis, V., Vakratsas, D., & Wong, V. (2007). Market-level information and the diffusion of competing technologies: An exploratory analysis of the LAN industry. *Research Policy*, 36: 742–757.

Trommsdorff, V. & Steinhoff, F. (2007). *Innovationsmarketing*. München: Franz Vahlen.

von Hippel, E. (1988). *The Sources of Innovation*. Oxford: Oxford University.

von Hippel, E. (2005) *Democratizing Innovation*. Cambridge, MA: MIT.

Zhao, H., Tong, X, Wong, P.K., & Zhu, J. (2005). Types of technology sourcing and innovative capability: An exploratory study of Singapore manufacturing firms. *Journal of High Technology Management Research*, 16: 209–224.

Chapter 2
Strategic Open Innovation: Basics, Actors, Tools and Tensions

Kathrin M. Möslein and Bastian Bansemir

Contents

2.1 Towards Open Innovation

Many regard the phenomenon of open innovation across organizations as a fundamentally new paradigm, with enormous potential for single innovators, organizations or even economies. Henry Chesbrough (University of California, Berkeley) describes this kind of innovation in his influential book "Open Innovation: The new imperative for crating and profiting from technology" as a new paradigm for value creation and contrasts it with closed innovation, i.e. innovating in traditionally closed R&D departments (Chesbrough 2003). Others marginalize open innovation to a trend or see it even as a threat for both the innovator's intellectual property and the successful utilization of innovation as competitive advantage for the innovating organization.

However, the possibility to participate in the development of innovation has always been given. Innovators ever since participated in generating innovations

K.M. Möslein and B. Bansemir (✉)
Information Systems I – Innovation and Value Creation, Friedrich-Alexander-University Erlangen-Nuremberg, Lange Gasse 20, 90403 Nuremberg, Germany
e-mail: kathrin.moeslein@wiso.uni-erlangen.de, bastian.bansemir@wiso.uni-erlangen.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, DOI 10.1007/978-3-642-17223-6_2,

Table 2.1 The BMW speedster story: innovation by cooperation with outside innovators

The automobile K'67 at the Bayer stand at the International Trade Fair for Plastics 1967 in Dusseldorf was completely constructed out of plastics (. . .). The engine, gear and wheels were the only parts made out of metal.
K'67 (. . .) was the result of a close collaboration over several years among various organizations. Since 1963 the former organizations Gugelot Design GmbH, Waggon- and Maschinenbau AG and Bayerische Motorenwerke AG (BMW) were trying to build a solid chassis out of plastics for a BMW roadster. A solution was only at hand, as Bayer application engineers recommended a polyurethane-sandwich-construction method for constructing the lower segment. In Spring 1967, this segment was presented at the Hannover Messe (German Industrial Trade Fair) for the very first time (Verg et al. 1988: 430).

beyond organizational boundaries, as evident in the following example of the development of an automobile, entirely made out of plastics (see Table 2.1).

Already during developing the roadster concept, participating organizations relied on the opportunities of collaborative work. But essential challenges, especially the construction of a plastic chassis, could not be fulfilled. Only the collaboration with Bayer and the utilization of a special construction method made it possible to build the K'67. This example shows that integrating outside innovators in innovation processes are practiced for a long time, not only since Chesbrough coined the term open innovation.

So, what lies behind the concept of open innovation and the often proclaimed change in paradigms? What role do different types of innovators play? And finally, how can different types of innovators be strategically integrated? This article aims at giving answers to these questions. It explains the underlying mechanisms of open innovation, discusses different types of involved participants, presents main tools and identifies possible conflicts. Strategies for executives are given as well as starting points for researchers.

2.2 Basic Perspectives

To facilitate open innovation activities multifaceted tools in the form of *Web 2.0* and *social software supported innovation platforms* are applied. InnoCentive (http://www.innocentive.com), NineSigma (http://www.ninesigma.com), IdeaCrossing (http://www.ideacrossing.org), IdeaConnection (http://www.ideaconnection.com) or CrowdSpirit (http://www.crowdspirit.com) are renowned representatives. Other examples include *firm sponsored innovation platforms*, for instance Connect and Develop by Procter & Gamble (http://www.pgconnectdevelop.com), InnovationJam by IBM (http://www.collaborationjam.com), IdeaStorm by Dell (http://www.dellideastorm.com), Factory-Concept by LEGO (http://www.factory.lego.com), SPORE by Audi (http://microsites.audi.com/ea_spore_onlinespecial) or Virtual Innovation Agency by BMW (http://www.bmwgroup.com/via/). These examples already comprise a large variety of different kinds of innovation tools,

complexity degrees, differentiation necessities, supplied features and realizations. To get a deeper understanding of key concepts, it is worth getting a deeper and richer understanding on open innovation.

Today, literature confronts us with basically two different perspectives on open innovation in literature exist. First, inspired by the open source world of software development, open innovation is seen as an emerging phenomenon of largely self-organized and self-motivated, internet-based, dispersed and collaborative development and implementation of innovations. It centers on independent participants and emphasizes interactive collaboration and coordination of various innovators. It even neglects the role of organizations to coordinate joint activities. Eric von Hippel (MIT in Cambridge) even postulates in his visionary deliberations that organizations as institutions and the importance of management for implementation of innovations could become obsolete at all (von Hippel 2005). Put into perspective, his concept of "democratizing innovation" outlines one possible extreme. This perspective of dissolving organizations is inspiring and brakes with established thinking, but is yet fictive. In contrast, we still observe that new organizations emerge out of decentralized innovative activities, or established organizations utilize these activities, if not even incorporate them. Dissolving organizations or innovation departments are not yet impending, though open innovation fosters dissolving of closure of strict inner and outer organizational boundaries.

Second, Chesbrough describes open innovation as an antithesis of often hermetically separated R&D departments, the so called "closed innovation". Traditionally, organizations bundle innovation activities in these departments, employ highly educated experts, entrust them with sophisticated innovation tasks, protect their intellectual property and scarcely participate in external innovation activities at the same time (Chesbrough 2006). Going in hand with professionalization of functional organizational departments, a general preference to internal expertise and solutions, a distinctive "not-invented-here" mentality towards external stimuli and an obvious seclusion have evolved and amplified themselves in a "vicious circle". This way of innovating is increasingly challenged by possibilities to not only create, but also to search for, find, develop and exchange ideas, concepts and innovations in vast areas of concern. In addition, Web 2.0 and social software enables to collectively evaluate, select, if not even implement and merchandize at global range.

Both outlined key perspectives have become reality in global innovation activities (1) emergent open innovation as the phenomenon of a largely self-organized and self-motivated, internet-based, dispersed and collaborative development and implementation of innovation and (2) firm-sponsored open innovation as a strategic process of opening up innovation activities across organizational boundaries (Möslein 2009).

> Reichwald and Piller combine both perspectives and define open innovation as "[. . .] a multi-level and open search and solve process, which spans across organizational boundaries to include multiple innovators" (Reichwald and Piller 2006; translated by authors).

Following this paradigm, organizations tend to integrate external experts, purposefully allow internal innovators to participate in external innovation activities,

Table 2.2 The Apple iPod story: System innovation by integration of outside and core inside innovators

"(. . .) The iPod originated around a business idea dreamed up by Tony Fadell, an independent contractor and hardware expert who helped to develop handheld devices at General Magic and Philips. 'Tony's idea was to take an MP3 player, build a Napster music sale service to complement it, and build a company around it' Knauss [Editor's note: Knauss has been a close companion to Fadell] said (. . .) Fadell left Philips and set himself up as an independent contractor to shop the idea around".
Apple hired Fadell in early 2001 and assigned him a team of about 30 people. (. . .) Fadell said, "This is the project that's going to remold Apple and 10 years from now, it's going to be a music business, not a computer business". Tony had an idea for a business process and Apple is transforming itself on his whim and an idea he had a few years ago.
Fadell was familiar with PortalPlayer's [Editor's note: At the time PortalPlayer was a cooperation partner of Apple] reference designs for a couple of MP3 players, including one about the size of a cigarette packet. And though the design was unfinished, several prototypes had been built. "It was fairly ugly", he said. "It looked like an FM radio with a bunch of buttons". The interface, Knauss said, "was typical of an interface done by hardware guys".
"(PortalPlayer) was attractive to Apple because we had an operating system", said Knauss. "That was a real selling point for Apple. We had the software and the hardware already done, and Apple was on a tight schedule".
Knauss said the reference design was about 80 percent complete when Apple came calling. For example, the prototype would not support playlists longer than 10 songs. "Most of the time building the iPod was spent finishing our product" Knauss said. At the time, PortalPlayer had 12 customers designing MP3 players based on the company's reference design. Most were Asian hardware manufacturers, Knauss said, but also included Teac and IBM.
Big Blue planned a small, black MP3 player, based on the company's own mini hard drives, which featured a unique circular screen and wireless Bluetooth headphones. "The design for IBM was a lot sexier", Knauss said (Kahney 2004).

communicate internal innovation projects at early stage, or try to initiate common innovation projects with customers, suppliers, or even competitors. This is not only true for product, process or organizational innovations, but to a similar extent for innovations in services, systems and even strategies.

On the one hand, Apple employed Tony Fadell as project manager and thus bought in his expertise, on the other hand, Apple relied on components largely developed by external innovation partners to launch the iPod. As the development of Apples iPod illustrates, there is already a tendency in industry to open up innovation processes towards services, systems and even strategies (Table 2.2).

2.3 Actors in Open Innovation

Organizations that open up their innovation processes beyond organizational R&D departments, try to integrate external experts like customers, suppliers, value partners, members of universities or research institutions. Besides the *core inside innovators*, who innovate by "job specification" or "per definitionem", and *outside innovators*, who are incorporated from outside the organizational boundaries, there is another group of innovators essential for the innovation success: *peripheral*

Table 2.3 The bubblegum story: Innovation by inclusion of peripheral inside innovators

"In 1928, bubblegum was invented by a man named Walter E. Diemer. Here's what Walter Diemer, the inventor himself, said about it just a year or two before he died: 'It was an accident'. 'I was doing something else', Mr. Diemer explained, 'and ended up with something with bubbles'. And history took one giant pop forward. What Mr. Diemer was supposed to be doing, back in 1928, was working as an accountant for the Fleer Chewing Gum Company in Philadelphia; what he wound up doing in his spare time was playing around with new gum recipes. But this latest brew of Walter Diemer's was – unexpectedly, crucially – different. It was less sticky than regular chewing gum. It also stretched more easily. Walter Diemer, 23 years old, saw the bubbles. He saw the possibilities. One day he carried a 5-pound glop of the stuff to a grocery store; it sold out in a single afternoon".
Before long, the folks at Fleer were marketing Diemer's creation and Diemer himself was teaching cheeky salesmen to blow bubbles, to demonstrate exactly what made this gum different from all other gums. The only food coloring in the factory was pink. Walter used it. That is why most bubblegum today is pink.
Gilbert Mustin, President of Fleer named the gum Dubble Bubble and it controlled the bubblegum market unchallenged for years, at least until Bazooka came along to share the wealth. Walter Diemer stayed with Fleer for decades, eventually becoming a senior vice president.
He never received royalties for his invention, his wife told the newspapers, but he did not seem to mind; knowing what he had created was reward enough. Sometimes he would invite a bunch of kids to the house and tell them the story of his wonderful, accidental invention. Then he would hold bubble-blowing contests for them (http://www.ideafinder.com).

inside innovators. These are employees within the organization who are not directly involved in the innovation process of their organizations by job description or formal role, but nevertheless have enough information about needs and solutions to act as innovators. They innovate mainly due to confidence, curiosity, proactivity and interest in the well-being of the organization.

The story of the bubblegum in 1928 shows that peripheral inside innovators ever since participated in innovation activities. Walter Diemer did not actually work as an innovator, but as ordinary accountant. In his spare time he experimented with new chewing gum recipe. In 1928, bubblegum was launched and grew to global success. The bubblegum story shows that not only externals provide valuable input as innovators because of their enhanced knowledge in regard to needs and user information. In addition peripheral inside innovators show extraordinary engagement and motivation for innovating. To conclude integrating this type of innovators seems especially fruitful, as they know the organization's products, processes, services and strategies, feel obliged to the company and have an undisguised perspective such as externals (Table 2.3).

If organizations open up innovation processes and extend their focus from internal core inside innovators (closed innovation) towards outside innovators (open innovation), dealing with the group of peripheral inside innovators becomes vital for innovative success (Neyer et al. 2009). Table 2.4 provides an overview of the three essential types of actors in open innovation.

All three types of innovators play a crucial role in innovation processes:

Core inside innovators are by definition entrusted with developing new products, processes, services and strategies. We find that the vast majority of business offerings stem from inventing, discovering and developing capacity of this type

Table 2.4 Three types of innovators in open innovation

Type of innovator	Origin	References
Core inside innovators	Employees of R&D-department and strategic innovation	Schumpeter (1934), Vissers and Dankbaar (2002), Wheelwright and Clark (1992)
Peripheral inside innovators	Employees in the depth of the corporation	Berger et al. (2005), Huff et al. (2006), Neyer et al. (2009), Robinson and Stern (1998)
Outside innovators	Customers, Suppliers, Value Chain Partners, Universities, Institutional Research Departments	Henkel and von Hippel (2005), Piller (2005), Reichwald and Piller (2006), von Hippel (1978, 1986, 2005)

of innovators. Designers, researchers, developers and innovators of the marketing, business operations or corporate strategy department usually belong to this group. Whilst organizational R&D departments, widely organized as closed departments used to be the "holy heart" of organizations, they open up ever more.

Outside innovators largely comprise customers, suppliers and value chain partners, as well as university members and research institutes, or even competitors. Within the strategy of open innovation, organizations implement manifold methods and tools to integrate outside innovators. E.g. innovation toolkits, innovation contests or open innovation communities are frequently used. Often, the greater public is inspired, motivated or even explicitly invited to participate.

Peripheral inside innovators innovated ever since based on self-motivation, engagement and confidence, but are often not or only scarcely supported by tools. Idea management systems still prevail in companies as a main mechanism to integrate peripheral inside innovators. Although modern versions are available, they are usually not yet well integrated in organizational innovation strategies (Bansemir and Neyer 2009).

The fact that even today all three types of innovators have not yet been incorporated into an integrated innovation strategy and are not supported by integrated tools and platforms poses essential constraints for the innovation capacity of organizations. As early as in 1984, Robert Rosenfeld, founder of the office of innovation at Kodak, is cited with the following words: "The failure of large organizations in America to innovate is primarily the result of a communication gap, not a decline in ingenuity" (Rosenfeld and Servo 1984). Despite a dramatically grown variety of communication technologies (mainly enabled by Web 2.0 and social software) and innovation tools, this problem rather intensifies than declines because of increasing specialization (Möslein 2005). In the following, we introduce a set of five classes of tools to strategically implement open innovation.

2.4 Tools for Open Innovation

Tools that support innovation activities are widely known and increasingly used. We discuss five classes of tools, which support and promote open innovation (1) innovation contests, (2) innovation markets, (3) innovation communities,

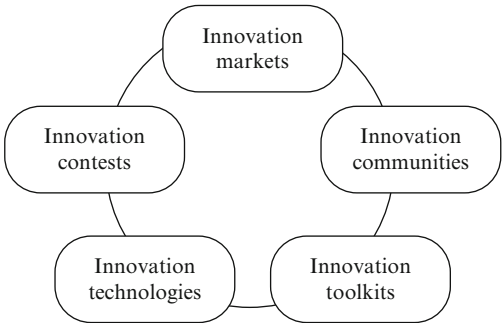


Fig. 2.1 Five classes of tools for open innovation

(4) innovation toolkits and (5) innovation technologies. Creation, enhancement and distribution of innovation tools is mainly enabled by Web 2.0 and social software features (Koch et al. 2009). In the following, each tool is introduced and illustrated by short examples. Well established tools which specifically refer to innovation activities *within* organizations (e.g. computer aided design (CAD) used by engineers etc.) are excluded (Fig. 2.1).

2.4.1 Innovation Contests

Innovation contests call for a solutions competition for clearly defined innovation challenges. Best solutions are awarded with announced prices. Already in 1714, the British Empire announced the so called "longitude prize" for an innovative method to calculate the exact longitude position. The awarded prize varied according to the solution's precision. Also Napoleon used an innovation contest to search for a durable and cheap substitute for butter, and finally margarine was invented. So, what is actually new and what turns innovation contests to an important tool for open innovation? Social software features and Web 2.0 enable a multitude of actors to announce contests for exciting innovation challenges, with global reach at minimal costs. To ensure success, broad attention and recognition is a prerequisite to motivate potential innovators. Web 2.0 provides suitable and effective functionalities for this purpose, which allows organizations to use innovation contest as an open innovation tool.

Innovation contests are implemented in great variety. The continuum of different contests starts with idea und design contests to contests targeting at marketable innovations (Walcher 2007). However, not only product and process innovations, but also organizational, marketing and business model innovations are announced. Formulating the innovation problem, which is to solve, is crucial to innovation contests. One main question that arises is, how does an organization formulate its innovation problem in such a way that the description motivates competent

innovators to participate, does not reveal own competence deficits or strategic information, but still is concrete enough to deliver a relevant contribution for own innovation activities? To answer this question, experience is the best guide.

2.4.2 Innovation Markets

Innovation markets are virtual places, bringing together supply and demand on innovation purposes. In general, they are realized as Web 2.0 supported platforms, on which innovation seekers (typically organizations) announce innovation problems and innovation providers propose concrete solutions or concepts (typically single or team innovators). Innovation markets act as intermediaries, connecting innovation seekers and innovation providers. A growing number of innovation markets are available for organizations for announcing innovation challenges.

One renowned and well established innovation market is Innocentive. It was founded in 2001 by Eli Lilly and declares itself as "the world's first open innovation marketplace" (http://www.innocentive.com). It originally focused on innovations in the chemical industry. Today, Innocentive serves organizations in more than 40 industries and 175 countries, across various industry sectors with more than 165,000 outside innovators. Organizations award successful innovation solutions with $5,000 to $1,000,000.

Other examples of innovation markets are NineSigma (http://www.ninesigma.com), Innovation Exchange (http://www.innovationexchange.com), Atizo (http://www.atizo.com) or Battle of Concepts (http://www.battleofconcepts.nl). Whilst these markets focus on organizations publishing innovation problems, e.g. Planet Eureka (http://www.planeteureka.com) establishes a provider-driven innovation market. Solution providers get the possibility to look for both a suitable problem and a possible purchaser for their innovative solution. Organizations directly search for promising innovative concepts; an approach especially attracting small and medium-sized organizations. Besides, other forms of innovation markets arise, which are lead by community principles. Such platforms are e.g. FellowForce (http://www.fellowforce.com) or Brainfloor (http://www.brainfloor.com).

2.4.3 Innovation Communities

Innovation communities enable innovators to collectively share and develop ideas, discuss concepts and promote innovations. Web 2.0 and social software based innovation communities normally bundle interested and specialized innovators for particular issues and thus support collective development and enhancement of innovation concepts. They originate from grouping together voluntarily and independently to create innovative solutions in a joint effort, embracing a family-like spirit. Open source communities are typical examples. Great success of these

communities led to a growing number of issue-related communities in various industry sectors.

One interesting example of an innovative, self-organized and internet-based innovation community can be seen in the project *OScar* (http://www.theoscarproject.org): "The idea behind the OScar project is simple: A community of people virtually plans and develops a new car. The idea is about the goal to develop a simple and innovative car, but also about the way how this goal is achieved. We would like to convey the idea of open source to "hardware" and we want *OScar* to be the precursor for many different projects in this field". The project was launched in 1999 on the basis of a published manifesto: "To built a car [...] without any factory, any CEO, any funds, any boundaries, [...] but instead with the support of lots of creative people in the Web [...] with a global spirit of optimism, [...] representing absolute empowerment. Altogether, this meant to face huge challenges and to use "the tool" internet in its essential sense".

Organizations discover innovation communities as a tool for creating innovations. Organizationally funded innovation communities increasingly replace originally emergent and self-organized innovation communities. One example of such an innovation community is the *Apple Developer Connection* (developer.apple.com). It invites innovators to develop applications, offers and solutions around Apple products. What makes this community special is that external enthusiasts do not contribute free of cost. In fact, there are different levels of community memberships, which imply different subscription fees. E.g. the premium membership reaches an annual subscription of $3,500. Apple's innovation community is not only a tool for creating innovations, but also a business model for increasing revenues. Developing strategies for the successful integration of innovation communities is a crucial challenge.

2.4.4 Innovations Toolkits

Innovation toolkits provide an environment in which users develop solutions step-by-step. Internet-based innovation toolkits give various externals, even without specific qualifications, the opportunity to participate in structured innovation activities. Users' creativity is stimulated by restricting the accepted solutions space and therefore stimulating trial-and-error.

Reichwald and Piller (Reichwald and Piller 2006) differentiate three types of toolkits which differ in their strategic targets, design principles and users. *Toolkits for user innovation* support the generation of innovation ideas, using a "chemistry set" to enable complete trail-and-error cycles, featuring great solution space with high costs of usage. *Toolkits for idea transfer* foster application of existing ideas in a new context, applying "black boards" with unlimited solution space and low costs of usage. In contrast to the next toolkit type, the before mentioned focus on lead users. *Toolkits for user co-design* perform product configurations, using a restricted solution space by

technical restrictions and standardized modules and are mostly used as a selling tool to attract customers of all kinds (Reichwald and Piller 2006: 167).

Regardless of specific configurations, toolkit-based innovation essentially needs feedback (either by the system or by users), simulates possible solutions (regarding design, performance and costs) and fosters the quest for solutions. The core challenge in configuring innovation toolkits is to define the degrees of freedom.

2.4.5 Innovation Technologies

Innovation technologies enable to progress from concept level of a (product) innovation to manufacturing. All innovation technologies that support the steps of prototyping and implementation are comprised in this tool class. No specific qualifications are needed to profit from these technologies. Examples include 3D-scanners, 3D-printers or laser cutters. These technologies are associated with the prospect of an ongoing democratization of innovation activities and with the often proclaimed trend towards "personal fabrication".

Whilst in programming of open source software programmers globally cooperate on their software code, innovation technologies enable to collectively and globally develop intangible specifications for real products, services, and solutions. Two-dimensional software controlled cutting with CNC-cutters allows creating fascinating designs for furniture, fitments and accessories (cf. http://www.ronen-kadushin.com or http://www.movisi.com). 3D-printers (i.e. printers that create three-dimensional objects out of plastic powder under CNC-control) allow a fast and immediate construction of prototypes during development and thus enable the so called "rapid prototyping". They also enable individuals or organizations to design and produce customized products instantly. Innovators envision first to design and specify three-dimensional models of innovations and second to order these directly from their household computers. Prospective visionaries like Neil Gershenfeld (MIT Media Lab) anticipated this trend when writing about "personal manufacturing" or "personal fabrication" (Gershenfeld 2005).

Indeed, this vision has partially become true: The internet company Ponoko (http://www.ponoko.com) offers the possibility to create, manufacture and finally distribute manifold design concepts. With the help of Ponoko, basically everybody can become a competitor to, e.g. IKEA. These innovation technologies are at the very beginning to become technologies for open innovation.

2.5 Tensions of Open Innovation

All presented tools for open innovation include four common and novel effects. They allow a *large number of innovators* to participate, enable these innovators to collaborate in *spacious extent*, *accelerate interactions* and provide a *global memory* for innovators.

These four effects clearly facilitate collaboration across organizational boundaries and symbolize new opportunities to create innovations. Additionally, the five innovation tools open up spaces for novel strategies, which integrate the three internal and outside types of innovators. To make full use of the potential of integrating the three types of innovators, using the five tools, strategic decisions on the following continua have to be made. These decisions ensure that open innovation is used in a strategic way and enhances the innovation capacity and therefore secures competitive advantage. The dualities comprise single versus team innovators, local versus global range, evolution versus revolution and closed versus open (Fig. 2.2).

Single versus team innovators: The existing conflict between individual and team innovation is intensified in open innovation. Additional and globally dispersed innovators (individuals as well as teams) are integrated in organizational innovation activities. Furthermore, the community of innovators, as an increasingly internet-based innovative community, reaches a more and more dominant status in open innovation. However, a loose interconnection of individuals and groups of individuals established to be common in innovation activities across boundaries of organizational units and organizations as a whole.

Local versus global range: The question between local pooling versus global dispersion of innovation activities was long regarded as an "either–or" question. Several successful cases clearly proof that prerequisites are given to bundle and complementarily combine global creativity and innovation potential of many dispersed participants with local strengths. This step is enabled by the presented tools. However, handling these tools successfully and to gain competitive advantage remains as a core challenge for strategy and management.

Evolution versus revolution: Whilst the opinion prevailed for a long time that outside innovators could only contribute to continuous (evolutionary) innovations, many examples show that they support both continuous and discontinuous (revolutionary) innovations. Organizations have to deal with the predominant challenge of how to design, implement and strategically incorporate open innovation.

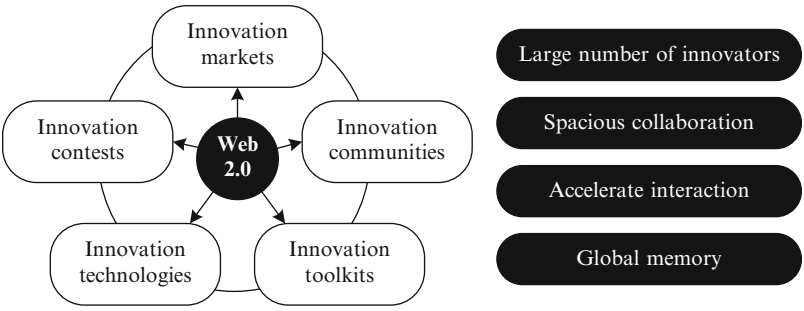


Fig. 2.2 Five tools of open innovation and their main effects

Closed versus open: Besides opportunities to reshape innovation activities, organizations have to face challenges to strategically handle arising conflicts between closed and open innovation. One main challenge lies in the decision, whether to open innovation activities partially or totally, replacing closed innovation with open innovation. Balanced strategies are needed that combine the advantages of opening innovation activities with the strengths of cohesive R&D departments. This decision has to be integrated with the organization's strategy.

The development story of Apple's iPod in combination with iTunes is an impressive example of discontinuous innovation that influences individual as well as affects existing boundaries of business sectors or even changes economic rules of whole industries. It is also a perfect example of successfully and strategically combining open and closed innovation in an overall corporate innovation strategy.

Bibliography

Bansemir, B. & Neyer, A.-K. (2009). From idea management systems to interactive innovation management systems: Designing for interaction and knowledge exchange. In Hansen, H., Karagiannis, D. & Fill, H. (Ed.), *Business Services: Konzepte, Technologien, Anwendungen* (pp. 861–870). Wien: OCG.

Berger, C., Möslein, K., Piller, F. & Reichwald, R. (2005). Co-designing modes of cooperation at the customer interface: learning from exploratory research. *European Management Review*, 5 (2), 70–87.

Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.

Chesbrough, H.W. (2006). *Open Business Models: How to Thrive in the New Innovation Landscape*, Boston: Harvard Business School Press.

Gershenfeld, N. (2005). *FAB – The Coming Revolution on Your Desktop – From Personal Computers to Personal Fabrication*. Cambridge: Basic Books.

Henkel, J. & von Hippel, E. (2005). Welfare implications of user innovation. *Journal of Technology Transfer*, 30 (1–2), 73–88.

Huff, A., Fredberg, T., Möslein, K. & Piller, F. (2006). Leading Open Innovation: Creating Centripetal Innovation Capacity. *AOM Presenter Symposium Paper,* Atlanta.

Kahney, L. (2004). Inside Look at Birth of the IPod. *Wired*, 21st April 2004.

Koch, M., Bullinger, A. & Möslein, K. (2009). Social Software für Open Innovation – Die Integration interner und externer Innovatoren. In Zerfaß, A. & Möslein, K. (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement* (pp. 161–178). Wiesbaden: Gabler.

Möslein, K. (2005). *Der Markt für Managementwissen – Wissensgenerierung im Zusammenspiel von Wirtschaftswissenschaft und Wirtschaftspraxis*. Wiesbaden: Gabler.

Möslein, K. (2009). Innovation als Treiber des Unternehmenserfolgs – Herausforderungen im Zeitalter der Open Innovation. In Zerfaß, A. & Möslein, K. (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement* (pp. 5–24). Wiesbaden: Gabler.

Neyer, A.-K., Bullinger, A. & Möslein, K. (2009). Integrating inside and outside innovattors: a sociotechnical perspective. *R&D Management,* 39 (4), 410–419.

Piller, F. (2005). *Innovation and Value Co-Creation: Integrating Customers in the Innovation Process*. München.

Reichwald, R. & Piller, F. (2006). *Interaktive Wertschöpfung – Open Innovation, Individualisierung und neue Formen der Arbeitsteilung*. Wiesbaden: Gabler.

Robinson, A. & Stern, S. (1998). *Corporate Creativity*. San Francisco: Berrett-Koehler.

Rosenfeld, R. & Servo J. (1984). Business and Creativity. *The Futurist*, August 1984, 21–26.
Schumpeter, J. (1934). *The Theory of Economic Development*. Cambridge: Harvard University Press.
Verg, E., Plumpe, G. & Schultheis, H. (1988). *Meilensteine – 125 Jahre Bayer: 1863-1988*. Leverkusen.
Vissers, G. & Dankbaar, B. (2002). Creativity in Multidisciplinary New Product Development Teams. *Creativity and Innovation Management*, 11 (1), 31–42.
von Hippel, E. (1978). A customer active paradigm for industrial product idea generation. *Research Policy*, 7 (3), 240–266.
von Hippel, E. (1986). Lead users: a source of novel product concepts. *Management Science*, 32 (7), 791–805.
von Hippel, E. (2005). *Democratizing Innovation*. Cambridge: MIT Press.
Walcher, D. (2007). *Der Ideenwettbewerb als Methode der aktiven Kundenintegration*. Wiesbaden: Gabler.
Wheelwright, S. & Clark, K. (1992). *Revolutionizing Product Development: Quantum Leaps in Speed, Efficiency, and Quality*. New York: Free.
Zerfaß, A. & Möslein, K. (2009). *Kommunikation als Erfolgsfaktor im Innovationsmanagement*. Wiesbaden: Gabler.

Chapter 3
Challenges and Visual Solutions for Strategic Business Model Innovation

Martin J. Eppler and Friederike Hoffmann

Contents

3.1 Introduction

The innovation of business models is one of today's most challenging tasks for managers (Chesbrough 2006; Christensen and Raynor 2000) as both rapid technological and environmental changes proceed (Johnson et al. 2008). Nevertheless, anecdotal evidence suggests that business model innovation is not yet treated systematically, but often happens by chance or not at all. While innovation is on the strategic agenda of most firms today, which have extended their resources and strategic efforts to foster innovation by exploring new technologies and business services or processes (Dougherty 1992), many organizations have shown limited abilities to innovate their business models (Chesbrough 2010).

The risks and costs associated with changing the current business model places the task for innovation at top-management and strategic units (Peterovic et al. 2001). Aiming at changes to the core of a company's value proposition, business model innovation affects and concerns various, if not all stakeholders inside as well

M.J. Eppler and F. Hoffmann (✉)
mcm – Institute for Media and Communication Management, Universität St. Gallen, Blumenbergplatz 9, 9000 St. Gallen, Switzerland
e-mail: martin.eppler@unisg.ch, friederike.hoffmann@unisg.ch

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_3,

as outside the firm. Among the challenges to be met by the development team are the needs to collect, process and distribute information, structure an inclusive and creative process to develop a new business model, while being under both time and economic pressure.

Furthermore, relatively little is known about how new business models are developed. The few existing studies on business model innovation were conducted ex post, as for example the study of Hilti's business model innovation (Johnson et al. 2008; Meehan and Baschera 2002). Considering the high risk that business model innovation poses to the survival of a firm, other researchers have suggested to develop scenarios in order to explore the feasibility of new business model options (Jonda 2007; Pateli and Giaglis 2005).

So far, no sufficient method for business model innovation has been developed. Nevertheless, first approaches are proposed. Chesbrough (2010) suggests that "experimentation" in existing firms with new business models is the key to gain sufficient data to decide upon the most successful option for a functional new business model, while Voelpel et al. (2005) see the need for "sensing" customer needs and business model requirements. Thus, a business model innovation development procedure needs to offer means to change the current business model, while at the same time minimize the risks of failure through testing new business model prototypes.

We believe that two issues are key for business model innovation as a management and communication process: first, the challenges a firm faces need to be identified and second, the challenges should be targeted with visual solutions in order to develop new business model ideas. This chapter identifies in a first step challenges for business model innovation and second, visual solutions from the existing literature, therewith combining two literature streams towards a systematic process of business model innovation. We suggest the development of visual solutions, as visualization facilitates knowledge creation and transfer, structures knowledge and team processes and thus can facilitate innovation.

In contrast to our approach in this chapter, extant research focuses only on establishing a common business model definition, evaluating business model components and identifying business model types and typologies. Disagreement exists among scholars on whether business models are to be understood mainly as method, process or strategy (Lambert 2006; Osterwalder and Pigneur 2002; Pateli and Giaglis 2004). We follow Magretta (2002), who argues that business models describe how the pieces of a business fit together by telling a story that explains how an enterprise works, and should not be confused with the above stated terms (Magretta 2002). A business model does not fix the strategy for achieving the business goals, nor does it explicitly provide how the model may be implemented. As a working definition, we follow the comprehensive definition provided by Osterwalder et al. (2005):

> A Business Model is a conceptual tool that contains a set of elements and their relationships and allows expressing the business logic of a specific firm. In a description of the value a company offers [. . .] to customers and of the architecture of the firm and its network of partners for creating, marketing, and delivering this value and relationship capital, to generate [. . .] revenue streams.

As business model innovation has not been defined in the literature, we refer to it based on our business model definition and in analogy to the highly recognized innovation definition by Baregheh et al. (2009) "Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace" (Baregheh et al. 2009).

Hence, *business model innovation is a multi-stage process whereby organizations transform new ideas into improved business models in order to advance, compete and differentiate themselves successfully in their marketplace*.

In the next section we outline is the difficulties firms encounter when aiming to change their business model.

3.2 Business Model Innovation Challenges

Every firm faces well-analyzed external environmental challenges relevant to its business model, as illustrated in Porter's Five Forces framework (Porter 1985). While these challenges often initially induce the need to innovate the current business model of a firm, there are many important internal challenges to innovation that need to be considered as well. In the following, we develop an inventory of internal challenges firms face when attempting to find new business models.

Chesbrough (2010) focuses on two main challenges to business model innovation, which we continue to use for our analysis: confusion of what the right business model may be, which he refers to as cognitive challenges, and obstruction by the firms internal structures and processes, which we refer to as organizational challenges. These two main challenges to business model innovation may also be described as barriers to innovation, which are "conflicts with existing assets and business models, as well as cognition in understanding these barriers" (Chesbrough 2010).

For an initial list of business model challenges, we have analyzed the literature on business model innovation, on innovation processes in firms, as well as on knowledge creation and problem solving in groups. We have then matched the challenges with potential visual solutions, which we have identified in previous research as being essential to facilitate innovation in organizations. We continue by introducing three cognitive and three organizational challenges.

3.2.1 Cognitive Challenges

The cognitive challenges we have identified are based on the individual level and fall into three main themes: challenges based on the complexity of the task, the existing dominant logic, and the knowledge required.

The first challenge for business model innovation we address is its complexity (Damanpour 1996; Lundberg and Richards 1972). The complexity of the task of

mastering business model innovation is expressed by the uncertainty of the innovation process itself (Doganova and Eyquem-Renault 2009; Garud and Karnoe 2003), and is especially overwhelming when carefully assessing and understanding the firms current business model (Erikkson and Penker 2000; Malhotra 2000; Osterwalder and Pigneur 2002; Pateli and Giaglis 2005), which is one of the prerequisites of business model innovation. Complexity usually arises when many elements, which are interrelated in an intransparent manner, need to be considered. This is given for business model innovation, as market forces and internal developments are not always inter-related in an easily discernable fashion.

For some researchers, the major obstacle to business model innovation is the *dominant logic of a firm* (Chesbrough and Rosenbloom 2002), which is "the way in which managers [in a firm] conceptualize the business and make critical resource allocations decisions" (Prahalad and Bettis 1986). The logic is stored via shared schemas, cognitive maps, mind sets as well as belief structures, and frames of reference; and is determined by the managers' previous experiences. Managers appear to focus on data relevant for the dominant logic; however, if the task is to change the dominant logic of doing business by developing a new business model, the dominant logic may pose a serious obstacle to innovation. Hence, the dominant logic filters out ideas that are not conform to the dominant logic. Chesbrough (2006) refers to the dominant logic in his work as "bias of the current business model". The dominant logic is also described as path-dependency (Coombs and Hull 1998) or the need to change a company's mindset (Wall et al. 2007). Furthermore, the dominant logic is understood as circular logic, as the logic influences actions, and the result of the actions shapes the dominant logic through feedback (von Krogh et al. 2000). Hence, the current business model can be understood as the dominant logic of the firm, which is questioned if substantial problems or a substantial crisis of the current dominant logic arise (von Krogh et al. 2000).

Research on the dominant logic is highly advanced, proposing distinct strategies to overcome the dominant logic of the firm. Christensen (1997, 2003), as well as Amit and Zott (2001) see the major requirement for business model innovation in a new way of strategic thinking towards a more integrative, dynamic, adaptive, and entrepreneurial strategies in order to overcome the firm's internal resistance, or *dominant logic*, in developing and adopting a new business model. As Chesbrough (2010) notes, those conflicts arise from the underlying configuration of assets that support the prevailing business model. Doz and Kosonen (2010) argue, that both *distancing* and *abstracting* are required for the generation of new perspectives and alternatives, by considering the possibility of applying different business models to the same business (Doz and Kosonen 2010). Also, *cognitive diversity* among executives is necessary to allow for the generation of genuinely different and independent alternatives (Peterovic et al. 2001). Furthermore, cognitive biases, as for example the role and interrelationship between search processes that are forward-looking, are based on the actors' cognitive map of action-outcome linkages, while those that are backward-looking, or experience-based (Gavetti and Levinthal 2000), relate to the dominant logic of the firm.

We argue that, while first potential solutions to handle the challenge posed by the dominant logic of the firm exist, the challenge is far from being met and remains among the major obstacles to business model innovation.

The third cognitive challenge concerns *knowledge* sharing and creation across epistemic boundaries (Carlile 2002, 2004; Dougherty 1992; Peterovic et al. 2001); essential to any kind of innovation and necessary if the new business model is elaborated in team work. The creation of knowledge occurs through the insights resulting from the information pooling process (Harris and Woolley 2009) and from interacting with other sources of knowledge outside the team, which may be internal or external to the company (Nonaka 1999). The management of group processes (in-group bias) and the group knowledge work in teams pose another related challenge to successful business model innovation. Groups often encounter challenges beyond their prior knowledge and experiences, and then having to learn how to materialize innovative ideas under pressure in a dynamic environment (Chao-Tung and Yi-Wen 2007). This type of knowledge integration is hence a fragile process that requires systematic and continuous support with corresponding tools. In the following section we will show that visual methods can be fruitfully used to meet this challenge.

3.2.2 Organizational Challenges

The organizational challenges we have found are as well threefold: challenges based on the *resources*, *values* and the *team*. (Christensen and Raynor 2000; Leonard-Barton 1992).

Resource fluidity is emphasized as core challenge for business model innovation by most scholars (Christensen and Raynor 2000; Doz and Kosonen 2010; Leonard-Barton 1992; Zott and Amit 2010). The resources available for business model innovation build the foundation for the whole idea generation and later implementation. Without sufficient resource allocation and support, business model innovation is doomed from the start. Hence, Doz and Kosonen (2010) argue, that resource handling is among the core capabilities for innovation, as they understand resources as "the internal capability to reconfigure capabilities and redeploy resources rapidly" (Doz and Kosonen 2010). Furthermore, the resources necessary in order to change a firms current business model need to be carefully assessed in order to identify core resources, which may continue to offer an competitive advantage based on their position in the new business model.

A firm's *values* are important for business model innovation as values influence the firm's culture, working methods, and habits; all of which are in movement when a new business model is developed. Changing working methods, habits, and culture requires involving employees and their creativity in the innovation process, thus, an overall change in a firm's culture may become necessary (Bettis and Prahalad 1995; Christensen and Raynor 2000; Doz and Kosonen 2010). The most important issue concerning values is that values are for most part not stated

explicitly. Thus, it becomes a challenge to identify the values which may foster change and those which are preventing change.

Choosing the right *team* for business model innovation is another challenge, as multiple stakeholders are involved in business model innovation, which leads to conflicts between departments, such as operations, engineering, marketing, sales and finance (Bettis and Prahalad 1995; Chesbrough 2010). Once the team is established, it has to be enabled to work properly, which requires to identify values, motivations, expectations and hidden agendas. Furthermore, coordination challenges to organize teamwork may hinder the business model innovation process substantially (Bartel and Garud 2009; Doganova and Eyquem-Renault 2009).

To summarize this section, we have depicted the challenges and their relations in Fig. 3.1. We found that one major challenge effects all other challenges, namely the *dominant logic*, while all of the challenges influence and add to one challenge, namely *complexity*.

The challenge of the *dominant logic* effects all challenges that we have identified by setting the mindset, previous *knowledge*, *team* compositions and determines the firms' *values*. As Chesbrough and Rosenbloom (2002) argue, the dominant logic filters out ideas and behaviors that do not comport with the current dominant logic of the firm, thus doing anything in a new way becomes inherently difficult. The dominant logic also influences patterns of *resource allocation* due to its impact on executive's decision making criteria in the resource allocation process. Changes in resource allocation that are necessitated by a new business model thus have to overcome strong organizational inertia. Last, the dominant logic adds to the *complexity* of the task.

The team challenges are influenced by knowledge and influence both knowledge and value challenges. The *team* challenges impact on both the *values*, as corporate

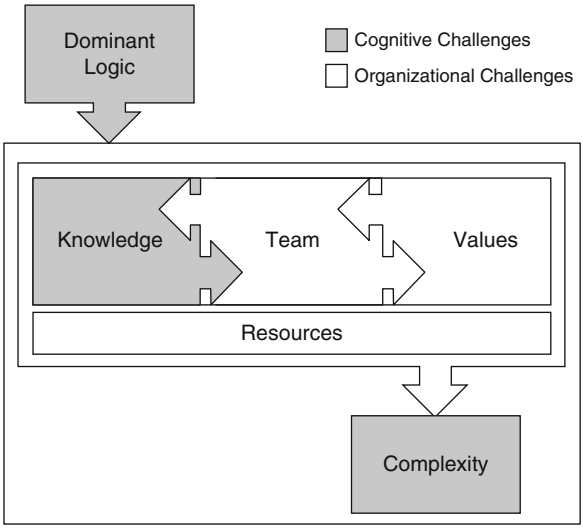


Fig. 3.1 Business model innovation challenges

values and individual values influence any team process and especially the unity among the team members (Chesbrough 2010), as well as on *knowledge* creation and sharing, while the *resources* and their flexible allocation build the foundation of business model innovation (Chesbrough 2010; Doz and Kosonen 2010; Zott and Amit 2010).

Finally, the challenge which is the result of the previously mentioned challenges is *complexity*. Complexity as a challenge itself is thus further enhanced by the specified interaction of business model innovation challenges.

3.3 Visual Solutions for Business Model Innovation Challenges

The challenges business model innovation poses to any organization are not only multiple, but are interlinked, as argued and visualized in the section above. In our research on visualization tools and techniques in management we found that visualization offers multiple opportunities to tackle the identified challenges, as it enables cooperation, clarifies complex issues and fosters creativity.

The opportunities offered by visual tools are supported by boundary object theory, with boundary objects being agents that socially organize distributed cognition. Furthermore, boundary objects allow members of different groups to read different meanings particular to their needs from the same material, while cognition is distributed by forms of nonverbal knowledge, for example through interactions with sketches and drawings (Henderson 1991; Star and Griesemer 1989). Recent findings on boundary objects theory suggest that boundary objects are involved in innovation activities. Examples in the literature are sketches and drawings (Carlile 2002; Henderson 1991; Doganova and Eyquem-Renault 2009).

Business model innovation requires the innovation team to consider and understand various and potentially conflicting positions of the stakeholder and units affected, complexity needs to be structured and mastered, which is considerably facilitated through the created artifacts. In addition, positions of stakeholders can be visualized and taken into consideration from the very beginning through visualizing brainstorming, position taking and rapid prototyping. Sketches, for example, can serve as boundary objects and assist communication to refine ideas further; serving to assist shared cognition and capture pertinent and implicit knowledge from different sources (Carlile 2002; Henderson 1991).

In a first step, we will match the identified challenges with visual solutions we have identified and experimented with.

Visualization helps to overcome the *dominant logic* of the firm by challenging self-imposed constraints (Mintzberg and Van der Heyden 1999; Platts and Kim Hua 2004), focusing attention (Fiol and Huff 1992; Platts and Kim Hua 2004) and by enabling playful exploration of other mindsets (Mintzberg et al. 2007). For business model innovation sessions, we specifically suggest to use scenario diagrams, which enable different views on the future (Fiol and Huff 1992); and sketching, which fosters big picture thinking and abstracting (Mayer 2008).

The dominant logic influences the challenges posed by knowledge, the team and corporate along with the individual team members values, as well as resource allocation. These add to the overall complexity of the issue. In order to ease the challenges posed for the *team*, research has shown that visualization generally fosters mutual learning in teams (Bresciani and Eppler 2009) and offers coordination benefits (Eppler and Platts 2009). We suggest to use strategy roadmaps, in order to create involvement and foster creativity in innovation teams (Blackwell et al. 2008), as well as using sketches and prototypes to help integrating different viewpoints (Schoen 1984). Following Schoen (Schoen 1984), visualization further elicits implicit values and triggers value-related dialogues, which facilitates to handle team members values just as dominant corporate values.

Knowledge creation and sharing is facilitated by visualization, as visualization generally stimulates thinking (Tufte 1990), fosters shared thinking (Fiol and Huff 1992), triggers memory (Craig 2000) and provides inspiration to innovation processes (Ewenstein and Whyte 2007). We suggest using collaborative visualization software to foster knowledge sharing in teams (Bresciani and Eppler 2009).

Without the necessary *resources*, business model innovation is seriously limited. Hence, we suggest mapping resources using for example core competence metaphors (Klein et al. 1998), which help to see their allocation potential and scope.

Finally, the *complexity* of the task may appear overwhelming at first. Here, visualization can help to map and clarify organizational complexity. We propose to use organigraphs (Mintzberg and Van der Heyden 1999) and graphic aggregation, such as portfolio diagrams to absorb complexity (Eppler and Platts 2009), and in a next step, to use the strategy canvas and profile charts to identify options (Kim and Mauborgne 2005). Especially interesting is the business model canvas elaborated by Osterwalder and Pigneur (Osterwalder and Pigneur 2009), who offer a powerful visual tool which visualizes the most important parts of a business model while at the same time, reducing the overall complexity.

Table 3.1 provides a preliminary overview on the state of the art of challenges identified in the literature, matched with potential visual solutions and brief explanations of what those tools offer in particular. Furthermore, Table 3.1 illustrates various forms of visualization that provide a wide variety of mostly cognitive and communicative benefits to business model innovation. Most of these benefits arise due to the *flexible and provisional, and yet accessible and persistent quality of visualizations*. Visual *tools*, however, need to be embedded in an organizational structure which supports business model innovation.

The visual tools and opportunities identified are often commonly known in many organizations, yet we found that they have not been *strategically* applied and used in order to foster business model innovation dialogues.[1]

[1]For readers interested in exploring the strategic use of visualization tools, we provide an interactive overview at: http://www.visual-literacy.org/periodic_table/periodic_table.html. We have also made available an interactive toolkit of interactive visual methods for business model innovation at lets-focus.com for downloading.

Table 3.1 Business model innovation challenges and visual solutions[2]

	Challenges	Visual solutions
Cognitive	Complexity	• Absorb complexity (Eppler and Platts 2009) • Organigraphs map and clarify organizational complexity (Mintzberg and Van der Heyden 1999) • Strategy canvas and profile charts (Kim and Mauborgne 2005) • Business model canvas (Osterwalder and Pigneur 2009)
	Dominant logic	• Scenario diagrams enable different views on the future (Fiol and Huff 1992) • Challenge self-imposed constraint (Mintzberg and Van der Heyden 1999; Platts and Kim Hua 2004) • Enable the playful exploration of mindsets (Mintzberg et al. 2007) • Sketching fosters big picture thinking and abstracting (Mayer 2008)
	Knowledge	• Foster shared thinking (Fiol and Huff 1992) • Stimulate thinking (Tufte 1990) • Trigger memory (Craig 2000) • Inspire (Ewenstein and Whyte 2007) • Sketches and prototypes integrate view points (Schoen 1984) • Collaborative visualization software fosters knowledge sharing (Bresciani and Eppler 2009)
Organizational	Resources	• Resource maps visualize allocation potential and scope (Klein et al. 1998)
	Values	• Elicit implicit values and trigger value-related dialogues (Schoen 1984)
	Team	• Foster mutual learning in teams (Bresciani and Eppler 2009) • Offers coordination (Eppler and Platts 2009) • Strategy roadmaps create involvement and foster creativity (Blackwell et al. 2008)

In this chapter, we have provided pointers to a wide range of existing visualization methods and their specific benefits for business model innovation. Visual tools are likely to help in overcoming many especially cognitive-based challenges firms face when innovating their current business model. Finally, visual tools foster strategic change by clarifying, organizing and uncovering relationships among business model elements and by pointing towards unexplored opportunities.

3.4 Conclusion

When business model innovation is on the agenda of top management teams, a variety of challenges emerge. In a first step, we have organized the challenges and grouped them into individual, cognitive challenges and collective, organizational challenges. For each category, we have identified three main challenges that are

[2]Interested readers can find an overview of the suggested visualizations at: http://www.knowledge-communication.org/pdf/innovation-templates.pdf.

likely to occur in the course of business model innovation and thus need to be addressed. In a final step, we have shown how these challenges are interlinked, therewith offering opportunities to address the challenges together.

We suggest approaching the challenges using visualizations, such as interactive graphic methods, which have proven to successfully address many of these issues. However, those have not been used systematically in order to arrive at a new business model idea yet, with the only exception being Osterwalder and Pigneur's canvas (Osterwalder and Pigneur 2009). Their business model canvas has not been systematically evaluated, which will eventually allow for a better assessment of its advantages. In this chapter, we have provided pointers to a wide range of existing visualization methods and their specific benefits for business model innovation, based on our research. Visual tools help to overcome the challenges firms face when innovating their current business model by fostering strategic change through clarifying, organizing and uncovering relationships, dependencies and pointing towards blue ocean strategies.

Bibliography

Amit, R., & Zott, C. (2001). Value creation in e-business. Strategic Management Journal, 22(6/7), 493.

Baregheh, A., Rowley, J., & Sambrook, S. (2009). Towards a multidisciplinary definition of innovation. Management Decision, 47(8), 1323–1339.

Bartel, C. A., & Garud, R. (2009). The role of narratives in sustaining organizational innovation. Organization Science, 20(1), 107–117.

Bettis, R. A., & Prahalad, C. K. (1995). The dominant logic: Retrospective and extension. Strategic Management Journal, 16(1), 5–14.

Blackwell, A., Phaal, R., Eppler, M. J., & Crilly, N. (2008). Strategy roadmaps: New forms, new practices. Paper presented at the Diagrams 2008, Fifth International Conference on the Theory and Application of Diagrams, Munich.

Bresciani, S., & Eppler, M. J. (2009). The benefits of synchronous collaborative information visualization: Evidence from an experimental evaluation. IEEE Transactions on Visualization and Computer Graphics, 15(6), 1073–1080.

Carlile, P. R. (2002). A pragmatic view of knowledge and boundaries: Boundary objects in new product development. Organization Science, 13(4), 442–455.

Carlile, P. R. (2004). Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries. Organization Science, 15(5), 555.

Chao-Tung, W., & Yi-Wen, C. (2007). The innovation process of entrepreneurial teams in dynamic business plan competition: From sense-making perspective. International Journal of Technology Management, 39(3/4), 346–363.

Chesbrough, H. W. (2006). Open business models: How to thrive in the new innovation landscape. Boston, MA: Harvard Business School Press.

Chesbrough, H. W. (2010). Business model innovation: Opportunities and barriers. Long Range Planning, 43(2/3), 354–363.

Chesbrough, H. W., & Rosenbloom, R. S. (2002). The role of the business model in capturing value from innovation: Evidence from xerox corporation's technology spin-off companies. Industrial and Corporate Change, 11(3), 529–555.

Christensen, C. (1997). The innovator's dilemma: When new technologies cause great firms to fail. Cambridge, MA: Harvard Business School Press.

Christensen, C., & Raynor, M. E. (2000). Meeting the challenge of disruptive change. Harvard Business Review, 78(2), 66.
Christensen, C., & Raynor, M. E. (2003). The innovator's solution: Creating and sustaining successful growth. Boston, MA: Harvard Business School Press.
Coombs, R., & Hull, R. (1998). Knowledge management practices and path-dependency in innovation. Research Policy, 27, 237–253.
Craig, M. (2000). Thinking visually. Business applications of fourteen core diagrams. London: Continuum.
Damanpour, F. (1996). Organizational complexity and innovation: Developing and testing multiple contengency models. Management Science, 42(5), 693–716.
Doganova, L., & Eyquem-Renault, M. (2009). What do business models do?: Innovation devices in technology entrepreneurship. Research Policy, 38(10), 1559–1570.
Dougherty, D. (1992). Interpretive barriers to successful product innovation in large firms. Organization Science, 3(2), 179–202.
Doz, Y. L., & Kosonen, M. (2010). Embedding strategic agility: A leadership agenda for accelerating business model renewal. Long Range Planning, 43(2/3), 370–382.
Eppler, M. J., & Platts, K. W. (2009). Visual strategizing: The systematic use of visualization in the strategic-planning process. Long Range Planning, 42(1), 42–74.
Erikkson, H., & Penker, M. (2000). Business modeling with uml – business patterns at work. New York: Wiley.
Ewenstein, B., & Whyte, J. (2007). Beyond words: Aesthetic knowledge and knowing in organizations. Organization Studies (01708406), 28(5), 689–708.
Fiol, C. M., & Huff, A. S. (1992). Maps for managers: Where are we? Where do we go from here? Journal of Management Studies, 29(3), 267–285.
Garud, R., & Karnoe, P. (2003). Bricolage versus breakthrough: Distributed and embedded agency in technology entrepreneurship. Research Policy, 32(2), 277.
Gavetti, G., & Levinthal, D. (2000). Looking forward and looking backward: Cognitive and experiential search. Administrative Science Quarterly, 45(1), 113–137.
Harris, E., & Woolley, R. (2009). Facilitating innovation through cognitive mapping of uncertainty. International Studies of Management & Organization, 39(1), 70–100.
Henderson, K. (1991). Flexible sketches and inflexible data bases: Visual communication, conscription devices, and boundary objects in design engineering. Science, Technology, & Human Values, 16(4), 448–473.
Johnson, M. W., Christensen, C. M., & Kagermann, H. (2008). Reinventing your business model (cover story). Harvard Business Review, 86(12), 50–59.
Jonda, M. (2007). Innovation Geschäftsmodell. Analyse- und planungsprozesse der strategischen unternehmensführung. Saarbrücken: VDM Verlag Dr. Müller.
Kim, W. C., & Mauborgne, R. (2005). Blue ocean strategy. Boston: Harvard Business School Press.
Klein, J., Gee, D., & Jones, H. (1998). Analysing clusters of skills in r&d–core competencies, metaphors, visualization, and the role of it. R&D Management, 28(1), 37.
Lambert, S. (2006). A business model research schema. Paper presented at the BLED 2006 Proceedings, Paper 43.
Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. Strategic Management Journal, 13, 111.
Lundberg, O., & Richards, M. D. (1972). A relationship between cognitive style and complex decision making; implications for business policy. Paper presented at the Academy of Management Proceedings (00650668).
Magretta, J. (2002). Why business model matter. Harvard Business Review, 80(5), 86–92.
Malhotra, Y. (2000). Knowledge management and virtual organizations. Hershey PA: Idea Group.
Mayer, C. (2008). Hieroglyphen der Psyche: Mit Patientenskizzen zum Kern der Psychosomatik. Stuttgart: Schattauer.

Meehan, S., & Baschera, P. (2002). Lessons from hilti: How customer and employee contact improves strategy implementation. Business Strategy Review, 13(2), 31.

Mintzberg, H., Ahlstrand, J., & Lampel, J. (2007). Strategy safari. London: Prentice Hall.

Mintzberg, H., & Van der Heyden, L. (1999). Organigraphs: Drawing how companies really work. Harvard Business Review, 77(5), 87–94.

Nonaka, I. (1999). Building a concept of knowledge creation. Boston: Butterworth-Heinemann.

Osterwalder, A., & Pigneur, Y. (2002). An ebusiness model ontology for modeling ebusiness.

Osterwalder, A., & Pigneur, Y. (2009). Business model generation. Handbook for visionaries, game changers, and challengers: OSF.

Osterwalder, A., Pigneur, Y., & Tucci, C. (2005). Clarifying business models: Origins, present, and future of the concept. Communications of the Association for Information Systems (CAIS), 16(1), 1–25.

Pateli, A. G., & Giaglis, G. M. (2004). A research framework for analysing ebusiness models. European Journal of Information Systems, 13(4), 302–314.

Pateli, A. G., & Giaglis, G. M. (2005). Technology innovation- induced business model change: A contingency approach. Journal of Organizational Change Management, 18(2), 167–183.

Peterovic, O., Kittl, C., & Teksten, R. (2001). Developing business models for ebusiness. International Conference on Electronic Commerce 2001.

Platts, K., & Kim Hua, T. (2004). Strategy visualisation: Knowing, understanding, and formulating. Management Decision, 42(5), 667–676.

Porter, M. E. (1985). Competitive strategy. New York: Free.

Prahalad, C. K., & Bettis, R. A. (1986). The dominant logic – a new linkage between diversity and performance. Strategic Management Journal, 7(6), 485–501.

Schoen, D. (1984). The reflective practitioner. How professionals think in action. Basic Books.

Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, 'translations' and boundary objects: Amateurs and professionals in berkeley's museum of vertebrate zoology, 1907-39. Social Studies of Science, 19(3), 387–420.

Tufte, E. (1990). Envisioning information. Cheshire, CT: Graphics.

Voelpel, S., Leibold, M., Tekie, E., & Von Krogh, G. (2005). Escaping the red queen effect in competitive strategy: Sense-testing business models. European Management Journal, 23(1), 37–49.

von Krogh, G., Erat, P., & Macus, M. (2000). Exploring the link between dominant logic and company performance. Creativity & Innovation Management, 9(2), 82.

Wall, B., Jagdev, H., & Browne, J. (2007). A review of ebusiness and digital business – applications, models and trends. Production Planning & Control, 18(3), 239–260.

Zott, C., & Amit, R. (2010). Business model design: An activity system perspective. Long Range Planning, 43(2/3), 216–226.

Chapter 4
Cognitive Diversity of Top Management Teams as a Competence-Based Driver of Innovation Capability: How to Decode Its Contribution Comprehensively

Michael Hülsmann, Meike Tilebein, Philip Cordes, and Vera Stolarski

Contents

4.1 Introduction: Strategizing in a World of Variety and Change

Permanent changes in so-called "real-time-economies" have amplified the characteristics of markets as worlds of variety and change (Tapscott 1999; Siegele 2002). Beside others, this is due to fast and constitutional developments in information and communication technologies in the last ten up to 20 years, which contributed to a drastic shift from an industrial to an information age of the global society (Ottens 2003). Additionally, strategic management of organizations is more and more confronted with multiple, intertwined, sometimes contradictious, and mostly competing demands articulated by worldwide stakeholders and resource holders

M. Hülsmann and P. Cordes (✉)
Systems Management, International Logistics, School of Engineering and Science, Jacobs University Bremen, Campus Ring 1, 28759 Bremen, Germany
e-mail: m.huelsmann@jacobs-university.de, p.cordes@jacobs-university.de

M. Tilebein
Institut für Diversity Studies, Universität Stuttgart, Pfaffenwaldring 9, 70589 Stuttgart, Germany
e-mail: meike.tilebein@ids.uni-stuttgart.de

V. Stolarski
Strascheg Institute for Innovation and Entrepreneurship, European Business School, Markt 8, 65375 Oestrich-Winkel, Germany

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, DOI 10.1007/978-3-642-17223-6_4,

(Müller-Christ and Hülsmann 2003). In consequence, organizations like companies and their strategic management have to cope with an increasing complexity and dynamic in their relevant environments (Hülsmann and Berry 2004).

For that reason, the bases on which decisions in management are rendered are increasingly characterized by imperfect information (introduced into the management literature by Simon 1972). Organizations face the challenge that the amount of external information, emerging from their complex and dynamic environments, might exceed their information processing capacities (Hülsmann et al. 2008). These capacities however are necessary in order to develop ideas, concepts and practices that improve the respective company's product or service characteristics that are perceived as new and valuable by any stakeholder of the respective organization, in other words for the innovation capability (see e.g. Rogers 2003). Gaining and maintaining innovation capabilities requires the ability to adapt the company's profile and processes to the perpetually changing environmental conditions (e.g. shifting customer demands). A lack of this ability as an effect that emanates from a too low information processing capacity might lead to a so-called lock-in situation (Schreyögg et al. 2003). This includes a vital risk to the functionality and robustness of the locked organization (Hülsmann and Wycisk 2005b).

From a complexity-science based perspective organizations can be regarded as Complex Adaptive Systems (CAS). They consist of autonomous, heterogeneous, interactive and learning elements and co-evolve with their environments. Thereby, they exist in a so-called melting zone between the edge of chaos and the edge of order (Wycisk et al. 2008; based on Holland 2002; Kauffman 1993). According to Wycisk et al. (2008), international supply networks are one example for such a CAS, which leads to the term Complex Adaptive Logistics Systems (CALS). Hence, the management of such a CALS in particular, but as well as of systems (e.g. a network of companies) and single organizations (e.g. companies) in general, are claimed to deal with increasing complexity and dynamics and the endangerment of lock-in-situations.

The challenge lies in two opponent requirements: On the one hand organizations need as much as possible information to be processed in order to react flexibly to changing environmental demands. On the other hand the information-inflow has to be on a manageable level (Hülsmann et al. 2008). In this means it is essential to understand how companies can adjust the level and quality of their capabilities and capacities with regards to the accessing, acquiring, and processing of knowledge and information to external requirements. Thus, a key factor for successful strategic management, aiming at the organization's long-term survivability by gaining and maintaining the innovation capability, even under complex and dynamic conditions, seems to be the organization's adaptivity, which is defined by Hülsmann et al. (2008) as the ability to keep the balance between an organization's flexibility and its stability (Hülsmann et al. 2008).

This article addresses this challenge by focusing on an approach that aims at an increase of organizations' flexibility, without losing sight of the limitations of a flexibility spillover. According to Top Management Team (TMT) cognitive diversity research the heterogeneity of a team potentially contributes to organizational

flexibility (Allen 2001; Akaishi and Arita 2002; Hülsmann et al. 2008; Stolarski and Tilebein 2009) by leading to an increased knowledge pool and inducing an extensive range of perspectives (Kauer et al. 2007; Pitcher and Smith 2001). The competence-based view, in which perspective flexibility can be seen as a competence itself, provides an adequate theoretical framework for an examination of cognitive flexibility as a source for flexibility as a competence on an organizational level (Sanchez 2004). However, former empirical diversity research does not deliver data of how and under which conditions cognitive diversity will reach its full potential as a driver for organizational flexibility. Additionally, it is not clarified yet from which degree on diversity endangers an organization's stability.

The overarching objective of this article is to analyze theoretically possible contributions of TMT cognitive diversity to organizational adaptivity and to point out approaches, elucidating the issue further. Therefore, several sub goals emerge: On a descriptive level, the need for organizational adaptivity and thus for a high but limited level of organizational flexibility will be specified. Furthermore, a description of flexibility as an organizational competence and TMT cognitive diversity as a possible approach to develop this competence shall be given. On an analytical level, the cause and effect chains between TMT cognitive diversity and the respective organizational flexibility and hence adaptivity shall be examined. Finally, implications for the management of organizations as well as for further research shall be deduced.

For that reason, the article proceeds as follows: In Sect. 4.2 potential effects of organizational flexibility in relation to a company's information-processing capability will be outlined, in order to show that a certain degree of flexibility is essential for an organization's innovation capability. Section 4.3 describes flexibility from a competence-based view, because TMTs are characterized by individual competencies that might lead in the following to organizational competences. Therefore, diversity management for TMTs will be emphasized as a special kind of the management of flexibility as an organizational competence. With recourse to these findings, Sect. 4.4 introduces TMT diversity as a potential driver of organizational flexibility and proposes agent-based simulation as an alternative research approach, in order to derive deeper insights regarding the specific interdependencies between diversity and the flexibility of organizations. Section 4.5 sums up the findings and illustrates the attended limitations of this research as well as further research requirements.

4.2 Locked organizations: Limitations to Rationality-Based Decision Making in Strategic Management

According to Dörner (2001) a complex system (e.g. an organization or an organization network) can be seen as "(. . .) the existence of many interdependent characteristics in a section of reality (. . .)". The more inter-relations among the elements within a system as well as between a system and its surrounding environment exist,

the more information is potentially available (Dörner 2001; Malik 2000). Burmann (2002) gives the example of new global sales opportunities for companies, evolving from the vast amount of information on new products and technologies, which is offered via internet (Burmann 2002). The term "dynamics" describes the accelerated variation of the system status (e.g. the internet) over time (Coyle 1977; Probst and Gomez 1989). Applied to the mentioned example, dynamics could be understood as the permanently altering and available information on the internet. In this case, the elements (pieces of information) themselves change and thus the relations between them and other organizations and their elements alter as well.

Hence, in order to obtain the organization's abilities to react to timely demands, they have to deal with complex information that are perpetually changing. In other words, organizations have to be capable to adapt to changes in their relevant environments so as to ensure their survivability. A system's adaptivity, in turn, helps to keep the balance between a high level of flexibility and a system's stability (Hülsmann et al. 2008). Whereas the former can be achieved by processes of system opening (Hicks and Gullett 1975; Garavelli 2003), the latter can be achieved by processes of system closure (Luhmann 1973, 1994). Both processes are opposite action alternatives, from which an organization's management has to choose in individual situations. Thus, the management is confronted with perpetual decision-making situations regarding the system's endowment with information, which is necessary for the management to render their decisions rationally respectively nearly rationally (Hülsmann and Wycisk 2005b).

Processes of system openings are based on mutual inter-relations (Luhmann 1973), as they allow the system to communicate with the environment. Thereby it sustains the existential exchange process of resources (Staehle 1999; Böse and Schiepeck 1989). While the system is in an open state, it is able to absorb some of the complexity within the environment and thereby the needed resources (Hicks and Gullett 1975). System openings are needed to gain an adequate amount of information for making preferably rational decisions. The higher the degree of complexity in the environment, the higher is by trend the degree of necessary information to find a solution for a certain problem. By system openings the decision maker therefore allows for more complexity that has to be absorbed by the system (Hülsmann et al. 2008), while the ability of processing this amount of complexity remains on a constant level. At the same time, the management has to take into account the dynamics of information and the risk of an information overload caused by system openings (e.g. Hülsmann 2005; Gebert and Boerner 1995; Gharajedaghi 1982). Furthermore, because flexibility is enabled by a system's ability to open its borders for required resources (e.g. information) (Hicks and Gullett 1975; Garavelli 2003), the system structures can alter permanently in the course of aiming at maintaining the system's ability to meet the demands of its relevant environment. In order to avoid system boundaries which diffuse too much, the degree of flexibility has to be balanced by processes of stabilization.

Hence, processes of system closures are required as a compensating means (Luhmann 1973, 1994). Not every single piece of information adds to the decision-making process, wherefore the flow of information has to be cut at some point to

enable a timely decision. Furthermore, no social system (e.g. organizations) is able to absorb the whole complexity of its environment. Hence, the problem of bounded rationality is imminent in every decision-making situation, which implies that managers are forced to base their decisions on incomplete information (Simon 1972). For this reason systems have to select the information they process, confining themselves to those parts which are still manageable by the system and necessary to solve specific problems (Luhmann 1994). In consequence, processes of system closure must be incorporated in a decision making process in order to select information in terms of quality and quantity with regard to its contribution to the company's innovation capability.

Therefore, in order to provide an organization respectively a system such as a CALS with a preferably high degree of adaptivity, its management has to find the optimum balance between system openings and system closures. In turn, this leads to perpetual decision-making situations. The management has to provide the system on the one hand with a preferably high degree of flexibility, but on the other hand it has to assure its stability. This can be seen as one of the major tasks and challenges in the management of such systems like organizations or organization networks.

If an organization does not succeed in balancing the underlying contradictory objectives, the management's ability to render decisions as rationally as possible might be restricted (Hülsmann and Berry 2004). The quantity and quality of information needed for a total rational choice in a complex and dynamic environment cannot be met by any system's capability to access, acquire or process information. Too much system opening, respectively flexibility, might therefore lead to an information overload. Too much system closure, respectively stability, might lead in contrast to an undersupply of information (Hülsmann et al. 2008). Both decrease the system's abilities in adapting to the changing and challenging demands of the environment and therewith to be innovative. If this is permanent and not only a temporary incident the respective system or organization can become a so-called "locked organization" (Schreyögg et al 2003). This phenomenon is based on path dependencies that develop in the course of repetitive actions of a system's single elements, fortified by feedback loops (David 1985). Actions that have been carried out in the past can therewith decrease the current range of possible action alternatives. Path dependency theory refers to this phenomenon as "history matters" (Arthur 1989; David 1994). As a result, a dysfunctional and suboptimal situation with a limited choice of possible decisions might occur (Schreyögg et al. 2003). Processes of locking can therewith reduce an organization's capability to cope with the complexity of its environment by decreasing its ability to continue its exchange of vital resources with its environment. Neither can it identify all necessary resources (e.g. information about new products, new trends or innovations) from the offered mass in the environment nor evaluate or integrate them. As a consequence, the organization cannot respond to the demand of the environment (e.g. products of the company which potential buyers need) in time, quality, quantity, or place. This lack of flexibility could result in a disequilibrium which in turn could lead to negative environmental responses in terms of the required resources (e.g. through a lower volume of sales the company could loose its market shares). In the

worst case, a lock-in situation may result in an organizational collapse (Hülsmann and Wycisk 2005b).

Therefore, the questions arise how to avoid a lock-in situation (ex-ante) and how to cope with an existing lock-in situation (ex-post). With recourse to the above stated dependencies between organizational flexibility and the risk of a lock-in situation, two challenges can be deduced: The increase of an organization's flexibility itself, as well as the increase of an organization's ability to cope with a high degree of flexibility. In other words, it is necessary to implement organizational flexibility on a level as high as possible, but low enough to ensure that the system's stability is not endangered, in order to gain and maintain the innovation capability.

4.3 Organizational Flexibility by Competence Based Management

Subsequent to the above-mentioned need for organizational flexibility on a high but stable level, the question arises, how the organizational system's structure (e.g. of a company or of an organizational network of companies) can be created in order to allow a maximum level of flexibility without loosing the system's stability. One possible approach applying to the flexibilization of organizations is competence-management (Sanchez 2004). According to the competence-based view, flexibility can be seen as a competence itself (Sanchez 2004; Krüger and Homp 1997) and can be understood as a basic demand of the organization structure, allowing it to form and apply competences and to refine their arrangement if necessary (Hülsmann et al. 2006). Important thereby is the differentiation between individual competencies and organizational competences (Müller-Martini 2008). In order to provide organizations with the required adaptiveness so as to secure a sustainable development and survival in dynamic, complex and highly competitive environments (Hülsmann and Wycisk 2005a), flexibility is not only necessary on the individual levels. Rather it has to be implemented as a competence on an organizational level, wherefore the competence-based perspective offers an appropriate theoretical framework (Sanchez 2004).

According to Sanchez et al. (Sanchez and Heene 1996, p. 8; Sanchez 2004, p. 521) competences can be described as "(. . .) the ability to sustain the coordinated deployment of assets in ways that help a firm achieve its goals". In the theory of the competence-based view a firm is seen as a learning organization that builds and deploys assets, capabilities and skills to achieve strategic goals (Hamel and Heene 1994).

Five different "modes" of competences have been defined by Sanchez (2004):

1. Cognitive flexibility to imagine alternative strategic logics
2. Cognitive flexibility to imagine alternative management processes
3. Coordination flexibility to identify, configure and deploy resources
4. Resource flexibility to be used in alternative operations and
5. Operating flexibility in applying skills and capabilities to available resources

Competence modes 3–5 are highly dependent on and limited by the competence modes 1 and 2. The cognitive flexibility, in turn, provides an appropriate connectivity to the approach of cognitive diversity. Therefore, this article focuses on the first two competence modes.

Competence mode 1 reflects an organization's ability to imagine different strategic ways of creating value in a certain market. Hence, it is highly dependent on the individual competencies of the organization's top managers to perceive the organization's relevant environment. Competence mode 2 reflects an organization's ability to imagine different processes in order to achieve the organization's strategic goals, which are, in turn, dependent on competence mode 1. In analogy to competence mode 1, this competence again highly depends on the individual competencies of an organization's top managers (Sanchez 2004). Although each meaning of the competence modes refers therewith to a different kind of flexibility, they all react towards a changing environment (e.g. changing markets or new technologies). Hence, they contribute, up to a certain point, to an organization's adaptivity. Therewith, the risk of a lock-in situation can be reduced. In consequence, the question arises, how organizations can achieve the competence "cognitive flexibility" regarding their strategic logics and their management processes. The latter are the pre-conditions for developing coordination, resource, and operating flexibility in order to enable organizations to avoid as well as to cope with lock-in situations as described above and hence, to gain and maintain innovation capability.

4.4 Design of Cognitive Diversity of TMT: A Key Issue of Strategic Organization?

According to the upper echelon perspective individual characteristics of TMT members like values, personalities, and experiences take influence on strategic choices and the overall performance of a firm (Hambrick 2007). TMTs constitute the aggregate informational entity, which is responsible for strategic decisions regarding the whole system's respectively organization's or company's future behavior and thus its development (Hambrick et al. 1996).

Speaking in terms of the competence-based view, TMT members' individual competencies might contribute to the TMT goals. In conjunction, individual competencies can constitute a resource, which composes an organizational competence under certain circumstances (Müller-Martini 2008). Focusing on TMT characteristics and composition (Hambrick et al. 1996), TMT diversity research contributes to the clarification of these circumstances.

TMT diversity is defined as the extent to which a top management team is heterogeneous with respect to its members' demographics or cognitions (Simons et al. 1999). As cognitive diversity, accounting for deep level differences like cognitions, beliefs, and attitudes, is much more potent in group interactions than

surface-level demographic differences (Harrison et al. 1998) this article focuses on cognitive differences opposed to surface-level demographic differences, e.g. age or gender. Cognitive differences are defined as distinctions in individual information processing, which comprises the way a person perceives and uses information (Lord and Maher 1990). Similarly, team-level information processing describes the way a team perceives and uses information (Akgün et al. 2006; Hambrick 2007). From a competence-based perspective, the information processing capability of individuals as well as of teams can be regarded as a pre-condition to imagine alternative strategic logics and management processes. In other words it constitutes a pre-condition for the development of cognitive flexibility, which is, in turn, a pre-condition for the competence organizational flexibility (Sanchez 2004). In this context the questions arise, in what way cognitive TMT diversity contributes to the creation of such an organizational competence and how this competence again contributes to organizational adaptivity respectively how does it help to avoid or to cope with organizational lock-ins and to foster an organization's innovation capability.

In empirical diversity research it is often assumed that cognitive diversity potentially enhances a team's information processing capabilities e.g. in means of coding and sorting out information or considering alternative solutions to a problem (Akgün et al. 2006). This again provides several assets relevant to organizational flexibility, e.g. allowing for decision making based on less imperfect information. The basic idea underlying this assumption is that diversity broadens a team's knowledge pool. The heterogeneity of team members with regard to e.g. knowledge, experience, and educational background enables them to produce a wide range of different ideas and to approach problems and tasks from different perspectives, resulting in enhanced problem-solving quality, creativity, and innovation (e.g. Cox and Blake 1991; Thomas and Ely 1996). In addition to these effects, taking place inside the organization, diversity may lead to a better acquisition and assimilation of new external knowledge (Jansen et al. 2005) and thereby again can contribute to an organization's flexibility (Akaishi and Arita 2002; Allen 2001).

However, in analogy to the risk of an information overload and the resulting need for a balance between flexibility and stability, diversity does not proof beneficial by all means. A number of studies revealed risks related to high degrees of team diversity (e.g. Miller et al. 1998; Cronin and Weingart 2007). Accordingly, communication and cooperation barriers tend to arise in heterogeneous teams, hampering information processing. In this case diversity leads to rigidity, counteracting the potential benefits it may have otherwise and confronting an organization with further risks in addition to the difficulties in today's business environments.

Apparently, within the field of diversity research there is no consensus on diversity effects respectively, under which circumstances diversity emerges as a risk or a resource (see e.g. overviews in Kilduff et al. 2000; Van der Vegt and Bunderson 2005). Although there seems to be a high potential, there are no definite implications for how to manage a diverse team successfully respectively how to unlock organizations by diversity management.

However, numerous researchers agree that unmeasured moderator, mediator, intervening, independent, or dependent variables contribute most predominantly to the observed inconsistency of empirical studies (e.g. Carpenter 2002; Hambrick et al. 1996; Pitcher and Smith 2001). Further there is evidence that diversity is a multifaceted construct, whose facets interact with team processes in converse ways (Pelled et al. 1999). Aside from the complexity of the subject matter the underlying processes of information processing in diverse teams are highly dynamic and take influence on team performance in the course of time (Harrison et al. 1998; Pitcher and Smith 2001).

As Stolarski and Tilebein (2009) point out, classical empirical methods are not capable of comprising the complex and highly dynamic relationships, accompanying diversity effects. For example, numerous potentially relevant moderator and mediator variables, taking influence on the "cognitive diversity" – "team information processing" relationship must remain unconsidered (Stolarski and Tilebein 2009). Apparently, this calls for an alternative research approach and research method, which takes account of all relevant variables and of the dynamics evolving between the variables (Stolarski and Tilebein 2009). Thus, it will be possible to clarify TMT diversity effects and consequently to explore TMT diversity as a driver for organizational flexibility.

Complexity research provides illuminating insights regarding the relationship between diversity, information processing capability and adaptivity of systems. Thus a basic understanding of the complex and dynamic mechanisms, which underlie diversity effects, can be derived from complexity theory (Tilebein 2006a). Complexity theory, which has its roots in systems theory, evolutionary biology, game theory, and information science, looks for common principles of complex adaptive systems (CAS). The dynamics of these systems can be either chaotic, locked in a stable state, or "on the edge of chaos" (Kauffman 1993).

Although chaotic systems are highly dynamic, they cannot respond to external impulses in a timely and adequate manner, comparable with organizations, being too flexible. Systems with a lack of flexibility on the other hand always reproduce their prior states wherefore they are not capable of adapting to changing conditions. Apparently, systems with too much flexibility and systems lacking flexibility are not able to cope in an adequate manner with the information provided by their environment, which, in turn, can lead to lock-in situations and hinder the organization to be innovative.

The edge of chaos is a balanced state where a system shows both stable and changing characteristics. In this state a system reaches a maximum in information-processing capability, and it can display spontaneous order and absorb external disturbances (Langton 1992; Kauffman 1993; Wolfram 1994; Tilebein 2006b). This again reflects organizational adaptivity as described in Sect. 4.2.

The different types of dynamics in CAS are based on information processing procedures performed by the interrelated system elements, which are called agents, and on the information flows within the network of agents (Holland 1995). The more interaction partners each agent has, i.e. the higher the network density is the more information can be passed on through the network (Boisot and Child 1999).

In order to be adaptive, CAS have to combine this information transfer capacity with adequate information storage capacities, which strongly relates to the idea of balancing system opening and system closure that was introduced in Sect. 4.2.

This analogy is acknowledged by results from agent-based simulation models, used in complexity theory (Law and Kelton 1991). For example, there is evidence from very simple agent-based models, Kauffman's Boolean Networks that an optimized fit between network density and diversity leads to adaptivity of the system. In contrast, networks with low diversity and low density might lead to locked systems, while highly dense networks between highly diverse agents might result in chaos. Lowering or rising diversity can optimize information processing capacity of those extreme systems and thus allow for adaptivity again (Kauffman 1993).

Agent-based simulation in general strives to model individual behavior and interactions of a system's micro-level entities, called agents (Klüver et al. 2003). Most important concerning the current issue agents possess schemes determining their individual goals and their actions, including their behavior towards and the information exchange with other agents (Dooley 2002; Klüver et al. 2003). This allows for simulating e.g. the emergence of cooperation in social groups, the communication of beliefs and aspirations, the negotiation with or without resorting to conflict, and the coordination of activities (Schieritz and Milling 2003; Wooldridge 2002). Additionally agents are able to interact not only among themselves, but also with their environment. In other words they absorb the information provided by their environment and adapt to them (Wooldridge 2002).

To sum up, in complexity research agent-based simulation is an established approach to examine diversity effects in regards to information processing capability and flexibility respectively stability of a system. Recently management science is beginning to realize and discuss on a broader basis the vast potential of simulation methods for experimental theory building (Davis et al. 2007; Hazy 2007).

4.5 Conclusions

In competitive environments of increasing variety and change strategic management has to face the risk of "locked organizations" (Schreyögg et al. 2003), which includes vital risks to the organization's operational reliability and robustness (Hülsmann and Wycisk 2005b) and to its innovation capability. Unlocking an organization from this risky state and reconstructing respectively maintaining its ability to cope with volatile and diverse environmental demands requires organizational adaptivity, which in turn requires a high, but stable level of organizational flexibility (Hülsmann et al. 2008). From a competence-based perspective the capability to imagine alternative strategic logics and management processes is an essential pre-condition for organizational flexibility respectively cognitive flexibility (Sanchez 2004).

The upper echelon view acknowledges a major role of management team characteristics in strategic decision-making and flexibility. Accordingly, one of the drivers of organizational flexibility seems to be TMT cognitive diversity. As shown many times in TMT diversity research, diversity leads to an increased knowledge pool, inducing an extensive range of perspectives (Kauer et al. 2007; Pitcher and Smith 2001). Thus diversity potentially enhances the flexibility of the organization, which might allow for adaptivity of the system (Allen 2001; Akaishi and Arita 2002).

To sum up, TMT diversity might constitute an organizational competence, which fosters the innovation capability. But the circumstances, which enable organizations to utilize this resource and develop an organizational competence, have not been identified by empirical research yet. While prior research has shown that top management team diversity affects strategic flexibility and performance, there is no consensus on the mechanisms underlying these effects.

Hence, strategic management should be aware of cognitive diversity as a potential driver of unlocking organizations. Adjusting the heterogeneity of a management team, e.g. via appointing new members to the team or by providing similar respectively dissimilar information to the team members, in order to allow for organizational adaptivity could be a first, practical approach. However, regarding the contradictory empirical results described above, caused by e.g. unmeasured moderator and mediator variables changing TMT diversity by way of trial in order to optimize organizational flexibility appears rather hazardously.

Accordingly, it is proposed to use agent-based models to clarify how and under which conditions diversity will reach its full potential as a driver for innovation capability. Referring to the shortcomings of empirical diversity research described above, agent-based simulation appears to be an appropriate approach to cope with the complexity and dynamic of intertwined variables, which contribute predominantly to the inconsistent results in empirical research.

Regarding the huge amount of TMT diversity studies, each focusing on different variables, which moderate the relationship between cognitive diversity and information processing (Stolarski and Tilebein 2009), it becomes clear that simulation models in management research will have to be more complex than those originally used in complexity theory, e.g. Boolean Networks. This renders more complex agent-based systems appropriate tools for modeling diversity and information-processing in management teams as they are able to model aspects like, heterogeneity, autonomy, openness to the environment and communication (Bandte 2007).

Thus, it seems promising to develop and apply agent-based systems, which are capable of modeling decision processes in TMTs in order to ascertain the conditions under which TMT diversity contributes to the innovation capability of organizations.

Bibliography

Akaishi J, Arita T (2002) Misperception, Communication and Diversity. In: Standish RK, Abbass HA, Bedau MA (eds.) Artificial Life VIII. MIT Press, Sydney

Akgün AE, Lynn GS, Yilmaz C (2006) Learning Process in New Product Development Teams and Effect on Product Success: A Socio-Cognitive Perspektive. Industrial Marketing Management 35(2): 210–224

Allen PM (2001) What is Complexity Science? Knowledge of the limits to Knowledge. Emergence 3(1): 24–42

Arthur WB (1989) Historical Events [1989] Competing Technologies, Increasing Returns, and Lock-in by Historical Events. Economic Journal 99(394): 116–131

Bandte H (2007) Komplexität in Organisationen. GWV Fachverlag, Wiesbaden

Boisot M, Child J (1999) Organizations as Adaptive Systems in Complex Environments: The Case of China. Organization Science 3:237–252

Böse R, Schiepeck G (1989) Systemische Theorie und Therapie. Asanger, Heidelberg

Burmann C (2002) Strategische Flexibilität und Strategiewechsel als Determinanten des Unternehmenswertes. Deutscher Universitäts-Verlag, Wiesbaden

Carpenter MA (2002) Implications of Strategy and Social Context for the Relationship Between Top Management Heterogeneity and Firm Performance. Strategic Management Journal 3: 275–284

Cox TH, Blake S (1991) Managing Cultural Diversity: Implications for Organizational Competitiveness. Academy of Management Executive 3: 45–56

Coyle RG (1977) Management System Dynamics. Wiley, London

Cronin MA, Weingart LR (2007) Representational Gaps, Information Processing, and Conflict in Functionally Diverse Teams. Academy of Management Review 32(3): 761–773

David PA (1985) Economics of QWERTY [1985] Clio and the Economics of QWERTY. The American Economic Review 75: 332–337

David PA (1994) Why Are Institutions the 'Carriers of History'?: Path Dependence and the Evolution of Conventions, Organizations and Institutions. Structural Change and Economic Dynamics 5: 205–220

Davis JP, Eisenhardt KM, Bingham CB (2007) Developing theory through simulation methods. Academy of Management Review 2: 480–499

Dooley K (2002) Simulation Research Methods. In: J Baum (ed.) Companion to Organizations. Blackwell, London

Dörner D (2001) Die Logik des Misslingens: Strategisches Denken in komplexen Situationen. Rowohlt, Reinbek near Hamburg

Garavelli AC (2003) Flexibility Configurations for the Supply Chain Management. International Journal of Production Economics 8(2): 141–153

Gebert D, Boerner S (1995) Manager im Dilemma – Abschied von der offenen Gesellschaft. Campus-Verlag, Frankfurt a. M. et al.

Gharajedaghi J (1982) Social Dynamics (Dychotomy or Dialectic). General Systems 27: 251–268

Hambrick DC (2007) Upper Echelon Theory: An Update. Academy of Management Review 2: 334–343

Hambrick DC, Cho TS, Chen MJ (1996) The influence of top management team heterogeneity on firm's competitive moves. Administrative Science Quarterly 41: 659–684

Hamel G, Heene A (1994) Competence-Based Competition. Wiley, Chichester et al.

Harrison DA, Price KH, Bell MP (1998) Beyond Relational Demography: Time and the Effects of Surface- and Deep-Level Diversity on Work Group Cohesion. Academy of Management Journal 41: 96–107

Hazy JK (2007) Computer Models of Leadership: Foundations for a New Discipline or Meaningless Diversion?. The Leadership Quarterly 4: 391–410

Hicks HG, Gullett CR (1975) Organizations: Theory and Behavior. McGraw-Hill, New York

Holland JH (1995) Hidden Order: How Adaptation Builds Complexity. Addison Wesley, New York

Holland JH (2002) Complex Adaptive Systems and Spontaneous Emergence. In: Curzio AQ, Fortis M (eds) Complexity and Industrial Clusters. Physica-Verlag, Heidelberg

Hülsmann M (2005) Dilemmata im Krisenmanagement. In: Burmann C, Freiling J, Hülsmann M (eds) Management von Ad-hoc-Krisen, Grundlagen, Strategien, Erfolgsfaktoren, Gabler, Wiesbaden

Hülsmann M, Berry A (2004) Strategic Management Dilemma – Its Neccessity in a World of Diversity and Change. In: Wolff R et al. (eds.) Proceedings from SAM/IFSAM VII World Congress: Management in a World of Diversity and Change. Göteborg, Sweden

Hülsmann M, Wycisk C (2005a) Contributions of the concept of self-organization for a strategic competence-management. In: Proceedings of the 7th International Conference on Competence-Based Management: Value Creation through Competence-Building and Leveraging Antwerp, Belgium (Web-publication)

Hülsmann M, Wycisk C (2005b) Unlocking Organizations through Autonomous Co-Operation – Applied and Evaluated Principles of Self-Organization in Business Structures. The 21th EGOS Colloquium: Unlocking Organizations, Berlin (Web-publication)

Hülsmann M, Grapp J, Li Y (2006) Strategic Flexibility in Global Supply Chains – Competitive Advantage by Autonomous Cooperation. In: Pawar KS et al. (eds.) Conference Proceedings of 11th International Symposium on Logistics (11th ISL), Loughborough, United Kingdom

Hülsmann M, Grapp J, Li Y (2008) Strategic Adaptivity in Global Supply Chains – Competitive Advantage by Autonomous Cooperation. Special Edition of the International Journal of Production Economics 114: 14–26

Jansen JJP, Van den Bosch FAJ, Volberda HW (2005) Managing Potential and Realized Absorptive Capacity: How do Organizational Antecedents Matter? Academy of Management Journal 48(6): 999–1015

Kauer T, zu Waldeck TC, Schäffer U (2007) Effects of top management team characteristics on strategic decision making: Shifting attention to team member personalities and mediating processes. Management Decision 45(6): 942–967

Kauffman SA (1993) The Origins of Order: Self-Organization and Selection in Evolution. Oxford, New York

Kilduff M, Angelmar R, Mehra A (2000) Top Management Team Diversity and Firm Performance: Examining the Role of Cognitions. Organization Science 1: 21–34

Klüver J, Stoica C, Schmidt J (2003) Formal Models, Social Theory and Computer Simulations: Some Methodical Reflections. Journal of Artificial Societies and Social Simulation 6(2)

Krüger W, Homp C (1997) Kernkompetenz-Management: Steigerung von Flexibilität und Schlagkraft im Wettbewerb. Gabler, Wiesbaden

Langton CG (1992) Life at the Edge of Chaos. In: Langton CG, Taylor C, Farmer JD, Rasmussen S (eds.) Artificial Life II: The Proceedings of an Interdisciplinary Workshop on the Synthesis and Simulation of Living Systems Held 1990 in Los Alamos, Redwood City, New Mexico

Law AM, Kelton DW (1991) Simulation Modeling and Analysis. McGraw-Hill, New York

Lord RG, Maher KJ (1990) Alternative Information-Processing Models and Their Implications for Theory, Research, and Practice. Academy of Management Review 1: 9–28

Luhmann N (1973) Zweckbegriff und Systemrationalität – Über die Funktion von Zwecken in sozialen Systemen. Suhrkamp, Frankfurt a. M.

Luhmann N (1994) Soziale Systeme: Grundriss einer allgemeinen Theorie. Suhrkamp, Frankfurt a. M.

Malik F (2000) Strategie des Managements komplexer Systeme: Ein Beitrag zur Management-Kybernetik evolutionärer Systeme. Haupt Verlag, Bern

Miller CC, Burke LM, Glick WH (1998) Cognitive Diversity Among Upper-Echelon Executives – Implications for Strategic Decision Processes. Strategic Management Journal 19: 39–58

Müller-Christ G, Hülsmann M (2003) Quo vadis Umweltmanagement? Entwicklungsperspektiven einer nachhaltigkeitsorientierten Managementlehre. Die Betriebswirtschaft 63(3): 257–277

Müller-Martini M (2008) Kundenkompetenzen als Determinanten der Kundenbindung: Eine empirische Kausalanalyse am Beispiel der TV-versorgung von Privatkunden. Gabler, Wiesbaden

Ottens M (2003) Statistics on the Information Society in Europe. In: European Communities (eds.) Statistics in focus: Industry, Trade and Services, Theme 4 – 38, Official Publications of the EC, Luxembourg

Pelled LH, Eisenhardt KM, Xin KR (1999) Exploring the Black Box – An Analysis of Work Group Diversity, Conflict, and Performance. Administrative Since Quarterly 2: 1–28

Pitcher P, Smith AD (2001) Top Management Team Heterogeneity: Personality, Power and Proxies. Organization Science 12(1): 1–18

Probst GJB, Gomez P (1989) Vernetztes Denken: Unternehmen ganzheitlich führen. Gabler, Wiesbaden

Rogers EM (2003) Diffusion of Innovations. Free, New York

Sanchez R (2004) Understanding Competence-Based Management: Identifying and Managing Five Modes of Competence. Journal of Business Research 57: 518–532

Sanchez R, Heene A (1996) A Systems View of the Firm in Competence-Based Competition. In: Sanchez R, Heene A, Thomas H (eds) Dynamics of Competence-Based Competition: Theory and Practice in the New Strategic Management. Pergamon, Oxford et al.

Schieritz N, Milling P (2003) Modeling the Forest or Modeling the Trees – A Comparison of System Dynamics and Agent-Based Simulation. In: Eberlein RL et al. (eds.) Proceedings of the 21th International Conference of the System Dynamics Society, New York

Schreyögg G, Sydow J, Koch J (2003) Organisatorische Pfade – Von der Pfadabhängigkeit zur Pfadkreation?. In: Schreyögg G, Sydow J (eds.) Strategische Prozesse und Pfade, Managementforschung 13, Gabler, Wiesbaden

Siegele L (2002) How About Now ? A Survey of the Real-Time Economy. The Economist 362: 18–24

Simon HA (1972) Theories of Bounded Rationality. In: McGuire CB, Radner R (eds.) Decision and Organization. North-Holland, Amsterdam

Simons T, Pelled LH, Smith KA (1999) Making Use of Difference: Diversity, Debate, and Decision Comprehensiveness in Top Management Teams. Academy of Management Journal 6: 562–673

Staehle WH (1999) Management – eine verhaltenswissenschaftliche Perspektive. Vahlen, München

Stolarski V, Tilebein M (2009) Diversity as a Knowledge Resource in Top Management Teams – a Framework for Agent-Based Modeling. Proceedings of the 42th Annual Hawaii International Conference on System Sciences, Computer Society Press

Tapscott D (1999) Creating Value in the Network Economy. HBS, Boston et al.

Thomas DA, Ely RJ (1996) Making Differences Matter: A New Paradigm for Managing Diversity. Harvard Business Review 5: 79–90

Tilebein M (2006a) Diversity and Information Processing in Teams: A Combinative View. IFSAM VIIIth World Congress: "Enhancing managerial responsiveness to global challenges". (Web-publication)

Tilebein M (2006b) A Complex Adaptive Systems Approach to Efficiency and Innovation. Kybernetes. The International Journal of Systems and Cybernetics 7/8: 1087–1099

Van der Vegt GS, Bunderson JS (2005) Learning and Performance in Multidisciplinary Teams: The Importance of Collective Team Identification. Academy of Management Journal 3: 532–547

Wolfram S (1994) Cellular Automata and Complexity: Collected Papers. Perseus Books, Reading

Wooldridge M (2002) An Introduction to Multiagent Systems. Wiley, Chichester

Wycisk C, McKelvey B, Hülsmann M (2008) 'Smart Parts' Supply Networks as Complex Adaptive Systems: Analysis and Implications. The International Journal of Physical Distribution and Logistics Management 38(2): 108–125

Chapter 5
Developing a Technology Intelligence Strategy to Access Knowledge of Innovation Clusters

Rani J. Dang, Letizia Mortara, Ruth Thomson, and Tim Minshall

Contents

5.1 Introduction

It is nowadays commonly acknowledged that innovation is a key source of competitive advantage for companies. In order to innovate, companies need to efficiently manage their internal resources as well as their external relationships. They need to

R.J. Dang (✉)
GREDEG CNRS-UNS, 250, avenue Albert Einstein, Bâtiment 2, Bureau 18, 6560 Valbonne Sophia Antipolis, France
and
Centre for Technology Management, IfM, Department of Engineering, University of Cambridge, Alan Reece Building, 17 Charles Babbage Road, CB3 0FS Cambridge, UK
e-mail: rani.dang@gmail.com

L. Mortara, R. Thomson, and T. Minshall
Centre for Technology Management, IfM, Department of Engineering, University of Cambridge, Alan Reece Building, 17 Charles Babbage Road, CB3 0FS Cambridge, UK
e-mail: lm367@cam.ac.uk, ruth.thomson@cambridgeconsultants.com, thwm100@eng.cam.ac.uk

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_5,

manage increasing specialisation while at the same time exploring new opportunities for innovation. Current times have often been referred to as characterised by a knowledge-based economy a fast pace of technological change. In this difficult environment, companies compete to maintain or improve their market position.

Current studies on technology management have emphasised the importance of keeping abreast with technological developments by adopting technology intelligence (TI) strategies – i.e. by establishing activities for the systematic capture and delivery of technological information to decision makers that can help an organisation to be better aware of technology threats and opportunities (Kerr et al. 2006). Kerr et al. (2006) developed a conceptual model to operationalise TI activities.

TI is typically operationalised by setting up a number of activities, employing people with specific skills and profiles and by implementing infrastructural support (Mortara et al. 2009a, b). Among these activities, a number of companies have chosen to establish "listening posts" (Gassmann and Gaso 2004, 2005) in areas of intense innovative activities, for example, in regional clusters. According to mainstream thinking, by being in a particular location companies can better access knowledge, in the more tacit form, through participation in the local "buzz" accessing firsthand the latest developments in the region. In fact, within regional clusters technical information flows are known to be particularly intensive. The easy flow of knowledge, the transfer of ideas is argued to contribute to greater dynamics of knowledge creation and exploitation (Marshall 1920:271; Becattini 2002). By operating within a cluster, companies can thus have an easier access to knowledge. Moreover, vertical interactions along the value chain, horizontal interactions between competing companies and exchange between suppliers and consumers enable the companies "participating" in a cluster to capture the regional market trends and preferences and help them to take a decision concerning their future technological focus and to identify the frontiers and the limits of their knowledge. The advantages of clustering have been abundantly argued theoretically as well as empirically (cf. examples in : Moulaert and Sekia 2003; Martin and Sunleyt 2003; Moulaert and Hamdouch 2006) to show how it can support innovation through the capture of information and knowledge. Similarly, researchers have made lots of efforts to develop applied models for TI strategy. Yet, we know very little about how these two processes of knowledge capture are linked. Companies cannot afford to setup a technology outpost in every single geographic area where innovation and technological development are intense and relevant. Hence, companies need to develop a TI strategy for reaching out and exploring remotely what science and technology is being developed across, potentially, long geographic distances by establishing global pipelines (Bathelet et al. 2004). A question remains to understand how the existence of clusters and of local knowledge interface organisations could facilitate the access of knowledge for firms external to the cluster.

Therefore analysing the interplay between TI activities and the features of clusters is promising for understanding the mechanisms by which the efficiency of TI strategy could be improved by being embedded in a cluster. The objective is therefore to look at *how do companies organise and implement TI activities to leverage the knowledge and existence of regional clusters*? This chapter is particularly concerned with the first step of the strategy, i.e. the capture of relevant new technological information.

To answer this question this chapter will first present and define Technology Intelligence. In the second part, the features of regional clusters are reviewed and we discuss how they can be particularly relevant in addressing TI needs. In the last part we examine a particular case study of how Kodak accessed both the local knowledge by being embedded in a high tech cluster and developed a TI strategy to allow them to access knowledge from other locations.

5.2 Technology Intelligence: An Important Activity for the Innovation Strategy

Maintaining and increasing the pace of innovation is a fundamental requirement for companies in today's evolving markets. In order to achieve this goal many companies are embracing a new innovation approach, which relies on inputs coming from outside the company's boundaries. This approach has been framed by academics as "open innovation" (OI) (Chesbrough 2003). It implies that companies' boundaries become more "permeable" to allow the identification and exploitation of opportunities from the external environment. Innovation is becoming an increasingly distributed process involving players dispersed across the globe, open to innovate through possible different value chain configurations (Fraser et al. 2005). Identifying potential innovation partners, and recognising opportunities and threats, is an important step in the "open innovation" process. In fact, in the most recognised OI process [Want → Find → Get → Manage; (Witzeman et al. 2006)], "Find" implies identifying opportunities (and threats) coming from the external environment.

Knowledge about new technologies can offer firms a competitive edge if it is paired with knowledge regarding market opportunities and competitor's domains (Deschamps and Nayak 1995). Consequently, companies set up intelligence activities dedicated to keeping abreast of interesting and relevant developments in the environment. With a specific focus on technological information, technology intelligence (TI) activities concentrate on capturing and delivering technological information as part of the process to develop an awareness of technology threats and opportunities (Kerr et al. 2006). The TI activity is not only about simple knowledge management and information processing: its purpose is to provide "intelligence consumers" (i.e. decision makers) (Bernhardt 1993) with analysed, contextualised and purposeful intelligence. Recent academic research has been directed to explore this particular activity and has resulted in several works in this area (e.g., Savioz and Blum 2002; Lichtenthaler 2003, 2004a, b, 2005, 2006, 2007; Gassmann and Gaso 2004; Savioz and Tschirky 2004; Gassmann and Gaso 2005; Savioz 2006; Arman and Foden 2010; Rohrbeck 2010).

For most practitioners, technology intelligence is a required resource. However, in many cases current technology intelligence activities are not structured and organised. Mortara et al. (2009a, b) studied 14 UK technology-based companies in a variety of sectors looking at the different approaches the companies were using

to gather information, exploring their strengths and weaknesses and identifying practical ways to address common problems. They also developed a model (Kerr et al. 2006), which can help companies in structuring their TI activities. The model comprises four principal search modes (Fig. 5.1) for gathering information.

The internal modes of this model look for information inside the organisation:

- *Mining:* extracting explicit intelligence information from internal resources such as libraries and databases.
- *Trawling:* making in-house information explicit, particularly information that was previously not known to be there.

The external modes are used to capture new relevant information:

- *Targeting:* focusing on identified relevant new technologies outside the company and monitoring their development.
- *Scanning:* keeping abreast of any unforeseen developments that could have an impact on the business.

Through cross comparison of company case studies (Mortara et al. 2009a, b) and building on Kerr et al.'s (2006) theoretical model, a generalised set of elements (toolbox) was proposed which can be used to map and characterise a TI system. This work highlighted that social network connections have a dominant role in any intelligence system. An initial model (Fig. 5.2; Mortara et al. 2009a) was developed combining Stephenson's (1999) model of social networks with the observation of practice. The model suggests that a company establishes links with

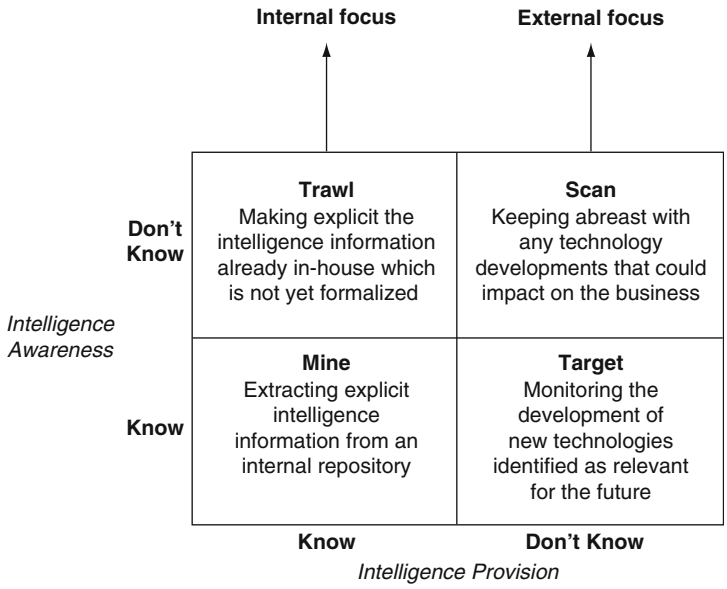


Fig. 5.1 TI search modes (Kerr et al. 2006)

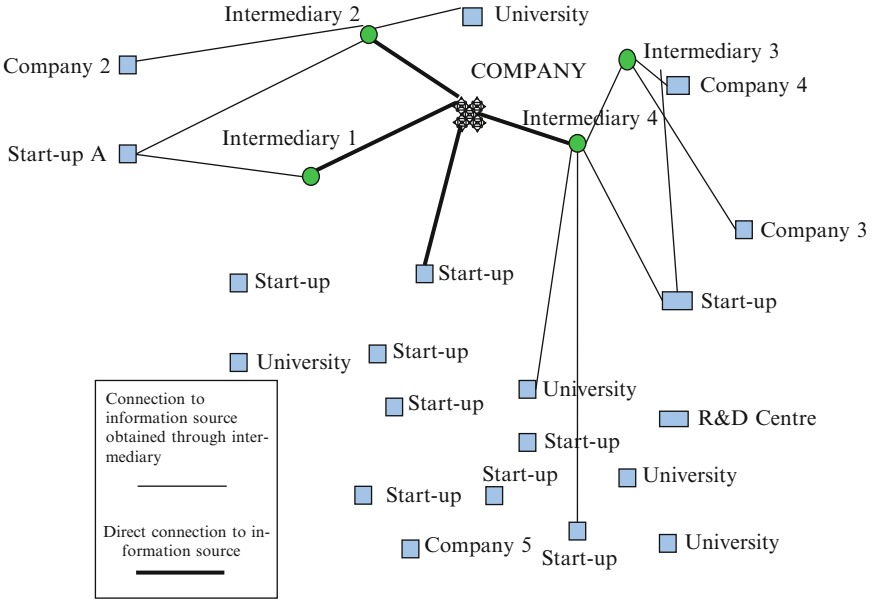


Fig. 5.2 Representation of TI external networks. An example observed during past research. (Mortara et al. 2009a)

primary sources of information via the external gatekeepers (the scouts), while *Scan* provides the connection with a large number of non pre-identified sources of information across the environment. Both target and scan could be operated through links with primary or secondary sources of information. The importance of links with secondary sources (intermediaries who can pass information between two groups) can be seen in the example shown in Fig. 5.2: where, by connecting to three intermediaries, the company achieves secondary connections with eight primary sources of information. However, social networks with intermediary 1 and 2 are clustered (Uzzi and Dunlap 2005) as they both reach start-up A. Making the connection with intermediary 1 is somewhat redundant. On the other hand, intermediary 4 allows the connection to the network of intermediary 3, giving access to 5 information sources through secondary contacts.

Researchers working in the field of social networks have long since highlighted the importance of weak ties (Granovetter 1983), i.e. the relationships that enable the connection between different social groups, to reach the most useful and relevant information. Networks enable information flows deriving from the social linkages that connect employees from different companies (Almeida and Kogut 1999). Social exchanges therefore require physical proximity and regular interactions. This is the reason why scholars working in the field of economic geography and economic sociology show that there is a significant qualitative difference between local and global networks (Whittington et al. 2009). Therefore, it would

be interesting to examine what features of localised innovation networks – or regional clusters – technology intelligence systems can leverage.

5.3 Regional Clusters and Innovation

5.3.1 The Innovation Capabilities of Clusters in the Context of Open Innovation

Regional clusters have been the focus of a substantial body of literature. Amongst the studies, the attention of the scholars has increasingly been focused on the analysis of how clusters' networks can support innovation. This is due to the fact that innovation is nowadays seen as a collective process (Keeble and Wilkinson 2000), which involves many different actors that need to combine their resources for innovation. Whilst traditionally companies have operated a "closed innovation" model where they rely only on internal R&D, companies now adopt an open approach to innovation by allowing external access to their innovation processes and reaching out to external knowledge. In fact, increasingly firms are getting involved in collaborations that transcend sectors and country boundaries. From this perspective participating in, and accessing regional clusters is particularly relevant. Regional clusters can enhance the capacity for innovation (Maskell 2001) as they promote the exchange of information and the combination of complementary knowledge (Von Hippel 1988; Lundvall 1992) through local social interactions (Garnsey and Longhi 2004). However, the front-end process of innovation is particularly tricky for companies as they need to capture the most recent and relevant information. This information is usually tacit and therefore highly dependent on its social context and it is known to be "sticky context-laden" (Asheim and Gertler 2005). Tacit information is often bound to a geographic location and requires contextual understanding. Spatial proximity enables people interactions that favour the exchange of tacit knowledge thanks to physical encounters, informal and face-to-face exchanges that enhance trust and a fast diffusion of new ideas. These dynamics are often referred to as "localised knowledge spillovers". Companies search for a constant renewal of their knowledge through the exchange and capture of informal knowledge that would accelerate their technological advancement (Audretsch and Feldman 1996; Garnsey and Longhi 2004). Interacting within clusters facilitates this complex process.

5.3.1.1 How Firms Gain by Interacting in Cluster

The transfer of information and knowledge that can assist innovativeness can proceed through several dimensions within a cluster: the structural dimension, the relational dimension and the cognitive dimension (Dang et al. 2010). Among the three dimensions, the capture of relevant information is particularly concerned with the structural and the relational dimensions.

5.3.2 The Structural Features of Clusters

Significant research exists on the structural features of regional clusters. Previous work mainly focuses on the way actors can benefit from localised knowledge spillovers (Audretsch and Feldman 1996; Breschi and Lissoni 2001) depending on the structure of interactions in cluster networks. Regional advantages derive from the existence of dense networks of interaction between actors but the benefits vary according to the mechanisms used.

5.3.3 Type of Links and Position in the Network

It is suggested that the analysis of the actors' position in the network and the type of links have an impact on the way the actors can access relevant information for innovation (Burt 1992). The importance of the structural dimension is also pointed out by Kogut (2000) who argues that, in a technology cluster, the network of relationships between participants is the principal source of knowledge and this is related to the networking potential (Saxenian 1994; Sorenson et al. 2006). Capaldo (2007) outlines the nature of "dual networks" on innovative capabilities. Dual networks refer to the structure of networks in which a small core of strong ties is integrated in a larger periphery of weaker ties. Weak ties speed up innovation by expanding the network diversity, whilst strong ties stimulate knowledge transfer (Granovetter 1985). However, as ties and connections are typically constrained by distance, the geographical concentration plays a crucial role. The integration of a company in a cluster enables them to mobilise both strong ties as well as weak ties. The potential benefit of networks regarding the capture of new information is therefore enhanced when companies embed themselves within a cluster. Besides, Owen-Smith and Powell (2004) claim that the innovative capabilities of networks also depend on the position of actors within the network. Powell et al. (1996) show the importance of being central to the network, centrality being measured by the number and importance of strategic alliances between organisations. As shown by recent studies (Giuliani and Bell 2004) information and knowledge flows in cluster networks are not diffused evenly "in the air" as stated by Marshall (1920): some companies may be isolated from relevant information if they are not central to the network. Also the number of connections between actors could be used as a measure of centrality in the network.

5.3.4 The Local-Global Trade-Off

For a firm, being embedded in the cluster, or at least having an outpost which acts as an interface between the main firm headquarters and the local actors and networks, is crucial. This is also highlighted in the works on gatekeepers of knowledge, (Allen

1977; Lazaric et al. 2008; Rychen and Zimmermann 2006) where the role of the gatekeepers is to create links and channels both inside and outside the cluster. As suggested by Keeble and Wilkinson (1999), successful clusters are those, which combine dense internal inter-firm interactions with external, and often global networks. Current research also shows that cluster performance does not only result from the quality of interactions and coordination inside the cluster but also from external networks and cooperation with distant rivals or partners (Rychen and Zimmermann 2006). One main advantage of cluster is based on their capacity to foster complementarity between dense internal interactions that sustain innovation and at the same time fulfil the needs for external and global knowledge (ibid, 2006). Most clusters have "technological gatekeepers" (Allen 1977), actors that "link their organisation to the technological world at large". This concept refers to the problem of communication in technology in the context of R&D organisations. As stated by Rychen and Zimmermann (2006), indirect flows of information are forwarded through opinion leaders. These gatekeepers are the people or organisations that "for various reasons, tend to become more acquainted with information sources outside their immediate community. They either read more extensively than most or develop personal contacts with outsiders. A large proportion of these people in turn attract colleagues from within the community who turn to them for information and advice" (Allen 1977, p. 150, quoted by Rychen and Zimmermann 2006). Technological gatekeepers are interfaces between internal and external resources enabling local actors to take advantage of their own external relations but also give external actors access to local resources. They also play a role in internal co-ordination as they are very well positioned to know what expertise and local skills they should mobilise and combine to draw benefits from geographical proximity effects.

5.3.5 The Social and Relational Features of Clusters

The influence of geographical proximity is beneficial only when strategic alliances link local actors (Almeida and Kogut 1999). The access to new knowledge is not only the result of interactions between actors. Type of relationships, whether formal or informal, business alliances, commercial relationships or social interaction between actors also play a role.

5.3.5.1 Clusters as a Combination of Vertical and Horizontal Relationships

If the cluster combines competitors' competencies as well as partners' competencies within the same industry, innovation is stimulated by competitive action (Porter 1998).

Porter (1998) has identified that interactions between competitors and collaborators in a cluster is a crucial element of cluster innovation dynamics. The 'horizontal

relationships' – i.e. those with competitors – create a lot of positive pressure on firms. Athough competition prevent firms from collaborating closely, t co-located firms are still well informed about their competitors's innovation in services and products, as well as "the cost and quality of the production factors they use" (Bathelt 2005:108). This does enhance product differentiation and increased efficiency and enables firms to effectively compare their performance (ibid, 2005). Thus, the horizontal interactions stimulate observation, comparison and exchange of information that create a local buzz and result in a perpetual updating of information. In this perspective, clusters can be viewed as ideal incubators for innovation (Preissl, Solimene 2003). They foster relationships and regular interactions that create and support new markets. This dynamic creates a definitive push towards innovation.

"Vertical relationships" – i.e. relationships along the supply chain – also stimulate innovation within clusters. Malmberg and Maskell (2005) refer to this as "learning by interacting". They claim that vertical interactions in clusters with "sophisticated" consumers enable companies to formalise and anticipate their offer and update their knowledge about the market.

5.3.5.2 Embedding Actors Within a Cluster and the Effects of "Local Buzz"

Local interactions are based on social relations that are due to, and fostered, by co-location. The cluster structure of embedded actors relies on the interdependencies between these individuals, which have evolved over time (He 2006; Bathelt 2008). In fact, as claimed by Storper and Venables (2003), the local buzz is a privileged channel for knowledge flow, particularly when the knowledge is tacit. Companies benefit from being embedded in a cluster because their employees regularly interacting with other actors enables the exchange of tacit knowledge. While codified knowledge can be quite easily diffused with any communication means, informal and tacit knowledge may be spread more through serendipity. Neither the transmitter nor the receiver knows in advance about its relevance before it is communicated (Saxenian 1994; Audretsch and Feldman 1996). This exchange of informal new knowledge can help accelerate technological advancement. This local buzz is the key difference between local and global networks (Witthington et al. 2009). Indeed, the concept of local buzz developed by Storper and Venables (2003) refers to "the information and communication ecology created by numerous face-to-face interactions (. . .)" (Malmberg and Maskell 2005). According to these authors, this buzz consists of information continuously exchanged and updated both through intended and unanticipated learning processes, for example in organised and accidental meetings. The buzz exists because of a number of tacit constructs such as the application of the same interpretative frameworks and a shared understanding of new knowledge and technologies, as well as cultural traditions and habits. These conditions, typical of a cluster, make interacting and learning less costly. Personal contacts are hence considered a necessary element in the transfer of knowledge and it implies that a certain degree of cognitive proximity exists through which people can achieve a mutual understanding of new technologies. Cooke (2006) has pointed

out that clusters accumulate knowledge and in time become a rich knowledge base, which he refers to as "leading knowledge". Firms are attracted by this "leading knowledge" and may decide to establish themselves in the cluster in order to capture knowledge spillovers (Hervás-Oliver and Albors-Garrigós 2008).

In summary, regional clusters constitute an important lever for Technical Intelligence strategy. They allow vertical interactions along the value chain and horizontal interactions between competing companies. The exchange between suppliers and consumers enables firms to understand and capture the regional market trends and preferences, and help them to take a decision concerning their future technological focus and their next investments. In addition, direct interaction within a cluster is widely recognised to be a necessary condition for establishing trusting relations and communicating sensitive, early-stage knowledge and information. Technical information flows are particularly intensive and facilitated in clusters thanks to the "local buzz" or, in other words, the networking potential. Finally, clusters' global pipelines represent privileged channels and conduits for information flows between local companies and external networks enhancing a fast diffusion of new ideas. Clusters represent a significant means for the establishment of trans-local relations in common situations of incomplete knowledge and uncertainty. "Local buzz" and "global pipelines" are thus, mutually reinforcing mechanisms (Bathelet et al. 2004) helping companies to identify the frontiers and the limits of their knowledge, and to capture new technical knowledge.

The following section will explore how these theoretical concepts and cluster characteristics are reflected in the TI strategy developed by Kodak. We will focus on how they accessed the local knowledge by being embedded in a high tech cluster (Cambridge, UK) and how they developed global pipelines to access knowledge in other locations.

5.4 Development of a TI Strategy at Kodak European Research: Accessing Knowledge Through Innovation Clusters

Kodak is a US-based multinational company employing over 20,000 people globally. It currently has a local presence in more than 50 countries worldwide. This global presence has been established since the company's foundation in 1888.

The current Kodak business focuses on three major areas – Consumer Digital Imaging, Graphic Communications and Film, Photofinishing and Entertainment. Kodak offers products and services for a broad range of imaging applications for consumer, commercial and industrial customers. The innovation commitment of Kodak is demonstrated by their extensive patent portfolio and by their strong and respected brand.

Following the growth of digital technology and Kodak's diversification into a wide range of imaging/printing technology businesses it was clear that for future innovation internal resources alone were not sufficient. Kodak hence adopted an Open Innovation strategy to complement internal innovation initiatives and, as part

of this, in January 2006 they established an "Open Innovation" centre (Kodak European Research (KER)) in Europe. KER had the mission to identify opportunities and partners of strategic importance within the European, African, and Middle Eastern Region (EAMER) (Mortara et al. 2010).

Although KER was closed in 2009 due to the 2007–2008 financial crisis, the story of how KER's TI strategy was developed represents an interesting case study to understand how TI and the TI communication strategy of a company can be influenced by the existence and activity of knowledge clusters. In particular, the following sections will discuss (1) how KER benefited from the Cambridge location and (2) how KER could leverage other regional clusters around Europe by connecting through "global pipelines" (Bathelet et al. 2004). In particular, this case study will discuss the communication approaches adopted at KER to carry out their scouting activity and how these approaches were refined through the experience of 3 years of activity.

5.4.1 The Cambridge Knowledge Cluster

Cambridge, UK, was chosen by Kodak as the base for KER from which to explore opportunities across the whole of EAMER. Cambridge is characterised by a high density of "actors and networks" (Cooke and Huggins 2003) and by extremely efficient informal channels and personal relationships which have developed since the origin of the cluster. The primary specialisation fields of the cluster are ICT and life science, especially biotechnologies (Huggins 2008) as well as ink jet printing (Drofiak and Garnsey 2009). Of particular importance for the cluster is the role of the University of Cambridge and its spin-off companies (Garnsey and Longhi 2004). The university plays a key role in the development of new technologies, in the foundation of new spin-off firms, in the creation of inter-company networks and generating a highly qualified workforce (Garnsey and Heffernan 2005). In addition to the university, the cluster encompasses a number of key players including intermediaries and consultancy organisations such as Cambridge Consultants and TTP as well as a rich venture capital community. Cambridge has several sites dedicated to innovation, including science parks and incubators. Thanks to the interplay between all these organisations, Cambridge has seen real success stories. One of the most famous is that of ARM (originated as a joint venture between Acorn and Apple and with the support of investors including VLSI Technologies and serial entrepreneur Hermann Hauser). ARM is now the global leader in the licensing of microprocessors and chips. Another example is CSR – a leading wireless technology firm - which was spun-out from Cambridge Consultants. Cambridge's dynamic environment has attracted multinational corporations from a diverse range of sectors including GlaxoSmithKline (GSK), Hitachi, Microsoft, Nokia, Philips, Rolls Royce, Schlumberger, Toshiba and Unilever. They have come to Cambridge to benefit from the "local buzz". Some of these companies have

partnered with the University to fund university–industry research initiatives and establish R&D centres. In addition, Cambridge Network Ltd. is a local organisation that focuses on reinforcing and expanding the ties across the network by acting as a knowledge intermediary. Of particular success are events such as the "Corporate Gateway", a showcase, brokering and networking event where external companies are introduced to ideas and technology from Cambridge and the East of England region through bespoke visits and seminars.

5.4.2 Accessing the "Local Buzz"

A number of factors influenced the decision to locate KER within the Cambridge Cluster. These included not only the relevance of the technical knowledge in the cluster to Kodak's business, the strength of the start-up and venture capital communities but also the softer aspects of the lifestyle of the region, the communication and transport channels, and the opportunities for identifying and recruiting competences in the area. According to Kodak's managers involved in the location decision-making, the ability of the local investment agencies and cluster organisations to "sell" Cambridge as an attractive and unique location helped determine this as the location for KER. The agencies portrayed a clear image of how the cluster differs from others, the core skills and capabilities that are accessible, as well as the benefits and opportunities of participating in local initiatives. Through initiatives such as the Corporate Gateway organised by the Cambridge Network, Kodak could appreciate the specialisations of the area and make the first business connections even before establishing a presence in Cambridge.

Once KER was established, in order to access local knowledge, the 25 KER staff developed an active programme of taking part in Cambridge activities, events, networks workshops and interest groups. For example, putting forward speakers for local events was regarded as very important:

> "It was important for us to start disseminating our message, telling people directly about the "Open Innovation" strategy at Kodak and about the new and exciting venture of the KER centre. You want people to hear the story from you so that the message is clear. New comers to clusters, particularly those with big brand names, always attract a lot of interest and if the message is not clear, coherent and directed, it is inevitable that contrasting voices will emerge. By spreading a consistent message and by being "open" about what we wanted to achieve we could really make the most of the "initial splash" of moving to Cambridge. Our experience of moving to the Cambridge cluster was that many people came forward to introduce us to different groups and to help us make the most of the cluster networks. Actively participating in the networks is important not only because you want your company to be known, but also you want to be known personally as a representative of the company." – Ruth Thomson, Innovation Leader at KER

Particular attention was paid to the public relations (PR) messages about why Kodak moved to Cambridge and what they wanted to achieve at KER. In these messages it was explained what technologies and fields were of interest, the ways in which Kodak could collaborate with different partners and who at Kodak should be

contacted to begin a discussion. This allowed the community to immediately identify the gatekeepers at Kodak and the best ways to communicate and propose ideas and technology. Ruth Thomson also noted that having a strong initial PR message has the side effect of raising expectations in the community and people might use the message to evaluate progress and results before these can be realistically achieved and/or communicated externally.

Being in the cluster had many advantages due to the predicted availability and access to local technology and networks. The plethora of relevant events "on the doorstep" made it possible to easily attend events just for part of the day or in the evening, making the best of the internal resources.

> "The flip side of this is that there is so much always going on [locally] that it was very difficult not to be totally absorbed by the local events with the risk of spending the majority of time in Cambridge and neglecting opportunities in the rest of the EAMER!" – Ruth Thomson

5.4.3 Establishing "Global Pipelines"

To reach out the rest of the EAMER, KER developed a four-step TI process based on the TI model (Kerr et al. 2006) in Fig. 5.1. The process is shown in Fig. 5.2 (Mortara et al. 2010) and progresses from an open search for information on what interesting technology, knowledge and clusters exist in different countries in the EAMER i.e. the 'Scan' activity described by Kerr et al. (2006) to the targeting of relevant technological areas through the establishment of links and relationships with key contacts and groups across EAMER.

The first step consisted of understanding the context and background of the regions across EAMER and, in particular, how science, technology and innovation are developed and supported in those regions. This step was achieved through a systematic desk-based creation of background "country guides". These were living documents that brought together key information relating to the different regions. These guides formed the background knowledge for both the identification of the regions to be explored and of relevant organisations that could act as knowledge intermediaries to facilitate access to the area. For the development of the guides a clear set of rules were established (see Mortara et al. 2010).

Knowledge intermediaries, i.e. people and organisation that could provide support in accessing local knowledge, especially in areas of dense science and technological development such as clusters, helped KER to prepare itineraries for visits to regions across EAMER.

> "Working with intermediaries made the task of accessing technology and clusters significantly more efficient. Intermediaries understand their own region so they can help you understand the context of the innovation environment. Working closely with them and helping them to understand your interests and objectives means you can identify the real opportunities. In this way you can make the most of a potential visit and follow-up interactions, while building an ongoing relationship with key contacts in the region" – Ruth Thomson

Intermediaries ranged from local and national development agencies, to venture capitalists and consultancy organisations. In some cases, single individuals provided feedback and access to local knowledge. Some intermediaries were privately owned, others were part of universities, science parks, or public bodies at a local national or international level (Fig. 5.3).

> "There was a great difference between the [intermediary] options and the response we got from them. Some told us too much, without tailoring the information to our needs, others too little so that we were unable to evaluate the advantages we would have had in collaborating with them and in visiting the region". – Ruth Thomson

Problems were noted by the KER managers in identifying, evaluating, and differentiating between intermediaries. These problems resulted the fact that some intermediaries did not explicitly communicate their areas of focus or speciality. There can be many organisations proposing themselves as the intermediary of choice for the same area and for those external to the local context it can be quite difficult to determine who they should collaborate with. KER managers noted that it would be much easier to appreciate how a cluster or a region differentiates itself if there is a clear reference to the specificity of cluster knowledge (for example, when it is reflected in the name of the intermediary organisation or clearly stated on the

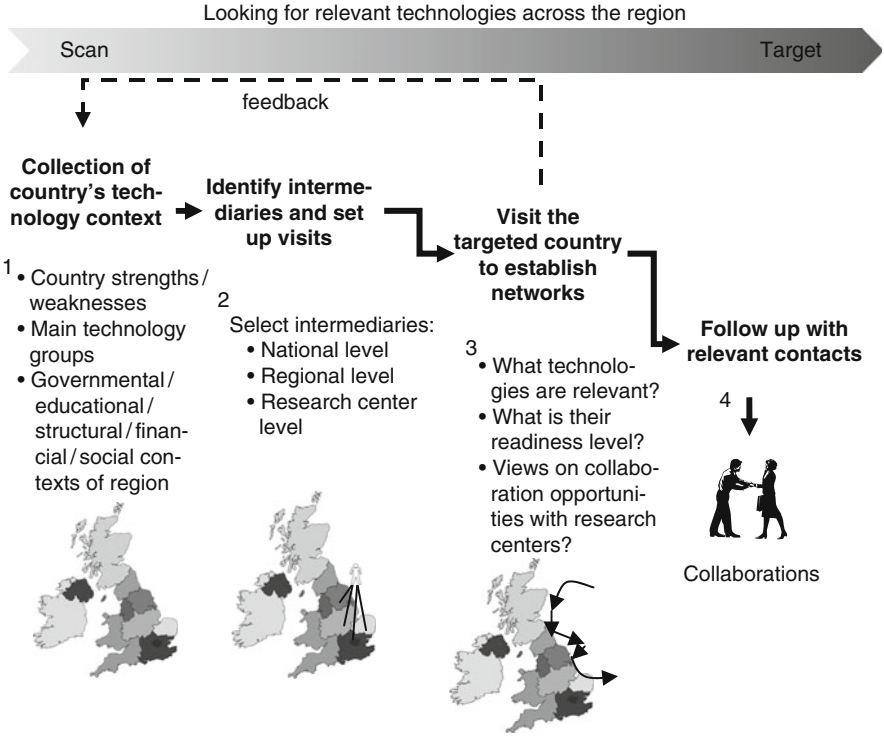


Fig. 5.3 Technology intelligence at KER, moving from Scan to Target (Mortara et al. 2010)

website). However, the downside to this is that there is the risk that by forcing labels and over generalising the knowledge of the cluster, one could overlook interesting opportunities.

KER developed a triangulation approach and a clear checklist to assess information from intermediaries (Mortara et al. 2010) as shown in Fig. 5.4.

In order to gain the most objective understanding and identify the best contacts for KER in a certain region, KER reviewed and compared information gathered from different intermediaries. This approach helped to reduce the potential bias of any single intermediary and to capture a larger set of information.

Equally, it was very important to be coherent and clear about what Kodak wanted from the visit and the opportunities for potential collaboration. Talking with the intermediaries prior to the visit, iterating ideas for the itinerary and being clear what KER wanted out of the visit were key.

Once arranged, visits to the designated region took place. The communication strategy was carefully planned in order to maintain a coherent and open discourse with the contacts.

> "It was very important that we were 'open' too. We knew that contacts would be doing their 'due diligence' on us, both as KER, and us as individuals – we would be 'Googled'! We wanted to make sure that they found accurate and 'open' information that would help facilitate interaction". – Ruth Thomson

A brochure and a presentation containing key information were prepared to be circulated as widely as possible where KER explained its needs and interests and routes to collaboration.

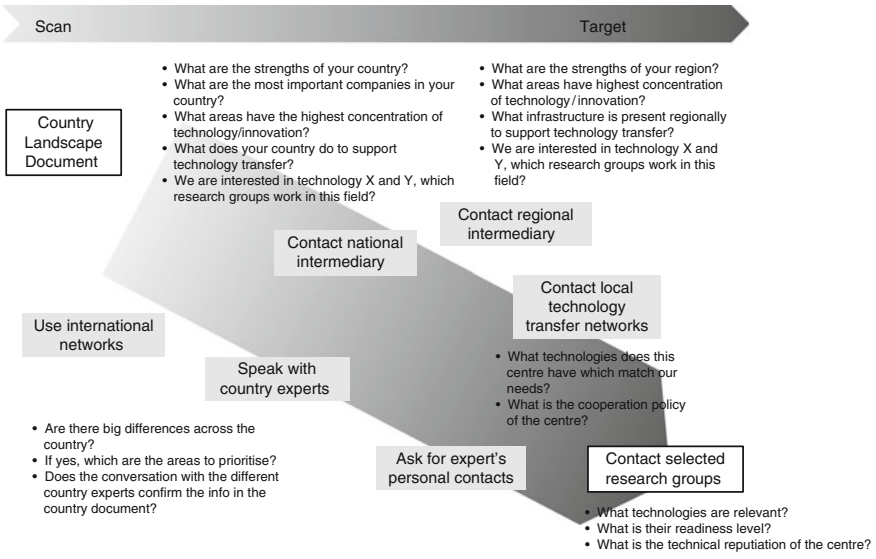


Fig. 5.4 KER developed a triangulation approach

> "Due to our strong brand equity and the association of the 'Kodak' name with photography it would be easy for people to assume that we wouldn't be interested in anything else. However our interests were diverse across the wide range of current and future printing and imaging technologies. It was important we communicated this clearly". – Ruth Thomson

A "double-act" was adopted for the scouting visits whereby KER sent teams with a balance between technical expertise and commercial understanding. This helped the dynamics during the visits and the dialogue between the scouts and their hosts.

Once back from the journey, KER scouts followed up on connections and potential collaborations. Predictably, the visits did not always lead to immediate collaboration, however, as part of the TI strategy, KER provided feedback and follow-up to those organisations and individuals they had met:

> "We understood the value of the connections and networks we had established as part of a visit. Even if something was not of interest at present it might have been in the future. Intermediaries in particular are an exceptionally important conduit of knowledge and could be the key to the discovery of future opportunities. Providing feedback to them about what was/was not of interest significantly improving their knowledge on what could be of interest in the future was important. By maintaining these connections we built up an effective network across EAMER". – Ruth Thomson

5.5 Discussion and Conclusion

Technology intelligence is an important firm activity to keep abreast with technological developments. One means of enhancing a firm's ability to perform TI effectively is to establish "listening posts" in areas of intense innovative activity, such as regional clusters. However, companies cannot afford to set up technology outposts in every single area of potential interest. This paper discussed an example of how companies can develop a TI strategy that enables them to explore remotely science and technology developments across long geographic distances. This chapter also discussed an example of how a company benefited from being embedded within a regional cluster, and how they could also set up strategies to enable them to access knowledge from other remote regional clusters.

This case study illustrates these issues through the example of Kodak European Research, and examines the role of regional cluster networks' main features in facilitating Kodak's TI strategy. Kodak TI strategy benefited from the Cambridge clusters' local and global networks in two ways. On the one hand, Kodak built connections within the cluster taking advantage of its position in Cambridge. The case study has also highlighted how Kodak could access knowledge in other clusters by linking to intermediaries such as development agencies, university technology transfer offices around EAMER.

By interacting with the Cambridge cluster, Kodak became more integrated within the local network as it could directly access relevant local knowledge that was not easily reachable from the headquarters in America. The literature refers to centrality as the number of strategic connections a company gains by interacting in

the cluster. Through KER, Kodak accessed a great number of relevant local networking events such as those facilitated by Cambridge Network Ltd and could start numerous relationships with local actors. However, although literature suggests the number of connections as a potential metric for the centrality of the network, practice at Kodak suggested that the number of connections is a somewhat irrelevant metric for the scouts. First of all, Ruth Thomson points out:

> what is valuable about connections is not their number but their relevance and proactiveness. Besides, it is not enough to talk with people once and count them as a 'connection'. Connections need to be fostered and maintained.

This suggests that there is the need for more dynamic and qualitative metrics of networks. Additionally, if one still desired to measure the number of connections one should also keep track of the connections that could be accessed through each relation. Although in current times people networks are becoming more explicit through systems like LinkedIn®, this approach to measuring relationships somewhat misses the point of the value of personal connections and the importance of the trust that can be established between individuals. Furthermore, the number of connections can be only interesting as a relative measure for a scouting activity, i.e. if the total possible number of connections is known or if one could directly compare how many connections others scouts in the outpost have gained. But the number of possible connections will be constantly changing and therefore very difficult to capture.

Through its presence in the Cambridge cluster KER became the intermediary between the cluster and Kodak's headquarters. Through KER, Kodak could more easily capture local knowledge from EAMER, and bring information to their headquarters located far away from the cluster. Thus, KER constituted a global pipeline and conduit for information flows between local companies and Kodak headquarters, enhancing the fast diffusion of new ideas. Figure 5.5 shows the two types of channels.

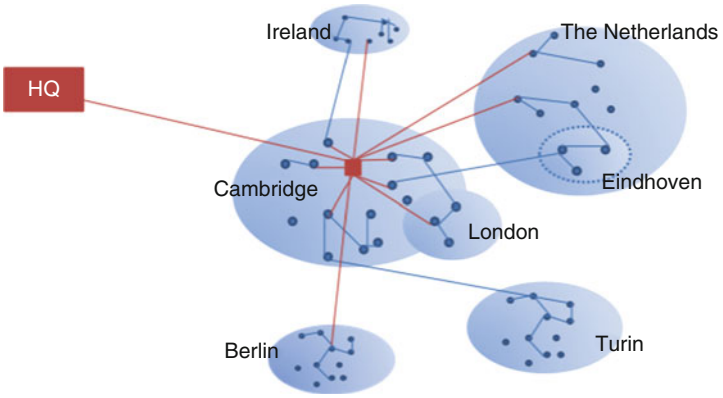


Fig. 5.5 A visual representation of Kodak's networks

The Cambridge cluster combines dense internal inter-firm interactions but also synergies with external, and often global, networks. The clusters constituted a significant channel for the establishment of trans-local relations. To reach these external connections KER benefited from the help of several organisations who acted as gatekeepers for their local knowledge. KER emphasised the importance of these intermediaries and considered them as an integral part of their social network (Mortara et al. 2010). The role of intermediaries was fundamental both within Cambridge and outside Cambridge. These agencies played the role of interface between internal actors and external new actors, giving Kodak access to the extremely efficient local informal relations and with it, the news and tacit information in the region: the "local buzz". This suggests that further research within the field of TI and regional cluster should be directed to understand how companies could identify and select the best intermediary configuration.

Although this is by no means an exhaustive description of the networks established, this picture qualitatively indicates the diverse types of networks across different regional clusters accessed by Kodak through KER.

Overall, the research bridges the gap between two domains of research, whose integration can give insights into the mechanisms by which TI activities can be enhanced by location. In this perspective, this chapter has explored the value of (1) being embedded within a cluster, and (2) remotely accessing the knowledge of clusters. It also shows (3) how cluster and TI approaches can be combined to support a company's TI strategy.

Bibliography

Almeida, P. and Kogut, B. (1999). Localization of knowledge and the mobility of engineers in regional networks. Management Science, 45(7): 905–917

Allen, T. J. (1977). Managing the Flow of Technology: Technology Transfer and the Dissemination of Technological Information Within the R&D Organization. MIT Press, Cambridge.

Arman, H. and Foden, J. (2010). Combining methods in the technology intelligence process: application in an aerospace manufacturing firm. R & D Management, 40(2): 181–194.

Asheim, B. T. and Gertler, M. (2005). The Geography of Innovation: Regional Innovation Systems. In Fagerberg, J., Mowery, D. and Nelson, R. (eds.), The Oxford Handbook of Innovation. Oxford University Press, Oxford.

Audretsch, D. B., and Feldman, M. P. (1996). R&D spillovers and the geography of innovation and production. The American Economic Review, 86(3): 630–640.

Bathelet, H., Malmberg, A., and Maskell P. (2004). Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation. Progress in Human Geography, 28(1): 31–56.

Bathelt, H. (2005). Cluster Relations in the Media Industry: Exploring the 'Distanced Neighbour' Paradox in Leipzig. In: Regional Studies (Vol. 39) pp. 105–127.

Bathelt, H. (2008). Knowledge-Based Clusters: Regional Multiplier Models and the Role of 'Buzz' and 'Pipelines'. In Karlsson, C. (ed.), Handbook of Research on Cluster Theory. Edward Elgar, Cheltenham, 336 p.

Becattini G. (2002). From Marshall's to the Italian Industrial District. A Brief Critical Reconstruction In Curzio AQ and Fortis M (ed) Complexity and Industrial Clusters – Dynamics and Models in theory and practice. Physica, Heidelberg (Germany), New-York, pp. 83–106.

Bernhardt, D. (1993). Perfectly Legal Competitor Intelligence. Pitman, London.
Breschi, S., and Lissoni F. (2001). Localised knowledge spillovers vs. innovative milieux: Knowledge "tacitness" reconsidered. Papers in Regional Science, 80: 255–273.
Burt, R. S. (1992). Structural Holes. The Social Structure of Competition. Harvard University Press, Cambridge.
Camagni, R. and Capello, R. (2000). The Role of Inter-SME Networking and Links in Innovative High-Technology Milieux, Chapter 5. In Keeble, D., Wilkinson, F. et al. (eds.), High-Technology Clusters, Networking and Collective Learning in Europe. Ashgate, Aldershot.
Capaldo, A. (2007). Network structure and innovation: The leveraging of a dual network as a distinctive relational capability. Strategic Management Journal, 28: 585–608.
Carbonara, N. (2004). Innovation processes within geographical clusters: a cognitive approach. Technovation, 24: 53–63.
Castell, M., and Hall P. (1994). Technopoles of the World. Routledge, London.
Chesbrough, H. (2003). Open Innovation: The New Imperative for Creating and Profiting from Technology. Harvard Business School Press, Boston.
Cooke, P. (2006). Global bioregional networks: a new economic geography of bioscientific knowledge. European Planning Studies, 14: 1265–1285
Cooke, P. and R. Huggins (2003). High-Technology Clustering in Cambridge (UK). The Institutions of Local Development. F. Sforzi. Ashgate, Aldershot, UK, pp. 51–74.
Dang, R. J., Thomas, C., and Longhi, C. (2010). What can help small firms accessing knowledge in territorial innovation networks? *26th EGOS Colloquium*, Lisbon, Portugal, 2–4 July 2010.
Deschamps, J. P. and Nayak, P. R. (1995). Product Juggernauts: How Companies Mobilize to Generate a Stream of Market Winners. HBS, Boston.
Drofiak A, and Garnsey E. (2009). The Cambridge high tech cluster: resilience and response to cyclical trends, CTM working papers.
Fraser, P., Minshall, T. H. W., and Probert, D. (2005). The distributed innovation pradigm: Evolution and dynamics. 6th International CINet Conference Continuous Innovation -(Ways of) making things happen. Brighton, UK.
Garnsey, E. and Longhi, C. (2004). High technology locations and globalisation: Converse paths, common processes. International Journal of Technology Management & Innovation, 28(3): 336–355.
Garnsey, E. and Heffernan, P. (2005). High-technology clustering through spin-out and attraction: The Cambridge case. Regional Studies, 39(8): 1127–1144.
Gassmann, O. and Gaso, B. (2004). Insourcing creativity with listening posts in decentralised firms. Creativity & Innovation Management, 13(1): 3–14.
Gassmann, O. and Gaso, B. (2005). Organisational frameworks for listening post activities. International Journal of Technology Intelligence and Planning, 1(3): 241–265.
Giuliani, E., and Bell, M. (2004). When micro shapes the meso: Learning networks in a Chilean wine cluster. SPRU Electronic Working Paper Series, Paper No. 115, April 2004
Granovetter M. S. (1985). Economic action and social structure : the problem of embeddedness. American Journal of Sociology, 91(3): 481–510.
Granovetter, M. S. (1983). The strength of weak ties: a network theory revisited. Sociological Theory, 1: 201–233.
He, S. (2006). Clusters, structural embeddedness, and knowledge: A structural embeddedness model of clusters. DRUID-DIME Winter PhD Conference, Skoerping, Denmark.
Hervás-Oliver J. L., and José Albors-Garrigós, J. (2007). Do clusters capabilities matter? An empirical application of the resource-based view in clusters. Entrepreneurship & Regional Development: An International Journal, 19(2): 113–136.
Hervás-Oliver J. L., and José Albors-Garrigós, J. (2008), Local knowledge domains and the role of MNE affiliates in bridging and complementing a cluster's knowledge. Entrepreneurship & Regional Development: An International Journal, 20(6): 1464–1514.
Huggins, R. (2008). The evolution of knowledge clusters: progress and policy. Economic Development Quarterly, 22(4): 277–288.

Keeble, D., and Wilkinson, F. (1999). Collective learning and knowledge development in the evolution of regional clusters of high technology SMEs in Europe. Regional Studies, 33(4): 295.

Keeble D., and Wilkinson F. (eds.) (2000) High-Technology Clusters, Networking and Collective Learning in Europe. Ashgate, Aldershot.

Kerr, C. I. V., Mortara, L., Phaal R., and Probert D. R. (2006). A conceptual model for technology intelligence. International Journal of Technology Intelligence and Planning, 1(2): 73–93.

Kogut, B. (2000). The network as knowledge: generative rules and the emergence of structure. Strategic Management Journal, 21: 405–425.

Lazaric N., Longhi C., and Thomas C. (2008). Gatekeepers of knowledge versus platforms of knowledge: from potential to realized absorptive capacity. Regional Studies, 42(6): 837–852.

Lazersona, M. H., and Lorenzoni, G. (1999). The firms that feed industrial districts: A return to the Italian source. Industrial and Corporate Change, 8(2): 235–266

Lee C.-K., and Saxenian A. (2008). Coevolution and coordination: A systemic analysis of the Taiwanese information technology industry. Journal of Economic Geography, 8: 157–180

Lichtenthaler, E. (2003a). Third generation management of technology intelligence processes. R&D Management, 33(4): 361–375.

Lichtenthaler, E. (2004a). Technological change and the technology intelligence process: a case study. Journal of Engineering and Technology Management, 21: 331–348.

Lichtenthaler, E. (2004b). Technology intelligence processes in leading European and North American multinationals. R&D Management, 34(2): 121–135.

Lichtenthaler, E. (2005). The choice of technology intelligence methods in multinationals: towards a contingency approach. International Journal of Technology Management, 32(3/4): 388–405.

Lichtenthaler, E. (2006). Technology intelligence: identification of technological opportunities and threats by firms. International Journal of Technology Intelligence and Planning, 2(3): 289–323.

Lichtenthaler, E. (2007). Managing technology intelligence processes in situations of radical technological change. Technological Forecasting & Social Change, 74: 1109–1136.

Lundvall, B.-A. (1992). National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. Pinter, London

Malmberg A., and Maskell P. (2005). Localized learning revisited. Druid paper.

Markusen, A. (1996). Sticky places in slippery space: a typology on industrial districts. Economic Geography, 72: 293–313.

Marshall, A. (1920). Principles of Economics, 8th edn. Macmillan, London, First edition [1891].

Maskell, P. (2001). Towards a knowledge-based theory of the geographical cluster. Industrial and Corporate Change, 10(4): 921–943.

Maskell, P., Bathelt, H., and Malmberg, A. (2006). Building global knowledge pipelines: the role of temporary clusters. European Planning Studies, 14: 997–1013.

Martin R., and Sunley P. (2003). "Deconstructing clusters: concept or policy panacea?", Journal of Economic Geography, vol. 3, pp. 5–35.

Minshall, T., Mortara, L., Napp J. J. (2007). Open Innovation: Linking Strategic and Operational Factors. R&D Management Bremen, Germany.

Mortara, L., Kerr, C. I. V., Phaal, R., and Probert, D. R. (2009a). A toolbox of elements to build technology intelligence systems. International Journal of Technology Management, 47(4): 322–345.

Mortara, L., Kerr, C. I. V., Phaal, R., and Probert, D. R. (2009b). Technology intelligence practice in UK technology-based companies. International Journal of Technology Management, 48(1): 115–135.

Mortara, L., Thomson, R., Moore, C., Armara, K., Kerr, C., Phaal, R., and Probert, D. R. (2010). Implementing a global technology sourcing strategy– scan and target at Kodak European research. Research Technology Management (July– August).

Moulaert F. et Sekia F. (2003). "Territorial Innovation Models: a Critical Survey", Regional Studies 37:3 289–303.

Moulaert, F., and Hamdouch, A. (2006). "Knowledge Infrastructures, Innovation Dynamics and Knowledge Creation/Diffusion/Accumulation Processes: An Institutional Perspective". The European Journal of Social Science Research, Vol. 19, n° 1, pp. 25–50.

Nooteboom, B. (2005). Innovation, learning and cluster dynamics. Discussion Paper 44, Tilburg University, Center for Economic Research.

Owen-Smith, J. and Powell, W. (2004). Knowledge network as channels and conduits: The effects of spillovers in the Boston biotechnology Community. Organization Science, 15(1): 5–21.

Pecqueur, B., and Zimmermann, J. B. (2004). L'économie de proximités. éditions Hermes-Lavoisier, Paris, 264 p.

Porter, M.-E. (1998). Clusters and the new economy of competition. Harvard Business Review, Vol. 76.

Powell, W. W., Koput, K. W., and Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. Administrative Science Quarterly, 41: 116–145.

Powell, W. W., Kelley Packalen, and Kjersten Bunker Whittington (2010). Organizational and Institutional Genesis: The Emergence of High-Tech Clusters in the Life Sciences. In Padgett, J. and Powell W. W (eds.), Clusters, Networks, and Innovation, Chapter 13. Princeton University Press, Princeton.

Preissl, B., and Solimene, L. (2003). The Dynamics of Clusters and Innovation. Physica-Verlag. Heidelberg, New-York.

Rallet, A., and Torre, A. (2005). Proximity and localization. Regional Studies, 39(1): 47–59.

Rohrbeck, R. (2010). Harnessing a network of experts for competitive advantage: technology scouting in the ICT industry. R & D Management, 40(2): 169–180.

Rychen, F., and Zimmermann, J. B. (2006). Clusters in the global knowledge based economy: knowledge gatekeepers and temporary proximity. Regional Studies, 42(6): 767–776.

Savioz, P. (2006). Technology intelligence systems: practices and models for large, medium-sized and start-up companies. International Journal of Technology Intelligence and Planning, 2(6): 360–379.

Savioz, P. and Tschirky, H. (2004). Technology Intelligence Systems: benefits and roles of top management. Bringing technology and innovation into the boardroom. Strategy, Innovation and Competences for business value. Palgrave Macmillan, New York, pp. 220–254.

Savioz, P. and Blum, M. (2002). Strategic forecast tool for SMEs: how the opportunity landscape interacts with business strategy to anticipate technological trends. Technovation, 22(2): 91.

Saxenian, A. (1994). Regional Advantage, Culture and Competition in Silicon Valley and Route 128, Harvard University Press.

Smith, J. O., and Powell, W. W. (2004). Knowledge network as channels and conduits: the effects of spillovers in the Boston biotechnology community. Organization Science, 15(1): 5–21.

Sorenson O., Rivkin J. W., and Fleming L. (2006). Complexity, networks and knowledge flow. Research Policy, 35(7): 994–1017.

Stephenson, K. (1999). Networks. In R. C. Dorf (ed.), The Technology Management Handbook. CRC – IEEE, Baoca Raton, pp. 7–40 to 47–45.

Storper, M., and Venables, A.-J. (2003). Buzz: Face-To-Face Contact and the Urban Economy. Centre for Economic Performance, London School of Economics, Londres.

Uzzi, B. and Dunlap, S. (2005) How to build your network. Harvard Business Review, 83: 53–60.

Von Hippel (1988). The sources of innovation. Oxford University Press, London and New York, pp. 232.

Waxell, A., and Malmberg, A. (2007). What is global and what is local in knowledge-generating interaction? The case of the biotech cluster in Uppsala, Sweden. Entrepreneurship & Regional Development: An International Journal, 19(2): 1464–5114.

Whittington, B. K., Owen-Smith, J., and Powell, W. W. (2009). Networks, propinquity and innovation in technological communities. Administrative Science Quarterly, 54: 90–122.

Witzeman, S., Slowinski, G., Dirkx, R., Tao, J., Ward, S., and Miraglia, S. (2006). Harnessing external technology for innovation. Research-Technology Management, 49(3): 19–27.

Chapter 6
Social Innovation and Interactive Value Creation as Strategic Demand for Management

Ralf Kopp

Contents

6.1 The Paradigms of Social Innovation and Interactive Value Creation

Smoking stacks as the trademark of our industrial society are increasingly vanishing from our eyes and minds. Instead, we are seeing smoke coming out of the heads of knowledge workers, signalling a major change towards new constellations in society. Today's trends are marked by terms such as network economy (Castells

R. Kopp
Sozialforschungsstelle Dortmund, ZWE der TU Dortmund, Evinger Platz 17, 44339 Dortmund, Germany
e-mail: kopp@sfs-dortmund.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, DOI 10.1007/978-3-642-17223-6_6,

1996), service society (Baethge and Wilkens 2001), knowledge society (Stehr 1994), global innovation economy (OECD 2009) and Society 2.0 (Baecker 2009). At the organizational level, more and more attention is paid to product development, sales and marketing and the provision of services. Market dynamization and the ever decreasing cycles of innovation are putting considerable pressure on traditional forms of management and on conventional methods of product and service development, requiring them to change. "What is new is that more and more companies are reacting to the changing conditions for business and are beginning to innovate in new ways. In other words, they are changing their strategies and business models" (OECD 2009: 10). By highlighting a number of areas, we want to illustrate that the "new way of innovation" is increasingly grounded in academic, political and practical considerations.

6.1.1 Prospects of Science of Management and Social Science

A main focus of international social sciences-based innovation research which concerns itself with the investigative questions "how innovations occur" and "how innovation differs" (cf. Fagerberg et al. 2005: 9) is the complexity and the systemic character of the innovation processes. The characteristic of this is, above all, an increasing thematization of the large number and heterogeneity of the stakeholders, organizations and institutions involved in the innovation process and the associated shifting of emphasis onto networks and (national, regional, local) innovation systems, onto new forms of innovation, e.g. open innovation and open source (cf. Chesbrough 2003; Reichwald and Piller 2009), which rely on communication with knowledge holders in business, education, and politics and an active role for users and/or end consumers in the innovation process. In terms of content, themes such as network management, new forms of knowledge production and knowledge logistics, processes of interactive, inter- and intra-organizational co-evolutionary learning and transdisciplinary communication and cooperation relationships come to the fore as areas of research (cf. Fagerberg et al. 2005).

Until into the 1980s the idea of a clearly definable, linear process from science and research to marketable products and services was prominent (cf. Hack 1988), it becomes increasingly clear from research results from the 1990s that innovation involves a complex social process in which the network-like interaction of the many parties involved in the innovation process plays the central role. Networks are considered to be superior to other coordination and control mechanisms for innovation processes (for example cf. Rammert 1997) and appear to be becoming a fundamental building block of a new paradigm of innovation (Bullinger 2006: 14).

Howaldt et al. (2009) see the basic openness of wide-ranging external groups of actors and sources of knowledge as the core of an innovation paradigm which they describe as "social innovation". They stress out a fundamental shift in the relationship between social and technical innovations. The focus now is on interaction and cooperation rather than on technology. Howaldt and Schwarz (2010) define social

innovation as a new and intentional configuration of social practices for the solution of problems or the satisfaction of needs. The characteristic feature of social innovation is its non-material, intangible form. An innovation is "social" if it spreads in a diffused manner into social subgroups via market mechanisms and if social acceptance manifests itself through changes in active practices and routines. Following the argument of Crozier and Friedberg (1993: 19), this can be interpreted as a "process of collective creation" in the course of which the participating heterogeneous actors "acquire the cognitive, relational and organizational skills that are needed for this purpose". Social innovation takes place through the medium of networks and their impact on the continuous restructuring of institutional configurations. As with all other innovations, "new" must not be equated with "good" or "socially desirable" in a normative sense. Attributions of social innovation can differ, depending on the actors' perspectives. Innovation always is the result of a social judgement.

Social innovation marks a specific sphere of action that centres on the moulding of knowledge work and innovation work through the development of collective intelligence. At the organizational level this points to the question of appropriate management and innovation strategies and suitable social arrangements and (technological) infrastructures. The focus is on inter- and trans-organizational learning as well as on network and knowledge management (Ciesinger et al. 2005; Flocken et al. 2001). This highlights the need for an organization's "absorptive capacity", i.e. its ability to acquire, assimilate, transform and exploit external knowledge. Gomeringer et al. (2009: 463) describe the capacity of acquisition as a process to identify and transform relevant informations from organizational environments. Very similar to the concept of selective knowledge management (Howaldt et al. 2004) it is crucial to select and reduce relevant informations. Assimilation labels the process of analyzation and (re-)interpretation of knowledge. Exploitation aims on development of competencies and resources. "Absorptive capacity" is another complementary area of discussion that should feed into a new understanding of innovation (Cohen and Levinthal 1990; Schreyögg and Schmidt 2009).

Von Hippel (1988, 2005) has a more narrow, customer-specific focus on innovation. He sees the "manufacturing-active paradigm" as being put in perspective or indeed being replaced by a customer-active paradigm. Von Hippel stresses that customers and, respectively, users in various product sectors are increasingly able to modify products of their own personal use or to even develop them (at least as prototypes) completely and independently without the involvement of manufacturer, for example. He calls the advanced customers "lead users". In contrast to traditional manufacturing-Active Paradigm (MAP) von Hippel's "Customer-Active Paradigm" (CAP) assumes an extreme form of labour division between the company and the customer; the time and effort involved is initially carried by the customer alone. Even more astonishing is the observation that a large number of these customers reveal their product developments and modifications to the general public, or leave them to the discretion of a manufacturer voluntarily without demanding compensation. In certain situations collaborating with a manufacturer after the developmental phase can still turn out to be advantageous for the

customer – sometimes to the point that customers initiate the interactive value creation process themselves (Harhoff et al. 2003). An important addition to the topic of customer innovation is (academic) work focusing less on contributors and their motivation and more on how to organize the division of labour. "Commons-Based Peer Production", a model established by Harvard professor Yochai Benkler (2002, 2006) to describe the principles of open source software development production, provides an important basis for defining organizational principles on how the division of labour can be best coordinated between the manufacturing company and external actors.

Reichwald and Piller (2009) have summarised and developed these ideas further under the concept of "interactive value creation". Interactive value creation means cooperation and social exchange. The concept of interactive value creation derives from a strong cooperative process, in which customers rarely take on a leading role. This idea takes into account that without the support of a manufacturer, the customer either cannot or will not come up with the necessary financial and material resources which a long and complex value creation process requires alone. Usually a company signals its openness for customer involvement by providing a purpose-specific infrastructure and resources. However, the role of the customer goes beyond simply putting together a shelf from Ikea or using an automated teller machine (ATM). Although also a form of labour division between supplier and buyer, these tasks often take place on a purely operational level and signify low customer involvement working primarily within a narrowly defined framework. In contrast, Reichwald and Pillerfocus on value creation characterized by broader solutions. In this sense, customers do not only supply practical product experience gained through market acceptance tests and pilot projects but also act as co-developers in the product development process itself. Customers contribute by submitting ideas for new products, co-developing concepts, or designing and configuring products (Dahan and Srinivasan 2000; Franke and Piller 2003; Brockhoff 2005). Furthermore the focus of interactive value creation is to solve the problem of local search bias which is marked by the limited search possibilities of the solution seekers. Unconventional solutions or unknown solution from other fields are thereby ignored but the internet provides companies new possibilities for the active participation and knowledge exchange with external actors. These new forms of involving customers and other external actors, company-dominated value creation becomes interactive value creation.[1]

Interactive value creation focus primarily on an active group of external contributors who, although working at the periphery of company activity, create value. Central to this group are customers, on the hand, and users of a product or a service, on the other. In our view, customers are no longer just passive recipients and

[1]Please note the term "customer" is equated with "buyer" and above all, with users of output. "Company" means "supplier," primarily a manufacturer of output. In business-to-business transactions a customer/user can also be a company. Output can be defined either as a material product or a service. When talking about interactive value creation, however, output is often also a product/service package.

consumers of a manufacturer's autonomously produced goods and services. Rather, customers co-create products together with companies. This means that customers design and, in part, even determine and/or take over the development and manufacture of goods and services. Not only customers, but other external actors, too, are included in producing goods and services in new ways. They respond to a manufacturer's call for participation in finding a solution to a specific problem.

6.1.2 Prospects of Innovation Policy

A look into German and European innovation policy reinforces the thesis that we are currently witnessing a fundamental change in the paradigm of innovation. Sociological findings have infiltrated deeply into European research and innovation policy where they have left behind significant traces.[2] According to Muldur (1996), three development phases can be identified from 1950 to 2020. The first phase (1950–1970) is characterized by the pair of terms "defence/basic sciences", the second phase (1970–2000) by "industry/key technologies" and the final phase (2000–2020) by "society/innovation". Especially between the last two phases, distinctive reorientations of the innovation system take place. These are indicated in the table below:

The key elements of an appropriate understanding of innovation from this point of view are (cf. European Commission 1998: 143 ff.):

- Coordination and mediation between various different groups of stakeholders who are involved in innovation activities.
- Interdisciplinarity, heterogeneity, recursiveness and reflectiveness of the processes of creation[3].
- Emphasis of historical, cultural and organizational preconditions.
- Increasing involvement of users/citizens in processes of "social pull" and "public policy drive"-founded "co-development".
- Deployment of new concepts and tools that are developed to analyse the dynamics of mixed stakeholders and the dynamics of testing itself.
- Systemic perspectives on innovation in the sense of "national innovation systems" or social innovation systems in which research, development, production and marketing are optimized simultaneously in an interactive process.
- Interactivity in the process.

"Hybridization" both at the boundary between society (practitioners/users) and science (experts/developers), and at the boundary between (soft) social sciences and (hard) engineering and natural sciences.

[2]However this has not been reflected in improved research funding allocations for the social sciences to date either at the international or national level.

[3]These considerations start from a criticism of the technological determinism of a linearly sequential understanding of innovation and, in contrast, refer explicitly to Gibbons' statements concerning "mode 2".

The Enquete Commission (1998) argues that social innovations are the new way to achieve objectives that alter the direction of social change. They can be preconditions, attendant circumstances or consequences of technical innovations. The productivity depends on human creativity and on symbolic resources.

The OECD (cf. 2009: 17) speaks of a "new nature of innovation". This nature is characterized by another role of technology in processes of innovation which means technology is more an enabler of innovation than a driver. Technology has always played an important role in driving innovation, and it will continue to do so in future, but for many companies technology will gradually move from being a driver of innovation to becoming an enabler of innovation. Today there are new drivers of innovation, which are gaining importance and becoming just as important as technology once was (OECD 2009: 9). The OECD identifies nine "drivers of innovation and innovation principles", i.e.:

- Co-creating values with customers
- Users' involvement in innovation processes
- Forming collaborative networks and partnerships.

6.1.3 Prospects of Consumer

The involvement of external actors is not only a central point in scientific or a political vision but also a demand from different groups of actors. There is a sustained trend in involving external persons in the innovation process (i.e. research experts, partner companies, suppliers, customers, ordinary citizens, etc.). Web 2.0, in particular, has led to a revitalization of conceptual ideas in knowledge and network management. Moreover, recent surveys have shown open innovation as a specific innovation concept (see Chap. 7) which is very much on the increase and will have become accepted in nearly all sectors of industry within the next few years. In 2009 an online survey was conducted by trommsdorff and drüner management consultants among 176 corporate innovation experts from different industries. It showed that 56 out of 100 companies believed this trend to be either relevant or very relevant to the market (Trommsdorff and Drüner 2010). The subject has long been an issue for some of the major management consultancies as well. AT Kearney speaks of "customer energy" defined as the expression of "the modern, well informed consumer who gets involved in a companies' value chain. "Customers" take over activities that would otherwise be carried out by the company itself or even single, several or stages in value chain. "Customers" are not only the current customers, but also all other persons, i.e. potential customers, interested persons e.g. general internet users" (AT Kearney 2010). The widening of the scope for obtaining information on needs and solutions and indeed for doing so outside the boundaries of an organization and the intensification of collaboration with customers are both more than a central functional requirement in bringing about innovation. It also matches consumer demand for participation, as many are

prepared to spend quite a few unpaid hours collaborating and co-creating within "their" communities or companies – through newsgroups, forums, blogs and other platforms.

6.2 Enterprise 2.0 as Driver of Social Innovation and Interactive Value Creation

The represented paradigms have a strong affinity to the "2.0 – Movement" (cf. Back et al. 2009), to Web 2.0 and above all to enterprise 2.0. The 2.0 – Movement shows the convergence of three lines of development that influence one another: understanding/development of technology, understanding/development of management and understanding/development of the market. Even in the context of industrial work under tayloristic principles, these lines of development display a high level of compatibility with regard to basic principles and strategies. During the incubation period the replacement of traditional industrial work by knowledge work led to serious tension and barriers between these lines of development. Yet we can now see new lines of convergence in knowledge work mode. Incompatibility is making room for more and more complementarity, thus increase the potential capacity for innovation and also its speed. Point of culmination is Enterprise 2.0.

6.2.1 Understanding/Development of Technology

The Open Source Initiative developed under the influence of Eric Steven Raymond's essay "The Cathedral and the Bazaar" (1997), opening up software development to the joint endeavours of its users. Since then Wikipedia has come to be its greatest success. Set against this background, we have seen the propagation of some agile software development as proclaimed in the Agile Manifesto some time ago, in the late 1990s. Interactivity with customers has been boosted considerably through a programming concept in which individuals and interaction are ranked higher than processes and where ongoing collaboration with the customer is seen as more important than contracts. The latest expression of such approaches can be found in Scrum as a form of agile project management (cf. Pichler 2008: 1). "As an agile framework, Scrum embodies the values of the Agile Manifesto (...). It puts humans at the centre of software development (individuals and interactions, collaboration). After all, software is only created through interaction and collaboration between people. Rather than focusing on technology or tools, Scrum demands and encourages collaboration between stakeholders". Scrum is not limited to software development but has always been inspired by new innovative paths in product development as piloted by Japanese companies and is closely connected with forms of lean production and also of a learning organisation.

Web 2.0 technologies support and expand the available options of interaction, communication and cooperation, particularly at the interface between companies and the external environment. In essence, Web 2.0 technologies provide potential that is open in its utilisation and can be used for functions such as listening, communicating, activating, supporting, integrating and evaluating. It is an iterative and highly dynamic process of exchanging information about needs and solutions between companies, on the one hand, and the environment and customers, on the other. In this process the roles of information recipients and providers change continuously. There is also a substantial increase in the quantitative and qualitative intensity of feedback. The crucial point is that Web 2.0 has overcome the limitations of first-generation knowledge management and that it has switched from information management to knowledge activation. Once certain Web 2.0 tools have been selected and deployed, "the knowledge bearers decide on the structures it should take and on the information it should contain. In other words, this technology has now come to a point where its objective is no longer the multiplication and publication of knowledge, but its focus is now on practice, usability and the relevant results of the knowledge work (. . .)" (Friedrich-Freska and Glatzel 2009: 52).

Peter Klotz has described this tendencies as the beginning of the "Inter-Net". Web 2.0 and social software "allow computer programs and by now also ordinary computer users to act as "speakers" on the internet and to interact with other users" (Klotz 2009: 241). Inspired by the success of social networking platforms such as MySpace, Facebook, YouTube and StudiVZ (a German networking platform for college and university students like Facebook), these technologies have been adapted for organizational purposes in a variety of ways.

6.2.2 Understanding/Development of Management

"Enterprise 2.0" is a management concept based on principles of the Web-2.0 movement, which are not completely new. "Many of the basics and areas of application in knowledge management – both on the practical level and in research – (. . .) have existed for quite a while. For instance, there is a large amount of knowledge about communities and knowledge networks (. . .), organizational learning, open innovation or idea management. These and other areas are core issues in Enterprise 2.0. The rise in popularity of 2.0 paradigms has given them a boost, so that they have now achieved breakthroughs" (Back and Heidecke 2009: 6). The understanding of management has been affected by certain forces since the 1970s, forces which – for a variety of reasons – have led to the decentralization of decision-making competencies (flattening of hierarchies) and the upgrading of experience-based knowledge (as a requirement for continuous improvement processes). There has been an increasing emphasis on peripheral competencies and thus on carriers of know-how at the interfaces of organizations with intensive customer contact. The space for communication and responsiveness in companies, which partly owes its expansion to Web 2.0, enables and enforces continuous activities and responses within the network. In principle, it allows ongoing learning

processes based on small doses of development results being fed back into the system and on the readjustment of development assumptions and objectives at a higher level. This describes the programme of a learning organization to which Enterprise 2.0 refers, sometimes explicitly. The concept of a learning organization was developed by Peter Senge (2003). It centres upon the development of structures, processes and competencies that allow the ongoing questioning of routines and the far-reaching stimulation of adjustment activities through self-organization.

6.2.3 Understanding/Development of the Market

Business management, market research and sociology are increasingly seeing markets as a matter of communication. The view is taken that "markets only come into being through interaction between customers, communities and companies, so that ultimately – just like innovations – they are largely rooted in social practices and manifest themselves as social constructs. Markets are no longer understood as a given volume of customers who must be conquered with precisely tuned products or services. This adds a totally new and fundamental meaning to the idea of "co-creation" with customers. The goal of interaction with internal and external stakeholders is not the development of new artefacts, but the establishment of joint social practices which – supported and enabled by technical/economic innovations – create specific values for all actors who are involved and also from the perspective of their own evaluation frameworks and interests" (Zerfass 2009: 35 ff.). Haderlein speaks of Marketing 2.0 as a communicative revolution in which the social operating system is being reconfigured (cf. Haderlein 2006: 9). He says that marketing and the targeting of customers must be geared towards the "prevailing socio-technological and socio-cultural innovations".

Conversely, consumers, customers and users increasingly expect to be involved as "co-creators", rather than being targeted as a "target group" or as "end users". The Cluetrain Manifesto looks at conventional notions in marketing that are based on unilateral communication and confronts them with the idea that future markets will be based on relationships among people and indeed on relationships between companies and people and thus markets. Innovation arises through dynamic interactive processes and therefore "(. . .) it is more about creating meanings than it is about creating artefacts" (Tuomi 2002 quoted in Zerfass 2009: 35) (Fig. 6.1).

6.3 Innovation Processes in Frame of Social Innovation and Interactive Value Creation

The transition from Enterprise 1.0 to Enterprise 2.0 is accompanied by a trend towards greater openness to the innovation process. Enterprise 2.0 is a management concept with principles and strategies that are especially closely associated with the

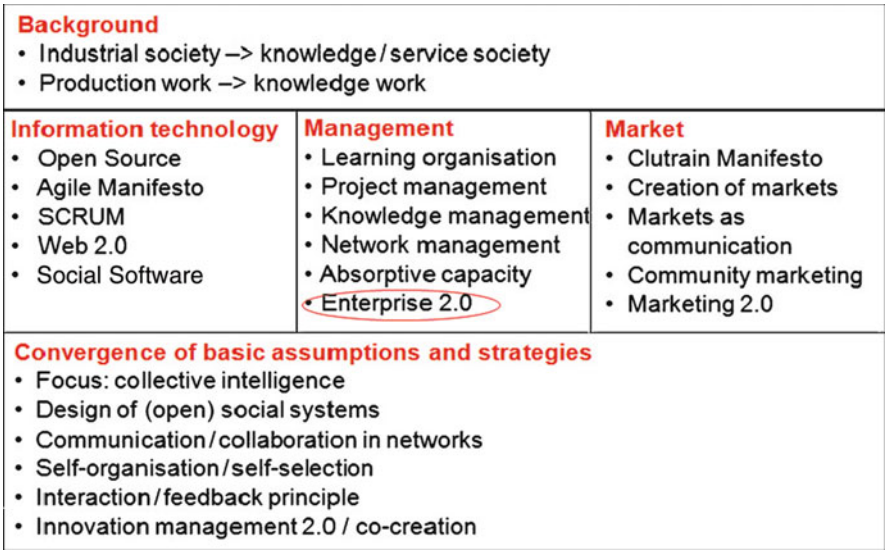


Fig. 6.1 Lines of development in the 2.0 movement

new innovation paradigm. In Enterprise 1.0 all the phases of the innovation process (generation, acceptance and realisation of ideas) take place within the controlled limits of a hierarchical organization. At best, any signs of opening up to the outside world can be seen in the collection of information on customers' needs, for instance, by gathering ideas through trend research and market research. When knowledge and core competencies are mobilized in Enterprise 1.0, this is done to gain a precise definition or transformation of an idea for a product or service. The result then leads to market "penetration". This model works as long as markets are not very dynamic. Greater market agility, however, means that internal sources of knowledge lose their impetus. To obtain information about needs and solutions, an organization can no longer do without external sources of knowledge. To put it in a nutshell, external actors in Enterprise 1.0 are often dependent on the (frequently unsatisfactory) knowledge of the organization. In Enterprise 2.0 this dependence is reversed. The organization requires substantial collaboration from external actors. The entire issue revolves around the question of inter- and trans-organizational knowledge organization. In this context intelligent forms of knowledge management rely on networking and resist the temptation to collect data (Baecker 1998: 17), a temptation to which business often succumbed in the past (cf. Howaldt et al. 2004). Appropriate knowledge management stimulates knowledge workers to network effectively, both internally and externally. This is facilitated by a wide range of physical and virtual tools. The management has just to structure this spectrum of opportunities through suitable decision-making processes, so that stimulation turns into relevance (Fig. 6.2).

According to the paradigm of interactive value creation developing an invention into an innovation, which is then successfully placed on the market, goes through a

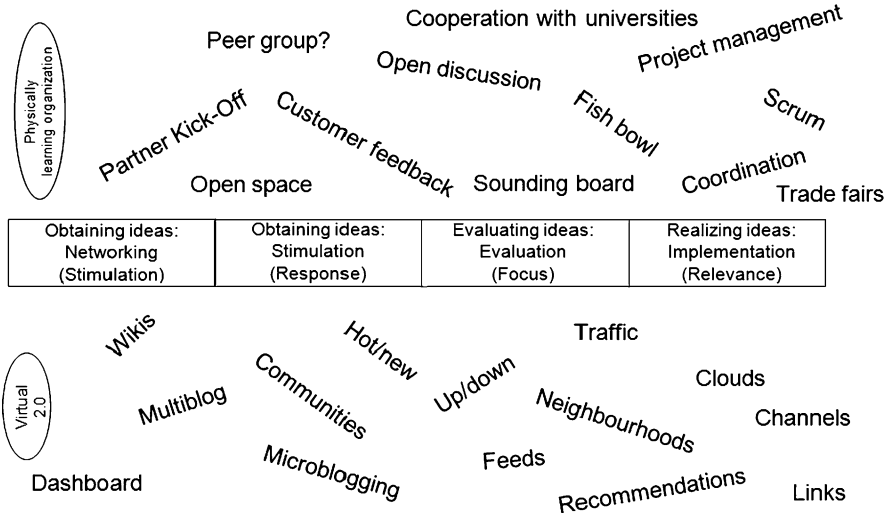


Fig. 6.2 Innovation tools in Enterprise 2.0

series of different phases. As a whole, all phases make up the innovation process. The innovation process is often divided up to fit an ideal model of execution. The phase model is a popular example, which goes through a series of five phases linearly: idea generation, concept development, prototype, product and market tests, and finally, market launch (Cooper and Kleinschmidt 1991; Staudt and Auffermann 1999; Wheelwright and Clark 1992). Empirical research often shows innovation processes not running in a linear fashion, but rather in recursive loops. And very often the process breaks off in different phases (Braun-Thürmann 2005; Hauschildt and Salomo 2007).

To outline the innovation process under the specific concept of interactive value creation and open innovation, we will refer to a simple linear phase model. Any phase can act as a starting point for open innovation. It begins with idea generation followed by concept and prototype development and finally ends, on the customer's side, with the problem solving phase. In this respect, open innovation complements conventional approaches to innovation management. From the manufacturer's perspective, the phases of the product and market test and the market launch are not superfluous, but because of customer interaction in previous phases, undergo another procedure with considerably lower market risk. Furthermore, other external factors can also make important contributions to the concept development phase, besides customers.

6.3.1 Phase 1: Idea Generation ("Ideation")

Innovation begins with idea generation ("ideation"). This phase is also called the "fuzzy front end" of the innovation process (Cooper 1988; Khurana and Rosenthal

2002). In this early phase, a company aims at building and/or increasing its pool of ideas for innovations. Ideas can include absolutely new products or services, which have not yet been offered by the company on the market before. Or, improve a company's existing products or services so that they become more attractive to customers. Information about (assumed unfulfilled) needs of (potential) customers and users of an innovation (innovation of needs) is the basis for idea generation. An innovation idea is rarely a mature concept. Rather, the idea embodies potential for further development. After their collection and organization, submitted ideas are subsequently evaluated. At this stage, economic considerations are not at the foreground of concern. Instead, an idea's compatibility with a company's current range of products and services as well as its (technological) strategy is more important. An idea's uniqueness in comparison to the competition as well as possible legal restrictions are also taken into account. An idea's assessment is normally carried out in-house and is often based upon the experience of senior management.

In traditional views of innovation management, only internal sources are involved in the phase of idea generation. The creative minds of a company's research and development department play a central role in generating ideas. Adjoining departments like marketing and sales, or employees in production and procurement are also seen as important and valid sources for ideas. However, open innovation includes external sources in the innovation process and focuses specifically on customer and user roles as owners of, or contributors to innovative idea generation and assessment. In order to source external potential for idea generation, instruments like contests, lead user methodology, or interaction with online communities are used. Another important method – even if neglected in science and in practice – includes external actors in an open assessment of generated ideas.

6.3.2 Phase 2: Concept Development

Ideas positively assessed enter the second phase of the innovative process: concept development. In this phase, the idea for an innovation – still a rather vague, verbal description – is refined and further developed. At this point, the research and development department (R&D) takes over. Ideas are first visualized through sketches, mock-ups, or animations. In addition, a production schedule, an investment plan as well as an appraisal of technical feasibility and market potential follow. The final concept assessment follows traditionally through experts, senior management and, above all, through market research analyses (Wheelwright and Clark 1992). It is in this phase that external actors are involved to help in the problem-solving process. However, lead users – or rather: especially advanced customers – often deliver ideas on new needs in specific concepts.

6.3.3 Phase 3: Prototype Production

In the third phase, a prototype is made. A prototype is a fully functional test model of a planned product or part. Today, new technologies like stereo lithography or selective laser sintering allow CAD files to produce prototypes directly and without manual intervention (rapid prototyping). By using physical and/or chemical processes, the prototype is put together in layers made of shapeless or form-neutral material (Gebhardt 2000). The prototype is then checked for conformance to the concept's requirements. This includes performance and acceptance tests performed under laboratory conditions. Expenses for development and production are also reassessed at this point.

In a modern interpretation of innovation management, the phases of concept and prototype development are combined to form one iterative process (Thomke 2003). Prototypes serve not only to confirm a concept, but also to deliver an important contribution to the original idea. Therefore, prototyping is seen today as a way to generate innovative solutions, while experimenting. The California-based design company IDEO is well-known for using this method in developing products.

Prototyping as a means generate solutions and plays an important role in interactive value creation. It is quite common for advanced customers to create fully functional prototypes in order to satisfy their personal needs. From the customer's perspective, the phases of idea generation, concept development, and prototype production make up one phase. Customers dissatisfied with an existing offer tend to create their own solutions. They also tend to transfer their unsatisfied needs to an artifact which contains the problem's solution. If manufacturers can actually see a customer's prototype, then the process of deriving a potentially new, innovative solution from the artifact is simpler than first sorting out ideas obtained traditionally through customer questionnaires. Moreover, information coming from customers is often "sticky", which may prevent a correct interpretation of their answers. Prototypes can drastically reduce information "stickiness".

6.3.4 Phase 4: Product and Market Tests

In traditional innovation processes, this phase transfers the prototype to the manufacturer's production system. Under normal circumstances, the product is first produced in small numbers for a test market. Introducing an innovation to a test market permits an evaluation of the innovation's acceptance and performance under real market conditions. Manufacturers then draw conclusions from the results and, if necessary, modify the product and/or adjust the marketing mix, respectively. Open innovation allows companies to transfer performance tests and expensive failure analysis procedures to customers. But product and market acceptance tests may not be necessary if the innovation is user-dominated or, in other words, based upon customer ideas. From the manufacturer's perspective, the phases of product

and market test and market launch are not superfluous, but because of customer interaction in previous phases, they undergo a different procedure with considerably lower market risk.

6.3.5 Phase 5: Market Launch

Marketing is central to product launch. Marketing an innovation includes all of the activities involved in communicating and marketing the innovation, for example: price setting, selection and combination of proper distribution channels, brand and communication management, training the sales force. But by marketing the innovation through pilot customers first, open innovation replaces large-scale product launches aimed at big, anonymous markets. In this way, open innovation gradually builds up market potential by accumulating experience. When customers are incorporated into marketing and distribution activities, they can also play an important role in product distribution. Once again, the T-shirt retailers Threadless and Spreadshirt provide good examples of the way in which customers can contribute to marketing products. For example, customers convince friends to buy from the website, they help model the online catalogue, and they promote the brand through "word-of-mouth" propaganda.

6.4 Three Strategic Consequences and Demands for Management

Social Innovation and Interactive Value Creation imply a dramatic increase of interactivity. There are to stress out three demands for management: Management has to handle the switch between the principles of hierarchy and network, it has to find new approaches of project management and it has to develop interactivity capacity from employee.

6.4.1 Consequence 1: Management of Opposing Principles for Action

Interactive value creation and open innovation stand for a systematic increase in networking intensity and thus for greater external resonance and external feedback in the innovation process. Web 2.0 technologies expand these options with regard to quantity (amount of feedback) and also quality (global scope, access to unknown third parties). Not only does this speed up change, but it also creates greater complexity and inherent dynamics as well as instability and insecurity for the

organizationally relevant processes. Whereas the management of stability is one of the core competencies of traditional management, the management of instability is still largely virgin soil. Networked knowledge work does not readily permit adequate control via a hierarchical monitoring structure. The need to grant free scope means more than partial autonomy. The containment of insecurity and unplannability in network dynamics is enabled far more readily in trust-based corporate cultures and values than in a culture where control is exercised through target agreements. "Within a network the required stability shifts to the level of regulations and values. Without a consensus on values and suitably adjusted rules of conduct any free dynamics will fail to function" (Kruse 2009: 148).

When an instability-focused action repertoire is added, it does not automatically replace the existing stability-focused strategies. The available evidence seems to indicate that it is not a matter of a transition from one strategy to another, but of expanding one's options so that one can switch between the two strategies with as little friction as possible. "A successful approach to dynamic markets requires an ability to created a purposeful strategic balance between stability and instability" (Kruse 2009: 59) (Fig. 6.3).

6.4.2 Consequence 2: New Approaches for Project Management

It is almost taken for granted nowadays that work is organised in projects, even though this is still inadequately reflected in management and leadership structures. The organization of work in projects revolves around the removal of routine elements from the work that is performed. Projects are always individual and never routine. They are tied to clear targets even if those targets need to be moved in this process. This is because projects are inherently complex. Nevertheless, projects are also subject to limited resources (time, budget and workforce). This particularly affects the development of services, as the customer is of course

Stability	**Instability**
Hierarchy	Network
Centralized	Decentralized / periphery
Optimization	Change / new patterns
Monitoring / partial autonomy	Free space / autonomy
Target agreements	Culture / values
Organization	Self-organization
Development	Self-development
Intelligence: individual / team	Network intelligence / system competence
Control / leadership	Communityship

Fig. 6.3 Management of opposing logics of action (on the basis of Kruse 2009)

not a "black box". Mangold therefore sees a project as an "ongoing dialogue between a contractor and a customer which leads to the achievement of the desired result" (Mangold 2009: 24). Conventional project management has been revolutionized by SCRUM in software development, in particular. The customer – who is seen as the "product owner" – is consistently regarded as the focal point of a project organization that uses agile methods. Cooperative internal and external relationships are marked not so much by long-term collaboration within a group whose members also know each other well on a personal level, but by "short-term task-focused mutual interaction between core competencies that are freely available within the company" (Kruse 2009: 146). The strategic challenge of the management lies in the coordination of IT landscapes, the establishment of a fully consistent and effective knowledge management, the assertion of a minimum basic code of conduct, a network-prone vision and the open evaluation of the attractiveness of the individual parties in the interaction (cf. Kruse 2009).

6.4.3 Consequence 3: Development of Interaction Competence

If innovations are increasingly generated in networks, then the development of interaction competence is of strategic importance. According to Reichwald and Piller (2009), interaction competence covers "the totality of competencies and skills of a supplier for the successful implementation of the principles of interactive value creation. It acquires its specific form in organizational structures (interaction-promoting procedural structures), in incentive structures (e.g. monetary incentives) and in the systems and tools of information and communication (e.g. toolkits and interaction platforms)". The central question is how one might encourage members of the organization to open up to external knowledge.

Passing on customer knowledge within the company and adopting external knowledge must be suitably rewarded through in-house incentives. Not all companies appreciate, or are as open to input from users. For many manufacturers, the idea of users making a (better) contribution to product development is very new. This knowledge transfer is often afflicted with the "not invented here" (NIH) syndrome. Katz and Allen (1982: 7) define the NIH syndrome as "the tendency of a project group of stable composition to believe that it possesses a monopoly of knowledge in its field, which leads it to reject new ideas from outsiders to the detriment of its performance". Traditionally it can be assumed that resistance to external knowledge is often greater than towards input from colleagues. In the case of interactive value creation between customers and a manufacturing company, this means that knowledge from external sources can meet with resistance by at least some internal users of this knowledge (Huff and Möslein 2004).

"Gatekeepers" are a traditional way of overcoming the NIH syndrome (Allen 1977). Gatekeepers link development teams with sources of external knowledge and also filter out non-goal-oriented information at the same time. Gatekeepers are fitted with mechanisms and incentives to promote sharing their knowledge over

external knowledge with relevant groups within the organization (see Allen (1977); Gemünden (1981) and Moenaert and Souder (1990) about creating the Gatekeeper role). Companies should install gatekeepers with the duty to absorb and pass on customer information to a company's internal development process. Another idea to inforce interaction competence is to shift decision-making competence to the level on which the relevant, necessary knowledge also lies for decision-making and execution. In companies, information transfer is often characterized as "sticky", which hinders a simple passing on of information from one place to another. The extent, to which dispositive and administrative tasks are reintegrated, depends on the perspective and the task at hand. However, when functions are decentralized, the subsidiary principle is generally followed as a guideline (Picot et al. 2003): Decision-making competence and responsibility for results should be positioned as low as possible in the hierarchy (as close as possible to the actual value creation process). Thus, decision-making competence within close vicinity of the process clearly means higher company flexibility gained through decentralized controlling cycles near the customer and the discontinuation of long and error-prone decision-making processes. At the same time, employee motivation should be raised through comprehensive task fulfilment and incentives for market-driven action should be strengthened.

If local knowledge is not only applied locally, but is brought together with local knowledge from other sources, a higher level of innovation can result. The passing on and sharing of knowledge supports process improvements that are not trivial. New combinations in the sense of Schumpeter's (1942) "creative destructions", can also result in (radically) new output (Kogut and Zander 1992; Tsai and Ghoshal 1998). Instruments supporting knowledge exchange like job rotation, interdisciplinary teams, or formal knowledge management can raise a company's innovative ability. Therefore, in agreement with Foss et al. (2005), we conclude that a delegation of decision-makers on the local level and the facilitation of open structures promoting knowledge impartation and knowledge transfer on the intra-organizational level can also – in relation to external customer knowledge – raise the absorptive capability of suppliers. In this sense, the open decentralization and organization of a company's workflows seems to be an important requirement for building interaction competence. Close cooperation, including passing on knowledge, can lead to fear in some people, who believe that this will make them superfluous and in extreme cases, endanger their own jobs. Equally, when innovating cooperatively, companies are afraid to lose their competitive edge. Therefore, it is necessary to generate trust through transparent measures and to create a basis for successful cooperation through goal-oriented "trust management". The form that is taken by specific processes and which leads to successful innovation networks, and the factors that support or hinder in various areas are elements that depend on in-house and externally-driven incentive systems.

While the development of internal interaction competence is already subject to an extremely large number of requirements, any exchange and creation of value as a cooperative process cannot remain limited to the workforce within the organization and finish at its boundaries. The vision is much wider and includes third parties,

customers and other value creation partners. The key to interactive value creation across existing boundaries is therefore the interaction competence of the workforce and also of the company's customers.

Acknowledgments This article is partly based on the results within the integro project (Integrated Innovation, Knowledge and HR Management in Companies and Innovation Networks of the High-Tech Industry; www.innovationsarbeit.de). The project is funded by the German Ministry of Education and Research and the Social Fund of the European Union. The project is administered by the Work Design and Services Project Sponsorship Unit of the German Aerospace Centre (DLR). The author thanks Prof. F. Piller (RWTH Aachen) and Prof. R. Reichwald (TU München) for their impact and feedback on this paper.

Bibliography

Allen, T. (1977). *Managing the Flow of Technology*. Cambridge, MA: MIT Press.

AT Kearney (2010). *Customer Energy. The Empowered Consumer Is Revolutionizing Customer Relationships*. Resource document. New York: A.T. Kearney. http://www.atkearney.de/content/misc/wrapper.php/id/50473/name/pdf_atkearney_bip_customer_energy_1236612558d666.pdf. Accessed 21 March 2010.

Back, A., & Heidecke, F. (2009). Einleitung. In A. Back & N. Gronau & K. Tochtermann, *Web 2.0 in der Unternehmenspraxis. Grundlagen, Fallstudien und Trends zum Einsatz von Social Software* (pp. 1–9). Munich: Oldenbourg.

Back, A., Gronau, N., & Tochtermann, K. (2009). *Web 2.0 in der Unternehmenspraxis. Grundlagen, Fallstudien und Trends zum Einsatz von Social Software*. Munich: Oldenbourg.

Baecker, D. (1998). Zum Problem des Wissens in Organisationen. *Zeitschrift für Organisationsentwicklung*, 3, 5–21.

Baecker, D. (2009). *Studien zur nächsten Gesellschaft*. Frankfurt am Main: Suhrkamp.

Baethge, M., & Wilkens, I. (2001). *Die große Hoffnung für das 21. Jahrhundert. Perspektiven und Strategien für die Entwicklung der Dienstleistungsbeschäftigung*. Opladen: Leske & Budrich.

Benkler, Y. (2002). Coase's Penguin, or: Linux and the nature of the firm. *The Yale Law Journal*, 112(3), 369–446.

Benkler, Y. (2006). *The Wealth of Networks*. New Haven: Yale University Press.

Braun-Thürmann, H. (2005). *Innovation*. Bielefeld: Transcript.

Brockhoff, K. (2005). Konflikte bei der Einbeziehung von Kunden in die Produktentwicklung. *Zeitschrift für Betriebswirtschaft*, 75(9), 859–877.

Bullinger, H. -J. (2006). Verdammt zur Innovation. *RKW Magazin*, 57, 12–14.

Castells, M. (1996). *The Information Age: Economy, Society, and Culture. Volume 1: The Rise of the Network Society*. Oxford and Malden, MA: Blackwell.

Chesbrough, H. W. (2003). *Open Innovation. The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.

Ciesinger, K.-G., Howaldt, J., Klatt, R., & Kopp, R. (Eds.) (2005). *Modernes Wissensmanagement in Netzwerken – Perspektiven, Trends und Szenarien*. Wiesbaden: Deutscher Universitäts-Verlag.

Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation. *Administrative Science Quarterly*, 35(1), 128–152.

Cooper, R. G. (1988). Predevelopment activities determine new product success. *Industrial Marketing Management*, 17(3), 237–247.

Cooper, R. G., & Kleinschmidt, Elko J. (1991). New product processes at leading industrial firms. *Industrial Marketing Management*, 20(2), 137–147.

Crozier, M., & Friedberg, E. (1993). *Die Zwänge kollektiven Handelns – Über Macht und Organisation*. Frankfurt am Main: Hain.

Dahan, Ely, Srinivasan, V. S. (2000). The Predictive Power of Internet-Based Product Concept Testing Using Visual Depiction and Animation. *Journal of Product Innovation Management*, 17(2), 99–109.

Enquete Commission. (1998). *Schutz des Menschen und der Umwelt. Ziele und Rahmenbedingungen einer nachhaltig zukunftsverträglichen Entwicklung. Konzept Nachhaltigkeit*. Bonn: Vom Leitbild zur Umsetzung.

European Commission. (1998). *Die Gesellschaft, letzte Grenze. Eine europäische Vision der Forschungs- und Innovationspolitik im XXI. Jahrhundert*. Brussels, Luxembourg: Office for Official Publications of the European Communities.

Fagerberg, J., Mowery, D., & Nelson, R. (2005). *The Oxford Handbook of Innovation*. Oxford/ New York: Oxford University Press.

Flocken, P., Hellmann-Flocken, S., Howaldt, J., Kopp, R., & Martens, H. (Eds.) (2001). *Erfolgreich im Verbund. Die Praxis des Netzwerkmanagements*. Eschborn: RKW-Verlag.

Foss, N. J., Laursen, K., & Perdersen, T. (2005). *Organizing to gain from user interaction: The role of organizational practices for absorptive and innovative capacities*. Copenhagen: Workingpaper, Copenhagen Business School, Center for Strategic Management and Globalization.

Franke, N., & Piller, F. (2003). Key research issues in user interaction with configuration toolkits in a mass customization system. *International Journal of Technology Management (IJTM)*, 26 (5/6), 578–599.

Friedrich-Freska, M., & Glatzel, K. (2009). Die intelligente Netzwerkorganisation: Realität oder Fiktion?. Die Entwicklung eines Phasenmodells zur Softwareimplementierung in Organisationen. *OrganisationsEntwicklung*, 4, 51–57.

Gebhardt, A. (2000). *Rapid Prototyping: Werkzeuge für die schnelle Produktentwicklung*. Munich: Hanser.

Gemünden, H. G. (1981). *Innovationsmarketing*. Tübingen: Mohr.

Gomeringer, A., Leyh, J., & Schmidt, S. (2009). Technologieadaption in High-Tech-Unternehmen. Herausforderungen an die Arbeitsgestaltung und Personalentwicklung. In I. Gatermann & M. Fleck (Eds.), *Innovationsfähigkeit sichert Zukunft. Beiträge zum 2. Zukunftsforum Innovationsfähigkeit des BMBF* (pp. 459–467). Berlin: Duncker & Humblot.

Hack, L. (1988). Vor Vollendung der Tatsachen. Frankfurt am Main.

Haderlein, A. (2006). *Marketing 2.0. Von der Masse zur Community. Fakten und Ausblicke zur neuen (Online-)Kommunikation*. Kelkheim: Zukunftsinstitut GmbH.

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.

Hauschildt, J., & Salomo, J. (2007). *Innovationsmanagement*. Munich: Vahlen.

Howaldt, J., & Schwarz, M. (2010). *Soziale Innovation*. Bielefeld: transcript.

Howaldt, J., Klatt, R., & Kopp, R. (2004). *Neuorientierung des Wissensmanagements. Paradoxien und Dysfunktionalitäten im Umgang mit der Ressource Wissen*. Wiesbaden: Deutscher Universitätsverlag.

Howaldt, J., Kopp, R., & Schwarz, M. (2009). Shaping Innovation by Social Research – the New Role of the Social Siences. In D. Harrisson, G. Szell & R. Bourque (Eds.), *Social Innovation, the Social Economy and World Economic Development* (pp. 245–260). Frankfurt am Main: Peter Lang.

Howe, J. (2006). The Rise of Crowdsourcing. Wired, 14, 6. http://www.wired.com/wired/archive/14.06/crowds_pr.html. Accessed 21 March 2010.

Howe, J. (2008). *Crowdsourcing: Why the Power of the Crowd Is Driving the Future of Business*. New York: Crown Business.

Huff, A., & Möslein, K. (2004). An agenda for understanding individual leadership in corporate leadership systems. In C. Cooper (Eds.), Leadership and Management in the 21st Century (pp. 248–270). Oxford, UK: Oxford University Press.

Katz, R., & Allen, T. (1982). Investigating the Not Invented Here (NIH) syndrome: a look at the performance, tenure, and communication patterns of 50 R&D projects. *R&D Management*, 12, 7–19.

Khurana, A., & Rosenthal, S. R. (2002). Integrating the Fuzzy Front End of New Product Development. In E. Roberts (Ed.), *Innovation: Driving Product, Process, and Market Change* (pp. 47–86). San Francisco, CA: Jossey-Bass.

Klotz, U. (2009). Von der Open-source-Praxis zum ‚Enterprise 2.0'. In I. Gattermann & M. Fleck (Eds.), *Innovationsfähigkeit sichert Zukunft. Beiträge zum 2. Zukunftsforum des BMBf* (pp. 239–249). Berlin: Ducker & Humblot.

Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. *Organisation Science*, 3, 383–397.

Kruse, P. (2009). *NEXT PRACTICE: Erfolgreiches Management von Instabilität. Veränderung durch Vernetzung*. Offenbach: Gabal.

Lakhani, K. R., Jeppesen, L. B., Lohse, P. A., & Panetta, J. A. (2007). The Value of Openness in Scientific Problem Solving. *Harvard Business School Working Paper*, No. 07-050.

Mangold, P. (2009). *IT-Projektmanagement kompakt*. Heidelberg: Spektrum Akademischer Verlag.

Moenaert, R. K., & Souder, W. E. (1990). An information transfer model for integrating marketing and R&D personnel in new product development projects. *Journal of Product Innovation Management*, 7(1), 91–107.

Muldur, U. (1996). Eine europäische Forschungs- und Innovationspolitik für das 21. Jahrhundert. In European Commission (1998), *Die Gesellschaft, letzte Grenze. Eine europäische Vision der Forschungs- und Innovationspolitik im XXI. Jahrhundert* (page unknown: internal report). Brussels, Luxembourg: Office for Official Publications of the European Communities.

OECD. (2009). New Nature of Innovation. Report document. Organisation for Economic Co-operation and Development. Resource document. OECD. http://www.newnatureofinnovation.org/full_report.pdf. Accessed 16 March 2010.

Pichler, R. (2008). *Scrum. Agiles Projektmanagement erfolgreich einsetzen*. Heidelberg: dpunkt.

Picot, A., Reichwald, R., & Wigand, R. (2003). *Die grenzenlose Unternehmung*. Wiesbaden: Gabler.

Rammert, W. (1997). Innovation im Netz. Neue Zeiten für technische Innovationen: heterogen verteilt und interaktiv vernetzt. *Soziale Welt*, 48, 397–416.

Raymond, E. S. (1997). The Cathedral and the Bazaar. Resource document. http://www.catb.org/~esr/writings/cathedral-bazaar/cathedral-bazaar/. Accessed 21 March 2010.

Reichwald, R., & Piller, F. (2009). *Interaktive Wertschöpfung. Open Innovation, Individualisierung und neue Formen der Arbeitsteilung*. Wiesbaden: Gabler.

Schreyögg, G., Schmidt, S. (2009). Absorptive capacity. Schlüsselrolle für das Innovationspotential. *Journal Arbeit*, 9(1), 13–14.

Schumpeter, J. A. (1942). *Capitalism, Socialism and Democracy*. New York: Harper.

Senge, P., (2003). *Die fünfte Disziplin: Kunst und Praxis der lernenden Organisation*. Frankfurt: Klett-Cotta.

Staudt, E., & Auffermann, S. (1999). *Der Innovationsprozess im Unternehmen: eine erste Analyse des derzeitigen Stands der Forschung*. Bochum: IAI.

Stehr, N. (1994). *Knowledge Societies*. London: Sage.

Tapscott, D., & Williams, A. D. (2007). *Wikinomics*. Munich: Carl Hanser Verlag.

Thomke, S. (2003). *Experimentation Matters: Unlocking the Potential of New Technologies for Innovation*. Boston, MA: Harvard Business School Press.

Trommsdorff & Drüner, forward2business (2010). Open Innovation. Über das TrendPanel. Resource document. http://www.2bahead.com/fileadmin/dokumente/ThinkTank/Trendpanel_OpenInnovation.pdf. Accessed 21 March 2010.

Tsai, W. P., & Ghoshal, S. (1998). Social capital and value creation: the role of intrafirm networks. *Academy of Management Journal,* 41, 462–476.

Tuomi, I. (2002). *Networks of Innovation. Change and Meaning in the Age of the Internet*. Oxford: Oxford University Press.

von Hippel, E. (1988). *The Sources of Innovation*. Oxford: Oxford Press

von Hippel, E. (2005). *Democratizing Innovation*. Cambridge, MA: MIT Press

Wheelwright, S. C., & Clark, K. B. (1992). *Revolutionizing Product Development: Quantum Leaps in Speed, Efficiency, and Quality*. New York: Free.

Zerfass, A. (2009). Kommunikation als konstitutives Element im Innovationsmanagement – Soziologische und kommunikationswissenschaftliche Grundlagen der Open Innovation. In A. Zerfass & K. M. Möslein (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement. Strategien im Zeitalter der Open Innovation* (pp. 23–55). Wiesbaden: Gabler.

Part II
Communicative Perspectives on Innovation

Chapter 7
Communication of Innovation: Marketing, Diffusion, and Frameworks

Nicole Pfeffermann and Michael Hülsmann

Contents

In the innovation economy, communication of innovation can encompass all market-related activities in technology and innovation management on a strategic and operational level (Trommsdorff and Steinhoff 2007) to commercialize innovation successfully. This implies a need for management frameworks, for instance, regarding integrated marketing communication (e.g., Bruhn 2006, 2008, 2009) to communicate consistently and continually about innovations and innovation-related issues. Moreover, innovation communication in corporate communication focuses on the presentation of innovations and the organization's innovative capability to establish long-term stakeholder relationships and constructs, such as corporate reputation, on the organizational level (e.g., Mast and Zerfaß 2005; Mast et al. 2005; Zerfaß and Möslein 2009). However, communication can also be examined from a social process perspective (e.g., Rogers 1995, 2003). The communicative perspective in innovation diffusion research concentrates on three different types of communication in social systems (Peres et al. 2010) and points out managerial implications, for instance, word-of-mouth communication may represent an effective marketing tool for enterprises to systematically facilitate an individual's decision-making processes to invest in innovation (Mazzarol 2011).

N. Pfeffermann (✉) and M. Hülsmann
Systems Management, International Logistics, School of Engineering and Science, Jacobs University Bremen, Campus Ring 1, 28759 Bremen, Germany
e-mail: m.huelsmann@jacobs-university.de, Nicole.Pfeffermann@googlemail.com

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_7,

Hence, communication of innovation is an emerging issue in different research areas, which are presented in this second part of the book. The main objectives of Part II "Communicative Perspectives on Innovation" are

- To provide an overview of different key aspects in innovation marketing, communication in innovation diffusion and organizational communication related to innovation and
- To encourage further progress in basic research as well as empirical study research

This part of the book therefore presents the status quo in literature, conceptual frameworks, and empirical results to understand the underlying mechanisms, drivers, and limitations of managing communication of innovation from an organizational perspective.

In the field of interest *communication of innovation,* six key issues can be stated to provide an overview of specific research topics.

7.1 Innovation Marketing

Innovation success is not guaranteed, which is shown in empirical studies and success factor research (e.g., Jahrfeld 2005; Trommsdorff and Steinhoff 2007). A variety of impact factors determine the market-related activities of innovation management on the operational and strategic level. These can be understood as innovation marketing (Steinhoff and Trommsdorff 2011). Innovation marketing can be considered to be its own research field in innovation management (e.g., Trommsdorff 1991, 1995; Trommsdorff and Binsack 1997; Trommsdorff and Steinhoff 2007) or an isolated field within marketing research (Trommsdorff and Steinhoff 2007; von Hippel 1988, 2005).

The understanding of marketing innovations implies that the customer focus is one central factor and, as a result, professional innovation marketing can lead to a competitive innovation advantage (CIA) (Steinhoff and Trommsdorff 2011). Steinhoff and Trommsdorff (2011), focus on the description of CIA and the elimination of the bottleneck factor *customer focus* in innovation marketing.

New market research methodologies provide opportunities to facilitate CIA (Trommsdorff and Steinhoff 2007) and main findings in research can result in new methods, management concepts, and application scenarios, such as marketing of innovations throughout the adoption process (Hofbauer et al. 2009); integrated marketing communication tools for radical innovations (Mohr et al. 2009); and specific aspects of innovation marketing in different industries and markets (e.g., Böhm 2004; Wolf 2008).

7.2 Diffusion of Innovations from a Communicative Perspective

The spread of innovations is affected by several determinants. Researchers identify these influencers acting on prosperous innovations by analyzing how individuals adopt new products, services, ideas, stories, and brands, and how new technologies

spread in a social system (e.g., Pae and Lehmann 2003; Rogers 1995, 2003). Diffusion of innovation is a social and psychological process and can be defined as "communication of an innovation through certain channels over time among the members of a social system" (Rogers 2003: 11). The social and psychological processes, rather than economic processes, are considered in diffusion research to explain the dissemination of ideas, new issues, technologies or products, as well as the media influence, forecast and managerial consequences from a communicative perspective (e.g., Balnaves et al. 2009; Mazzarol 2011; Peres et al. 2010). Three research fields are concerned with communicative aspects of diffusion in social systems (1) word-of-mouth communication (e.g., Martilla 1971; Mazzarol 2011), (2) network externalities (e.g., Rohlfs 2001; Tomochi et al. 2005), and (3) social signals (e.g., Van den Bulte and Stremersch 2004; Berger and Heath 2008).

In particular word-of-mouth communication, as a kind of inter-personal communication in social systems, can be used as a potential marketing tool in the commercialisation process of innovation to positively influence decision-making to invest in innovation, which is described by Mazzarol (2011).

Regarding future directions, research may take into account online communities, web services and complex types of product-service categories and consider the shift from forecasting focus to a managerial diagnostic focus (Peres et al. 2010).

7.3 Communication Process in Collaborative Innovation

Regarding knowledge sharing and building a common understanding of innovation in collaborative innovation networks, communication serves as a coordinating function and research takes into account the information flow and system structure in knowledge exchange between constituencies (e.g., Argenti 2007, 2009; Donaldson et al. 2011). Communication in collaborative innovation is "in the process but also in the dialogue between partners" (Donaldson et al. 2010).

As a result, dialogues between members of collaborative innovation can lead to new knowledge through interaction, such as idea sharing, as well as internal and external dialogs in open innovation processes (e.g., Daschkovska et al. 2010; Donaldson et al. 2011). Collaborative networks can thus benefit from communication in terms of knowledge creation and knowledge exploitation. This might have an effect in particular in the innovation economy, where tacit knowledge can represent an intangible asset for organizations, for instance, in technology clusters (e.g., Schilling 2008).

7.4 Innovation Communication in Corporate Communication

Innovation communication represents a managerial concept in corporate communication and a constitutive element in innovation communication (e.g., Zerfaß et al. 2004; Zerfaß 2009). Internal and external communication activities are used to

systematically initiate communication processes with internal and external stakeholders to support technical, economic and social novelties (Zerfaß 2009). Framing, campaigning, and storytelling are examples of tools for innovation communication (Huck 2009). Pfeffermann (2011), mentions several strategy-oriented and operational tools in a management concept of innovation communication that exploits the potential of innovation management as a communication field in organizational communication.

In fact, communication management takes into account the planning, monitoring, and evaluating activities of innovation communication (e.g., Zerfaß et al. 2004; Zerfaß 2009; Zerfaß and Möslein 2009). In this context, innovation communication research focuses on new management concepts to integrate all communication processes and activities over a company's lifetime and new approaches to link innovation communication to the current concepts of corporate communication, such as reputation, issues management and international communication.

7.5 Integrated Marketing Communication and Innovation Communication

Due to changing environments and their effects on the development of media market structures, communication has become a "strategic factor for a company's success" (Bruhn 2007: 34; for value creation through communication see also Pfannenberg and Zerfaß 2005, 2010). The constantly changing competitive market situations and the need for professional communication can be addressed by applying a systematic approach of integrated marketing communication. "Integrated marketing communications is a process of analysis, planning, organization, implementation and monitoring that is oriented toward creation unity from diverse sources of internal and external communication with target groups to convey a consistent impression of the company or the company's reference object." (Bruhn 2006: 17; Bruhn 2008, 2009). Research has investigated and deeply discussed the phenomenon *integrated marketing communication* (e.g., Cornelissen 2003; Duncan and Everett 1993; Esch 2006; Fill 2001; Moore and Thorson 1996; Schultz et al. 1993) and several conceptual approaches have been developed (for an overview see: Bruhn 2009: 71–72).

Related to open innovation, integrated innovation communication can be understood as "a process that aims to identify internal and external contact points in the development and implementation process of an innovation, as well as to develop and implement communication measures that guarantee the alignment of these interaction points in order to achieve a maximum level of development efficiency and effectiveness internally as well as optimal market saturation externally" (Bruhn and Ahlers 2011).

Thus, research in integrated innovation communication can develop and discuss new approaches and can conduct empirical studies to analyze planning and coordinating of integration tasks of communication instruments in open innovation processes.

7.6 Management Communication and Innovation Communication

One emerging field in innovation communication is management communication (e.g., Zerfass and Huck 2007; Mast 2011). Management communication can be understood as a part of organizational communication (e.g., Zaremba 2006). In the context of innovation management, the so-called promoters are "... key persons who help a matter or a topic to get into the focus of selected stakeholders and spread the benefits of the innovation within the boundaries of an organization and beyond". Five types of promoters can be identified: expert promoters; authority promoters; process promoters; relationship promoters; and communication promoters (Zerfass and Huck 2007: 112). They play are key role in communication of innovations, for instance, to support the collaboration, bring expertise into the innovation project, involve people, shape innovations, and also provide resources based on their management position in the organizational structure. These types of promoters exemplify the important role of managers in communicating innovations (Mast 2011). Mast (2011), states that management communication is crucial in innovation communication and thus manager roles and functional tasks have to be analyzed in more detail in future research related to innovation communication (Fig. 7.1).

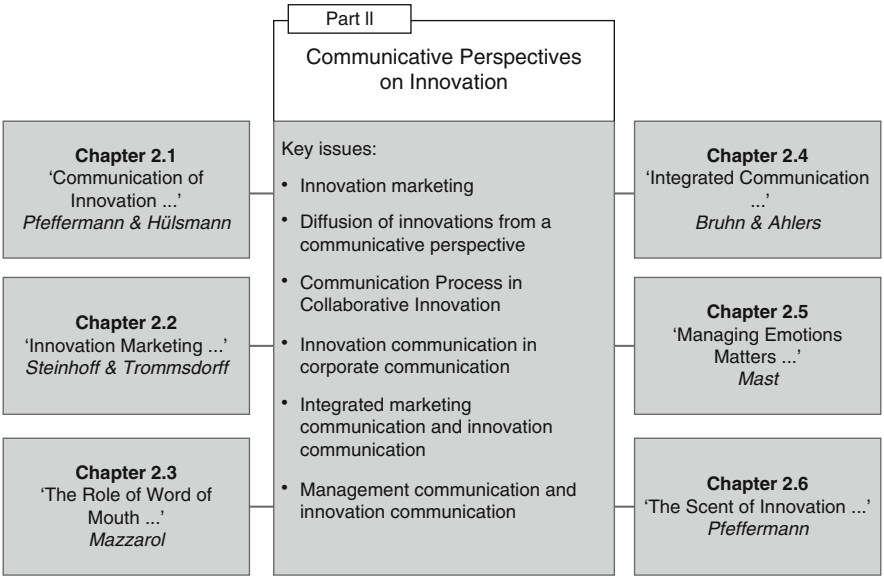


Fig. 7.1 Structure of Part II "Communicative Perspectives on Innovation"
Source: authors

Bibliography

Argenti, P.A. (2007). *Corporate Communication*. (4th ed.). New York: Mc-Graw Hill.

Argenti, P.A. (2009). *Strategic Corporate Communication. A Global Approach for Doing Business in the New India*. New York: McGraw-Hill.

Balnaves, M., Donald, S., & Shoesmith, B. (2009). *Media Theories and Approaches: A Global Perspective*. Basingstoke: Palgrave Macmillan.

Berger, J. & Heath, C. (2008). Who Drives Divergence? Identity Signaling, Outgroup Dissimilarity, and the Abandonment of Cultural Tastes. *Journal of Personality and Social Psychology*, 95(3): 593–607.

Böhm, S. (2004). *Innovationsmarketing für UMTS-Diensteangebote*. Wiesbaden, Germany: Deutscher Universitäts-Verlag.

Bruhn, M. (2006). *Integrierte Unternehmens- und Markenkommunikation. Strategische Planung und operative Umsetzung*. (4th. ed.). Stuttgart, Germany: Schäffer-Poeschl.

Bruhn, M. (2007). *Kommunikationspolitik. Systematischer Einsatz der Kommunikation für Unternehmen*. (4th ed.). München, Germany: Vahlen.

Bruhn, M. (2008). Planning Integrated Marketing Communications. In H. Sievert, & D. Bell (Eds.), *Communication and Leadership in the 21st Century* (pp. 13–34). Gütersloh, Germany: Verlag Bertelsmann Stiftung.

Bruhn, M. (2009). *Integrierte Unternehmens- und Markenkommunikation: Strategische Planung und operative Umsetzung*. (5th ed.). Stuttgart, Germany: Schäffer-Poeschel.

Bruhn, M. & Ahlers, G.M. (2011). Integrated Communication in the Innovation Process. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 10). Berlin, Germany: Springer.

Cornelissen, J. (2003). Change, Continuity and Progress: The Concept of Integrated Marketing Communication and Marketing Communication Practice. *Journal of Strategic Marketing*, 11 (4): 217–234.

Daschkovska, K., Pfeffermann, N., Meyer-Larsen, N., & Hülsmann, M. (2010). Adoption Framework for Innovations in Logistic Transport Chains. In W. Kersten, T. Blecker, & C. Lüthje (Eds.), *Pioneering Solutions in Supply Chain Management. A Comprehensive Insight into Current Management Approaches* (pp. 347–364). Berlin: Erich Schmidt Verlag.

Donaldson, B., O-Toole, T., & Holden, M. (2011). A Relational Communication Strategy for Successful Collaborative Innovation in Business-to-Business Markets. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 15). Berlin, Germany: Springer.

Duncan, T.R. & Everett, S.E. (1993). Client Perceptions of Integrated Marketing Communications. *Journal of Advertising Research*, 33(3): 30–40.

Esch, F.-R. (2006). Wirkung integrierter Kommunikation. Ein verhaltenswissenschaftlicher Ansatz für die Werbung. (4th ed.). Wiesbaden, Germany: Gabler.

Fill, C. (2001). Essentially a Matter of Consistency: Integrated Marketing Communications. *Marketing Review*, 1(4): 409–425.

Hofbauer, G., Körner, R., Nikolaus, U., & Poost, A. (2009). *Marketing von Innovationen. Strategien und Mechanismen zur Durchsetzung von Innovationen*. Stuttgart, Germany: Kohlhammer.

Huck, S. (2009). Innovationskommunikation in den Arenen der Medien. Campaigning, Framing und Storytelling. In A. Zerfaß & K. M. Möslein (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement. Strategien im Zeitalter der Open Innovation*. Wiesbaden, Germany: Gabler.

Jahrfeld, M. (2005). *Im Land der tausend Flops. werben & verkaufen*, 38: 20–24.

Martilla, J.A. (1971). Word-of-Mouth Communication in the Industrial Adoption Process. *Journal of Marketing Research*, 8(2): 173–178.

Mast, C. & Zerfaß, A. (2005). *Neue Ideen erfolgreich durchsetzen. Das Handbuch der Innovationskommunikation*. Frankfurt am Main, Germany: F.A.Z.-Institut für Management-, Markt- und Medieninformation.

Mast, C., Huck, S., & Zerfass, A. (2005). Innovation Communication. Outline of the Concept and Empirical Findings from Germany. *Innovation Journalism*, 2(7): 1–14.

Mast, C. (2011). Managing Emotions Matters – A Balanced Framework for Communicating Innovations in Companies. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 11). Berlin, Germany: Springer.

Mazzarol, T. (2011). The Role of Word of Mouth in the Diffusion of Innovation. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 9). Berlin, Germany: Springer.

Mohr, J., Sengupta, S., & Slater, S. (2009). *Marketing of High-Technology Products and Innovations*. (3rd ed.). New Jersey: Pearson.

Moore, J. & Thorson, E. (1996). Strategic Planning for Integrated Marketing Communications Programs: An Approach to Moving from Chaotic Toward systematic. In E. Thorson & J. Moore (Eds.), *Integrated Communication: Synergy of Persuasive Voices* (pp. 135–152). Mahwah, NJ: Lawrence Erlbaum Associates.

Pae, J.H. & Lehmann, D.R. (2003). Multigeneration Innovation Diffusion: The Impact of Intergeneration Time. *Journal of the Academy of Marketing Science*, 31(1): 36–45.

Peres, R., Muller, E., & Mahajan, V. (2010). Innovation Diffusion and New Product Growth Models: A Critical Review and Research Directions. *International Journal of Research in Marketing*, 63: 849–855.

Pfannenberg, J. & Zerfaß, A. (2005). (Eds.) *Wertschöpfung durch Kommunikation*. Frankfurt am Main: Frankfurter Allgemeine Buch.

Pfannenberg, J. & Zerfaß, A. (2010). (Eds.) *Wertschöpfung durch Kommunikation: Kommunikations-Controlling in der Praxis*. Frankfurt am Main: Frankfurter Allgemeine Buch.

Pfeffermann, N. (2011). The Scent of Innovation: Towards an Integrated Management Concept for Visual and Scent Communication of Innovation. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 18). Berlin, Germany: Springer-Verlag.

Rogers, E.M. (1995). *Diffusion of Innovations* (4th ed.). New York: The Free Press.

Rogers, E.M. (2003). *Diffusion of Innovations* (5th ed.). New York: The Free Press.

Rohlfs, J.H. (2001). *Bandwagon Effects in High-Technology Industries*. Cambridge, MA: MIT Press.

Schilling, M.A. (2008). *Strategic Management of Technological Innovation* (2nd ed.). New York: McGraw Hill.

Schultz, D., Tannenbaum, S.I., & Lauterborn, R.F. (1993). *Integrated Marketing Communications: Pulling it Together and Making it Work*. Lincolnwood, IL: NTC Business Books.

Steinhoff, F. & Trommsdorff, V. (2011). Innovation Marketing – An Introduction. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 8). Berlin, Germany: Springer.

Tomochi, M., Murata, H., & Kono, M. (2005). A Consumer-Based Model of Competitive Diffusion: The Multiplicative Effects of Global and Local Network Externalities. *Journal of Evolutionary Economics*, 15: 273–295.

Trommsdorff, V. (1991). Innovationsmarketing. Querfunktion der Unternehmensführung. *Marketing – Zeitschrift für Forschung und Praxis* (ZFP), 13(3): 178–185.

Trommsdorff, V. (1995). *Fallstudien zum Innovationsmarketing*. München, Germany: Vahlen.

Trommsdorff, V. & Binsack, M. (1997). Neue Märkte Wie Marketing Innovationen durchsetzt. *Absatzwirtschaft*, 40(11): 60–65.

Trommsdorff, V. & Steinhoff, F. (2007). *Innovationsmarketing*. München: Franz Vahlen.

Van den Bulte, C. & Stremersch, S. (2004). Social Contagion and Income Heterogeneity in New Product Diffusion: A Meta-Analytic Test. *Marketing Science*, 23(4): 530–544.

von Hippel, E. (1988). *The Sources of Innovation*. Oxford: Oxford University.

von Hippel, E. (2005) *Democratizing Innovation*. Cambridge, MA: The MIT Press.

Wolf, K.H. (2008). *Marketing für Innovationen in der Automobilindustrie : der Pioniervorteil und die Bedeutung des Marketings neben der reinen Innovationsleistung in einem reifen, wettbewerbsintensiven Markt*. Aachen, Germany: Shaker Verlag.

Zaremba, A.J. (2006). *Organizational Communication: Foundations for Business & Collaboration*. Mason, Ohio: Thomson/South-Western.

Zerfaß, A., Sandhu, S., & Huck, S. (2004). Innovationskommunikation – Strategisches Handlungsfeld für Corporate Communications. In G. Bentele, M. Piwinger, & G. Schönborn (Eds.), *Kommunikationsmanagement. Strategien, Wissen, Lösungen* (August 2006; 1.24, 1–30). München: Luchterhand.

Zerfass, A. & Huck, S. (2007). Innovation, communication, and leadership: New developments in strategic communication. *International Journal of Strategic Communication*, 1(2): 107–122.

Zerfaß, A. (2009). Kommunikation als konstitutives Element im Innovationsmanagement – Soziologische und kommunikationswissenschaftliche Grundlagen der Open Innovation. In A. Zerfaß & K.M. Möslein (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation* (pp. 23–56). Wiesbaden, Germany: Gabler.

Zerfaß, A. & Möslein, K.M. (2009). *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation*. Wiesbaden, Germany: Gabler.

Chapter 8
Innovation Marketing: An Introduction

Fee Steinhoff and Volker Trommsdorff

Contents

8.1 Introduction

Companies currently face enormous pressure to innovate. In addition to repeatedly outlined arguments such as globalization, saturation trends in markets and increasing customer demands, another reason is rapid technical progress: a stream of new technologies, broader and deeper than ever before, awaits implementation in new product developments. Development departments in the textile industry, for example, are busy working on apparel of the future, high-tech fashion. Textiles are being equipped with additional features to make them "intelligent" companions in everyday life. A cell phone with Internet access has already been woven into a jacket – with

Notification: For a detailed description of the tasks involved in innovation marketing and the most important instruments for effective and efficient resolution, we recommend the practical guide "Innovationsmarketing," Trommsdorff and Steinhoff (2007), Verlag Franz Vahlen GmbH, Munich.

F. Steinhoff (✉)
Deutsche Telekom Laboratories, Leader User Driven Innovation, Ernst-Reuter-Platz 7, 10587 Berlin, Germany
e-mail: Fee.Steinhoff@telekom.de

V. Trommsdorff
Institute of Marketing, WIL-B-3-1, Wilmersdorfer Str. 148, 10585 Berlin, Germany
e-mail: volker.trommsdorff@tu-berlin.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, DOI 10.1007/978-3-642-17223-6_8,

sleeve keyboard, collar microphone and hood speakers. Researchers are also working on technologically enhanced textiles. Paraffin capsules integrated in the fabric will cool muscles: when the fabric heats up, the paraffin melts, absorbing the heat energy; when the fabric cools, the paraffin capsules solidify once again. Last but not least, substances with "on-board intelligence" are to deliver drugs such as aspirin directly to the skin, or bind odor molecules through cyclodextrins (Trommsdorff and Steinhoff 2007; FAZ 2002).

These and other new technologies harbor the potential for fundamental changes in the textile industry. In addition to covering present basic physiological and psychological needs (clothing to protect against inclement weather and express personality), apparel will be able to provide entirely new functions that have not previously been associated with clothing. Of course, it remains to be seen whether the associated technologies (such as cyclodextrins) can actually deliver what they promise. But the important thing is that technical success merely provides a necessary, but not sufficient condition for innovation success. The basic success factors are great benefit to the customer and successful communication of same to the target group.

In a long-term, empirical, cross-sector study examining product innovations at 116 companies, only 0.6% of the 1919 recorded product innovation ideas proved to be marketable and successful. Innovations run through a tight selection funnel: less than 10% of initial ideas were actually turned into products that reached the market, and market failure eliminated 70% of those that did. Of the products that actually remained on the market, 46% resulted in losses, 33% did not produce noteworthy profits and only 21% (0.6% of the original total – 11 of 1,919) were profitable (Berth 1993).

These findings on failure rates emphasize how important success factors research is for the business world. What ultimately determines whether or not an innovation is successful on the market? The key factor to success is the CIA – competitive innovation advantage. Ultimately, acceptance by customers is the decisive point. No matter how perfectly information and communication technologies are integrated in clothing, if these innovations are not articulated or do not address the latent needs of the target customers, they will ultimately be market failures.

This paper provides an introduction to innovation marketing. It first examines innovation from the object, subject and process-related perspectives, as well as defines and delimits innovation marketing. The subsequent description of CIA will prove that its core conditions mean "customer focus." This focus on the target customers and their needs is the ultimate bottleneck in practice, one that can be overcome using the intelligent methods of innovation marketing.

8.2 Innovation Dimensions: Object, Subject and Process

The phenomenon of innovation is a topic in numerous scientific disciplines, although no standard, generally accepted definition of innovation exists to date. The term dates back to Saint Augustine (ca. 400 C.E.), who used the Church Latin

term "innovation" when speaking of reformation or change. The term became widespread in Germany through the German translation of Joseph Schumpeter's book "Business Cycles" (1939), one chapter of which dealt with the "Theory of Innovation" in detail (Quadbeck-Seeger 1998).

Hauschildt and Salomo (2007) analyze a classification of existing definitions and conclude that innovations are qualitatively novel products or processes that are markedly different from the status quo. This approach is based on the business science theorem of the end/means relationship: New technologies offer new means. Demand drives the fulfillment of new ends. Innovation is the novel end/means combination. But the idea alone is not enough. In addition to an idea/invention, innovation also includes its exploitation (Roberts 1988). From a business perspective, innovations differ from inventions as a result of the business exploitation or internal company utilization of the latter.

To better understand innovation as a concept, the object, subject and process-related dimensions of innovation are described below. The object-related dimension of innovation concerns the question: "What is new?" In this context, the literature differentiates between product innovation and process innovation (Utterback and Abernathy 1975). Product innovations are focused on new solutions to customer issues. They offer performance that meets new ends or meets existing ends through novel means. Process innovations describe new combinations of factors in a company's internal production process. Their goal is to increase efficiency by producing a good at lower cost, at higher quality, more quickly or more reliably. The marketing perspective particularly deals with product innovations. In many cases, however, they cannot be detached from the corresponding process innovations. A product innovation could require a previous process innovation in the manufacturer's factory. At the same time, a new product such as an innovative communications system is not only a product innovation, but also – for the customer – a process innovation.

A further aspect of the object-related dimension is the issue of how the innovation is induced. When market pull innovations are involved, the needs of the demanders are the starting point for the vendor's innovation activities, whereas technology push innovations are initiated by technical improvements, for which potential applications are then sought (Hauschildt and Salomo 2007). It is not always easy to determine which type of innovation is involved. Were cell phones, personal computers, the Internet, superglue, polystyrene, instant whipped cream from a can and opaque contact lenses for aggressive chickens in coops market pull innovations or technology push innovations? From today's perspective, how the innovation was induced is less relevant than how technology and market potential can be reconciled in a synergetic relationship (Herstatt and Lettl 2004).

Ultimately, the degree of novelty of an innovation can be taken as an aspect of the object-related dimension of that innovation. Innovation typologies represent an initial approach to a scientific analysis of the degree of novelty. For example, the novelty dimensions defined by Cooper (1994) — (1) market = purpose = function = customer issue and (2) technology = means = solution = technical realization – make it possible to classify innovation in four categories (Hauschildt and Salomo

2007). If both the purpose and the means are familiar (not new), then the innovation is considered marginal at best. The pharmaceutical development of a new migraine headache pill has a prerequisite technological innovation (new means/old end): a new molecular substance must be found that acts on this specific pain and has as few side-effects as possible. In contrast, the positioning of aspirin as a cardiovascular prophylaxis – as part of the discovery that this 100-year-old substance can prevent cardiovascular diseases and help prevent heart attacks – is a market innovation (old means, new end). Combined market and technology innovations indicate radical innovations, because everything is "new" – that is, the novelty is especially high. The novelty of an innovation is not just a yes/no determination; there are several shades of gray: an innovation is more or less novel and has a "degree of innovation" on the continuum between smallest (incremental) change and total (radical) change (for more details, see Hauschildt and Salomo 2007).

The subject-related dimension of innovation concerns the question: "For whom is the innovation new?" Novelty is subjective: an innovation can be considered more or less novel, depending on one's perspective. The novelty concept can be externalized by asking about the objective uniqueness of the innovation: is this a world premiere? But externalization is not expedient from the management perspective. When Mannesmann entered the mobile telephony market with its D2 brand, mobile phones already existed. The innovation for Mannesmann was to use a technology that was new for the company to capture customer groups that were not previously served. Therefore, from the perspective of the innovative company, it is irrelevant whether or not other innovating companies consider the innovation to be novel. The subjectively perceived novelty results in company-specific challenges.

Even more than the market supply side, the issue of subjectivity impacts the demand side. A product that the company considers old could still be an innovation for certain customer segments. This perceived novelty of the innovation has a decisive impact on the information processing and absorption process among the target customers (Binsack 2003). In innovation research, the subjective definition of innovation dominates. Specifically, this means the measure for classifying novelty does not lie within the innovation itself, but instead with the individual (company or target customer) who perceives it.

The process-related dimension of the innovation aims at specific characteristics during the development of an innovation. The innovation process can be characterized by temporal phases and encompasses the full range of activities associated with creating and implementing an innovation: The (1) recognition of the problem can develop within the company (analysis of potential and technology) or from externally (analysis of market and environment). The (2) generation of ideas demands (market and/or technical) creativity, which can be supported through creativity techniques. Aside from internal sources, external sources – particularly customers – can also be used for the generation of ideas. (3) Selection and valuation means reducing the existing innovation ideas to those that are potentially profitable. To estimate the technical/economic feasibility, it is important to determine whether and when the innovation will be accepted by the target customers. During (4) strategic development, the budget information must be verified by R&D controlling

or modified based on new information. On the market side, the positioning analysis must show how the target customers perceive the innovation in relation to substitute products, and thus how the innovation is to be positioned. During the (5) operative development phase, both marketing tests and technical function tests should be carried out, making it possible to eliminate discrepancies in customer needs and barriers to acceptance even shortly before the planned market launch. In the (6) launch/implementation phase, the marketing mix (product, pricing, communication and distribution policies) must be coordinated and implemented in line with the strategy followed by the innovation. Marketing communication plays a special role here: the innovation will not succeed unless and until target customers recognize the advantages offered by the product and find them beneficial.

This phase model – like every model – is a simplified, idealized model of reality to identify the major steps in the process among the complexity. In reality, the process is characterized by overlapping, parallel and feedback subprocesses aimed at analysis, decision-making, execution and control and interwoven in a complex way. The success of the project and profitability of the new product on the market must be questioned over the entire innovation process, since the losses in case of failure increase progressively along the development timeline. Early decisions as to whether to continue (GO) or terminate (NO) are a constant challenge throughout the innovation process.

8.3 Definition and Delimitation of Innovation Marketing

An exploration of the concept of innovation marketing first requires delimitation from related terms and concepts. Innovation management encompasses the analyses, the decisions stemming from these analyses and communication activities involving the innovation project, as well as its implementation and control. The management of innovation projects entails the integration of all functions and areas involved in the innovation process, making it a typical cross-area discipline – perpendicular to the specialized functions – of a company based on the division of labor. Subcomponents of innovation management include R&D (research and development) management, technology management and innovation marketing.

R&D management controls the technological processes that are required for innovation – namely basic research, technology development and (early) product development (Brockhoff 1998). Technology management is part of R&D management. It is intended to ensure the company's technological competitiveness. To this end, it steers the technological resources – that is, not only the development of new technologies, but also the further development and enhancement of existing ones. Technologies must be developed or purchased, and existing technologies improved, in line with available potential and with a focus on market opportunities (Specht et al. 2002).

Innovation marketing encompasses all market-oriented activities of innovation management – that is, all strategic and operative decisions for marketing new

products. On the one hand, innovation management implies innovation marketing, since numerous analytical, strategic and planning marketing activities occur between the situation analysis and support of the new product on the market. On the other hand, marketing implies innovation marketing as the specific task of discovering, detailing and implementing competitive advantages through new products. Therefore, innovation marketing as a whole is not equivalent to innovation management, just as marketing is not the same as management in general. The activities of innovation marketing concentrate on creating and implementing potentially and effectively new offers, compared to existing and potential markets.

8.4 The Competitive Innovation Advantage as the Key Construct of Innovation Marketing

Innovation management aims for success (Hauschildt 1991). Although the appropriate management activities cannot guarantee the success of an innovation, they can increase the chances of success significantly (Lynn et al. 1996). Accordingly, both theory and practice are highly interested in the question of what is responsible for the success of innovations.

Factors for success originate from an empirical direction of research that was founded in the 1960s and continues even today. This research into success factors aims at both strategic effectiveness and operational efficiency. The decision to establish an idea for an innovation as a project is an effectiveness decision ("doing the right thing"). In addition to the question of "whether or not" the priority of the project also impacts its effectiveness: the intensity with which it is pursued, in contrast to other activities, can also be right or wrong. This decision of resource allocation must be supported by suitable analysis methods. In contrast, how product development and marketing take place within the available resource budget is not a question of effectiveness, but rather efficiency ("doing things right"; Cooper 1999).

An examination of research into success factors shows that a large portion of the success/failure variance is caused by factors that are assigned to an aspect of innovation marketing in the broad sense. This includes strategic and operative marketing decisions, as well as the underlying information for these decisions from (innovation) market research. In any case, these are factors that involve the behavior of target customers and competitors; factors of the technology itself or internal business factors are much less relevant (for more detailed information on the results of success factors research, see Trommsdorff and Steinhoff 2007).

The dominating factor for success is what Cooper (1994) calls "product uniqueness and superiority." This property of a product has many other names, each with slightly different nuances: Backhaus (2003) calls it the "comparative competitive advantage – CCA" (which is somewhat redundant, since an advantage is always comparatively better); American literature sometimes refers to it as the "(strategic) competitive advantage – SCA"; marketing practice speaks of the "unique selling

proposition – USP." To emphasize the fact that we are concerned with advantages through innovation and to define this property precisely enough, we call it "competitive innovation advantage – CIA."

The CIA has five conditions, all of which are necessary, but not sufficient:

1. A superior performance among the competition
2. That delivers a crucial benefit to the customer
3. That the customer perceives as such
4. That the competition cannot catch up to easily
5. That can hardly be invalidated in its environment

Definition elements 1 through 4 of this definition of the CIA are based on those of the "comparative competitive advantage – CCA" (Backhaus 2003). In innovation marketing the influences on success and failure that go beyond the customer benefit and involve other opportunities and – especially – risks from the environment (such as legal developments) are on the rise. Accordingly, we have extended the CCA with condition 5: no counteraction from the environment.

The CIA explains innovation success to a large degree. A study of failures, for example, showed that 80% of the examined flops were missing one or more characteristics of the CIA (Cooper and Calantone 1981). Innovations with a CIA are much more likely to succeed than imitations or innovations with low benefit, because target customers perceive them to be subjectively advantageous compared to conventional products (the company's own or competitors'), deliver a relatively large benefit and are perceived to have superior quality to competing offerings.

Therefore, an innovation must be associated with a distinct customer benefit that makes the product appear to be superior to the competition. This perceived uniqueness is particularly decisive for product categories of high technological development. The uniqueness of technical products can be achieved through uniqueness of a single performance characteristic (for example, "only step motor with a 10–12% failure risk"). However, it is crucial that this characteristic be the purchase factor for potential customers and that the uniqueness is also perceived as such. Likewise, it plays a crucial role in determining the potential price level.

Therefore, the importance of a CIA to the success of an innovation is beyond dispute. In practice, the difficulty is not in the comprehension or estimation of the concept, but instead in its implementation. Why is this the case? An analysis of the CIA definition elements shows that the CIA is, to a large extent, the result of customer-oriented innovation processes. Conditions 2 (crucial benefit for the customer) and 3 (communicating the customer benefit properly) of the CIA are factors of customer focus – namely intelligent market research (2) and professional communication (3). Condition 4 (not easy for the competition to imitate) also belongs to the customer focus, at least in part, since only a relatively small portion of this condition can be fulfilled through patents and utility models; far more important are the barriers to market entry in the minds of the customers (who were won over by the innovator). These barriers are primarily subjective – built through trust in the business relationship or strong association or through subjectively perceived (and of course at least partially existent) barriers to change, such as software

compatibility. Accordingly, two to three of the five CIA conditions can be subsumed under customer focus.

8.5 Eliminating the Bottleneck Factor of Customer Focus

The need for new products to focus consistently on the needs of target customers is undisputed in both business practice and scientific research. The importance of focusing on customers has achieved broader acceptance than nearly any other assertion in the past. Nonetheless, companies find it difficult to implement in practice. Studies repeatedly point out significant shortcomings in the implementation of a customer focus agenda (Mason and Harris 2005).

A major reason likely is the high market uncertainty that is imminent in innovations, along with the difficulties of overcoming it. Market uncertainties are based on lack of knowledge of the market and of users' requirements. They can result in two types of incorrect decisions (Eliashberg et al. 1997). The first type of incorrect decision occurs when management invests (or continues to invest) in an innovation project, although the expected profit potential is classified as low. The consequence is disappointing market performance of the innovation; if the deviation from expectations is large, a classic innovation flop has occurred. Incorrect decisions of the second type mean a product idea with the potential for market success exists, but management does not (continue to) invest in the corresponding innovation project. The objectively high potential for success is not identified and the option for market profit is incorrectly not taken.

A real customer focus, above all else, requires the generation and interpretation of information: who are the target customers of the innovation and what are their specific needs? Finding the answers to these questions can significantly increase the information base and forecasting accuracy of the expected market potential of the innovation. Consistent decisions make it possible to pursue potentially successful innovation projects as effectively as possible, while discontinuing potential failures as early as possible (Eliashberg et al. 1997).

This is far from a trivial task, however. Due to the many varying and/or unexpected events and the lack of internal problem-solving routines (Daft and Lengel 1986), the information requirements of innovation projects are seldom structured and often even unknown (Gales and Mansour-Cole 1995). As a consequence, the innovation team quickly reaches the limits of its own information base (Moenaert et al. 1994). Empirical findings in high-technology sectors show that the use of external information sources (particularly customers) increases significantly as the perceived insecurity grows (McGee and Sawyerr 2003). At the same time, however, it is clear that many methods of conventional market research are not well-suited to estimating the market potential of innovative products and services (Trott 2002; Wind and Mahajan 1997).

Still, a variety of "intelligent" methods are available to provide reliable market information. It is here, the purvey of strategic innovation market research, that the

greatest contribution to the development of scientifically-based, practical innovation marketing is made. Gone is the unsatisfactory, often counterproductive, conventional survey-based research, whose caricature is the naïve innovation acceptance question: "would you buy it if . . ." Because innovation market research cannot work with conventional (survey) methods, which are designed primarily to support tactical/operative decisions. Innovations often address future needs that target customers are not (yet) aware of or which they cannot (yet) articulate (Rosenthal and Capper 2006).

Numerous new product flops, some of them spectacular, show how poorly conventional methods can support strategic decisions. One example (see Trommsdorff and Steinhoff 2007): BASF developed leaf springs made of glass–fiber reinforced plastic, for heavy trucks, which were lighter than conventional steel leaf springs. If overstressed, the springs did not break, but only individual fibers. At the start of product development, BASF asked the target customers (truck manufacturers) whether they would install these improved BASF leaf springs. The responses were positive, so BASF began the expensive development process. When the product had reached market maturity, however, none of the target customers accepted it. The development engineers, who were used to using steel as a matter of course, rejected the new technology – contrary to the early survey results. BASF failed to identify – or at least vastly underestimated – the psychological barriers to acceptance.

Today's innovation research has "intelligent" methods at its disposal, however, that enable a focus on target customers even in early phases. This includes a versatile toolkit of survey and analysis procedures (for more details, see Trommsdorff and Steinhoff 2007). The suitable qualitative, exploratory methods include in-depth interviews as well as various types of customer workshops – such as idealized customer design, projective techniques, role-playing games and the looking-glass method – in which ideas for new product concepts can be derived within the framework of discussions with customers (Durgee et al. 1998). Other qualitatively focused, ethnographic methods aim to achieve the broadest, deepest possible understanding of the customer through observing target customers in their natural environment. The emphasis lies on the identification of latent customer needs that are difficult to articulate (Perry et al. 2004). Aside from the most well-known method, empathic design, the similarly rooted methods of day-in-the-life visits and Japanese Gemba research are also available. Customer visits, in which a cross-functional team enters the customers' world through systematic calls to customers, also belong to the family of ethnographic methods (Ekström and Karlsson 2001).

Simulation methods, such as the "information acceleration" method developed at the Massachusetts Institute of Technology (Urban et al. 1997), are also available. This method targets the fact that the valid assessment and adoption of particularly novel innovations demand learning processes (Binsack 2003). Its aim is to accelerate these learning processes by providing comprehensive information about the innovation and future framework conditions before preferences are measured. A similar principle forms the foundation for other virtual methods, such as the

information pump – a virtual focus group in which the learning effects are simulated through word-of-mouth (Dahan and Hauser 2002).

Another interesting option for generating information in the context of innovative methods is the lead user method. Instead of aiming to generate a representative model of the overall population, this method aspires to include only specific innovative customers in the innovation process (von Hippel 1986). The toolkits for user innovation represent a related approach. These user-friendly design tools enable customers to develop their own product innovations. The increased involvement of target customers in the development process helps to reduce the transfer costs of customer-specific information that is otherwise difficult to convey (von Hippel and Katz 2002).

By generating valid information, intelligent methods for innovation market research help to increase forecast accuracy and thus minimize both the first and second types of errors. If BASF had included visionary lead users from the heavy truck industry in an early stage of their product development process, for example, then (1) more differentiated, more reliable market research results would have been available and (2) these key customers would likely have developed a commitment to the project that would have at least established a supply relationship with these customers, which might even have brought about a breakthrough to the overall market.

Overall, however, the knowledge of general success factors is an insufficient information base for innovation marketing. The CIA takes a key position as the overreaching factor for success. Intelligent innovation market research must provide project-specific information, particularly about the expected response of target customers, partners and competitors. Such a customer focus deeply embedded in the innovation process is a major factor in supporting the realization of a promising CIA.

8.6 Conclusion

New technologies await implementation in new product development and trigger high pressure to innovate on business. Future apparel with integrated information and communication functions or made from “intelligent” substances, for example, harbor high potential for fundamental change in the textile industry. But in all technological progress, customer acceptance is ultimately decisive. The basic question is whether the target customers actually have a current, latent (or at least future) need for clothing with additional “intelligent” functions.

Specifically, can a CIA be established? That is, a competition-beating performance that delivers benefit to the customer, is perceived by the customer as such, that the competition cannot catch up to easily, and that can hardly be invalidated in its environment? Ultimately, innovation marketing aims to provide early, intelligent answers to this question and support the subsequent market launch. Methods of innovation market research enable in-depth understanding of customers, their needs

and their usage situations. In other words, the CIA is the result of professional innovation marketing.

Bibliography

Backhaus, K. (2003). Industriegütermarketing. München: Verlag Vahlen.
Berth, R. (1993). Der kleine Wurf. Manager Magazin, 23 (4), 214–227.
Binsack, M. (2003). Akzeptanz neuer Produkte. Vorwissen als Determinante des Innovationserfolgs. Wiesbaden: Deutscher Universitäts-Verlag.
Brockhoff, K. (1998). Forschung und Entwicklung. Planung und Kontrolle. (5th ed.). München; Wien: Oldenbourg.
Cooper, R.G. (1994). New Products: The Factors that Drive Success. International Marketing Review, 11 (1), 60–76.
Cooper, R.G. (1999). From Experience: The Invisible Success Factors in Product Innovation. Journal of Product Innovation Management, 16 (2), 115–133.
Cooper, R.G., & Calantone, R.J. (1981). New Product Scenarios: Prospects for Success. Journal of Marketing, 45 (2), 48–60.
Daft, R.L., & Lengel, R.H. (1986). Organizational Information Requirements, Media Richness and Structural Design. Management Science, 32 (5), 554–571.
Durgee, J.F., O'Connor, G.C., & Veryzer, R.W. (1998). Using Mini-Concepts to Identify Opportunities for Really New Product Functions. Journal of Consumer Marketing, 15 (6), 525–543.
Ekström, K.M., & Karlsson, M. (2001). Customer Oriented Product Development? An exploratory study of four swedish SME's. FE-rapport 2001-380, Göteborg, 1–30.
Eliashberg, J., Lilien, G.L., & Rao, V.R. (1997). Minimizing Technological Oversights: A Marketing Research Perspective. In R. Garud, P.R. Nayyar, & Z.B. Shapira (eds.), Technological Innovation: Oversights and Foresights (pp. 214–230). Cambridge; New York; Melbourne: Cambridge University Press.
FAZ (2002). Nur mit der Kraft des Fortschritts hat die Zukunft eine Chance. Blick zurück und Schau voraus. In Frankfurter Allgemeine Zeitung vom 31.12.2002.
Gales, L., & Mansour-Cole, D. (1995). User involvement in innovation projects: Toward an information processing model. Journal of Engineering & Technology Management, 12 (1/2), 77–109.
Hauschildt, J. (1991). Zur Messung des Innovationserfolgs. Zeitschrift für Betriebswirtschaft, 61 (4), 451–475.
Hauschildt, J., & Salomo, S. (2007). Innovationsmanagement. München: Verlag Vahlen.
Herstatt, C., & Lettl, C. (2004). Management of 'Technology Push' Development Projects. International Journal of Technology Management, 27 (2/3), 155–175.
Lynn, G.S., Morone, J.G., & Paulson, A.S. (1996). Marketing and Discontinuous Innovation: The Probe and Learn Process. California Management Review, 38 (3), 8–37.
Mason, K., & Harris, L.C. (2005). Pitfalls in Evaluating Market Orientation: An Exploration of Executives' Interpretations. Long Range Planning, 38 (4), 373–391.
McGee, J.E., & Sawyerr, O.O. (2003). Uncertainty and Information Search Activities: A Study of Owner-Managers of Small High-Technology Manufacturing Firms. Journal of Small Business Management, 41 (4), 385–401.
Moenaert, R.K., Souder, W.E., De Meyer, A., & Deschoolmeester, D. (1994). R&D-Marketing Integration Mechanisms, Communication Flows, and Innovation Success. Journal of Product Innovation Management, 11 (1), 31–45.
Perry, B., Woodland, C.L., & Miller, C.W. (2004). Creating the Customer Connection: Anthropological/Ethnographic Needs Discovery. In P. Belliveau, A. Griffin, & S. M. Somermeyer (eds.), The PDMA Toolbook 2 for New Product Development (pp. 201–234). Hoboken; New Jersey: Wiley.

Quadbeck-Seeger, H.-J. (1998). Faszination Innovation. Weinheim u.a.: Wiley-VCH.
Roberts, E. B. (1988). Managing Invention and Innovation. Research Technology Management, 31 (1), 11–39.
Rosenthal, S.R., & Capper, M. (2006). Ethnographies in the Front End: Designing for Enhanced Customer Experiences. Journal of Product Innovation Management, 23 (3), 215–237.
Specht, G., Beckmann, C., & Amelingmeyer, J. (2002). F&E Management. Kompetenz im Innovationsmanagement (2nd ed.) Stuttgart: Schäffer-Poeschel Verlag.
Trommsdorff, V., & Steinhoff, F. (2007). Innovationsmarketing. München: Verlag Vahlen.
Trott, P. (2002). Innovation Management and New Product Development. Harlow u.a.: Financial Times/Prentice Hall.
Urban, G.L., Hauser, J.R., Qualls, W.J., Weinberg, B.D., Bohlmann, J.D., & Chicos, R.A. (1997). Information Acceleration: Validation and Lessons From the Field. Journal of Marketing Research, 34 (Feb.), 143–153.
Utterback, J.M., & Abernathy, W.J. (1975). A Dynamic Model of Product and Process Innovation. Omega, 3 (6), 639–656.
Von Hippel, E. (1986). Lead Users: A Source of Novel Product Concepts. Management Science, 32 (7), 791–805.
Von Hippel, E., & Katz, R. (2002). Shifting Innovation to Users via Toolkits. Management Science, 48 (7), 821–833.
Wind, J., Mahajan, V. (1997). Issues and Opportunities in New Product Development: An Introduction to the Special Issue. Journal of Marketing Research, 34 (1), 1–12.

Chapter 9
The Role of Word of Mouth in the Diffusion of Innovation

Tim Mazzarol

Contents

9.1 Innovation Diffusion

Innovation is undoubtedly a major driver of economic change and has been viewed as the key element in economic growth and the business cycle (Schumpeter 1934, 1939). The innovator who lies at the heart of this process of innovation generation has been likened to a "tool of the social relations in which he is enmeshed", with these forces motivating innovation as a survival mechanism (Sweezy 1943). The adoption and diffusion of innovation is the critical element in the successful commercialisation of new products and services. In seeking to understand how this process works it has been suggested that attention be given to the communication relationship between two or more individuals (Rogers 1976).

The reasons for this attention to the social aspects of innovation adoption and diffusion were originally explained by Tarde (1903) who observed that human society adapts and evolves as a process of imitation. According to this theory scientific knowledge is advanced through imitation in one form or another. Each new invention expands within its social environment in which its diffusion is facilitated by the social interactivity between the members of this environment.

T. Mazzarol (✉)
UWA Business School, The University of Western Australia, 25 Stirling Highway, Crawley, Perth, Western Australia 6009, Australia
and
Affiliate Professor, Burgundy School of Business Group ESC Dijon, Bourgogne, France
e-mail: tmazzaro@biz.uwa.edu.au

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, 117
DOI 10.1007/978-3-642-17223-6_9,

Imitation is found to be easier than invention amongst individuals, therefore when a new innovation is seen to be effective it is likely to be adopted and rapidly diffused within the society. The more competitive a market or society is the more likely that invention, innovation and imitation will occur (Brozen 1951).

Diffusion of inventions that turn into innovations takes place via imitation and this is typically facilitated by a process of communication in which the innovators or "emitters" transfer the invention to the wider community of adopters. Frequently there is a sociological element to the diffusion process in which the more influential members of the community serve as innovators and early adopters (Kinnunen 1996). The process of diffusion involves a series of seven distinct elements that form together to create the overall system in which the innovation is diffused. These elements include the *item* or innovation that is to be diffused, the *time* it takes to diffuse within a given community, the *adopting units* (e.g. individuals, groups, organizations), the *social structure* and *culture* found within the adopting community, the *channels of communication* through which the diffusion process is transmitted, and finally the *acceptance* of the innovation within the community (Katz et al. 1963).

The communications channels via which an innovation diffuses have been recognized as of key importance to the diffusion process with early research into the adoption of hybrid corn seed in rural Iowa demonstrating how early adopters influenced the later adopters via personal communications (Ryan and Gross 1943). Subsequent research into the role of interpersonal communication on the diffusion of new products found that exposure to positive word of mouth (WOM) enhanced the likelihood that a new product would be adopted, while negative word of mouth was likely to have the opposite effect (Arndt 1967a).

This social network theory of the diffusion of innovation has been demonstrated with the work of social geographers who have mapped the adoption of new technologies. According to this evidence the network of social communications that facilitates the diffusion of an innovation can be mapped from person to person as the local level, then community to community at the regional level and finally across regions or nations at the international level (Brown 1969). Early research into the spread of rumours through university student populations and the populations of small towns found that the spread of such rumours moved rapidly from an initial point of introduction into a community, but faded quickly without their perpetuation via the mass media (Dodd 1952).

Analysis of the diffusion rates for a range of technological innovations within the United States during the Twentieth Century (e.g. automobiles, railways, intercity buses, television sets) suggests that society can be viewed as a "huge learning system" in which individuals observe the behaviour of others and talk with each other about these behaviours. Inventions are adopted via this process of imitation and the peer group exchange of ideas and experiences. The diffusion of technological innovations was only slowed during the last century by such major social crises as the Great Depression and Second World War. These events disrupted the economic freedom of individuals and made it more difficult for certain products to become adopted (Hamblin et al. 1979).

In the view of Hagerstrand (1966) the diffusion of innovation is a function of interpersonal communication via a network of links and nodes in which the links are the channels of communication and the nodes the individuals who receive and then act on this information. Like a ripple on a pond struck by a stone, the innovation that is initiated by a given individual will spread outwards across a given population although the evenness of its diffusion is unlikely to be smooth in reality. Of importance is the structure of the society into which the innovation is to be diffused and the impact that this has on social learning (Bala and Goyal 1998). As Grubler (2000) demonstrated with his historical analysis of the diffusion of mediaeval monasteries the real impact of an innovation is dependent on the ability of sufficient adopters to be generated to enable a critical mass to form within the society. "One abbey could not transform European agriculture; 740 did" (p. 25).

Coughenour (1964) observed that three key issues are likely to impact on the rate of diffusion of an innovation within a given community. The first is the attitudes, knowledge, decision making ability and inter-personal competencies of the individuals who are choosing whether or not to adopt. In the case of farmers this may also encompass the size of their farm enterprise and the resources available to it. The second is the structure of the social relationships in which these individuals are embedded. This includes the way such social groups use and communicate information relating to new ideas and technologies and how independent their decision making is. Studies of diffusion rates in American farming communities highlight the importance of education levels and use of information media by the adopters, and the integration of the communication structure in their locality. The third issue is the nature of the innovation that is being diffused. Characteristics such as cost, complexity, concreteness, divisibility and communicability all determine how quickly diffusion can take place.

Innovations that offer the adopter enhanced benefits at a low risk and uncertainty are likely to be more quickly diffused than those that don't. High initial investment costs and slow costs of recovery of this investment may not be a significant deterrent where the adopter is sufficiently prosperous and commercially savvy (Fliegel and Kivlin 1966). Where a society is prosperous and has access to good mass media communications channels the diffusion rates of an innovation are likely to be significantly faster than in communities where the level of socio-economic disadvantage is lower and communications infrastructure limited. These more disadvantaged communities are also hampered by lower levels of education and restricted targeting by mass media (Nan and Burt 1975).

Wejnert (2002) summarised the literature relating to innovation diffusion and identified three major components critical to understanding the nature of the process (1) the characteristics of the innovation; (2) the characteristics of the innovator; and (3) the environmental context in which the innovation is seeking to diffuse. Key characteristics of the innovation are whether it has public or private consequences and the costs and benefits associated with it. Innovations with public consequences typically involve a large number of groups or organisations. This can include governments, government agencies and major organisations. They may

take on public policy debates such as the introduction of carbon trading regimes to curb greenhouse gas emissions. By contrast, innovations with private consequences typically involve individuals or small groups. The benefits and costs associated with the innovation can be either financial or non-financial in nature and include the risks and uncertainty of adoption. High costs can impede the rate of diffusion and may lead to failure of the innovation to become adopted even if it offers superior fundamental technologies.

The characteristics of the innovator include whether the innovator is a person, group or organisation, how familiar they are with the innovation, their social status and socio-economic situation, position in a social network and personal characteristics. According to Wejnert (2002) there has been relatively little research into the influence of personal characteristics on the diffusion of innovation. However, it is apparent that while the specific influences of some of these variables remains unclear, the characteristics of the innovator are important. There is also the environmental context in which the innovation is seeking to diffuse. Here the key units of analysis are the geography of the region in which the innovation is diffusing, with some locations likely to be more conducive to rapid diffusion than others. Also the nature of the social and political conditions found in the target communities. While some societies and countries are open to the adoption of new ideas and prepared to tolerate change and risk, others are more traditional and closed to such change. Finally, there is the extent to which an innovation can take advantage of uniform standards or systems across international jurisdictions. The growth of innovations such as the standard 20 ft equivalent unit (TEU) shipping container was made possible as a result of global agreements over standards (Mangan et al. 2008).

Gatignon and Robertson (1985), in their analysis of the literature relating to diffusion research to that time, proposed a conceptual model of the diffusion process occurring within a social system. This comprised three primary elements. The first of these is the social system operating within the target market. The key units of analysis within the social system are the personal characteristics of the actors within the network, the perceived characteristics of the innovation and the level of personal influence these actors might have on each other. The second element is the nature of the adoption process, with specific focus on the level of cognitive processing required by adopters (e.g. complexity and ease of understanding), as well as the level of uncertainty and risk associated with it, and how much priority the adopter places on the innovation. The third element is the diffusion process, with key units of analysis being the time, patter and spatial distribution of the innovation, as well as actual and potential rate of diffusion. As noted by Gatignon and Robertson (1985):

> "The diffusion patter at the social system level is an outcome of the distribution of individual adoption decisions. These individual adoption decisions are influenced are influenced by personal characteristics, perceived innovation characteristics, personal influence, and marketing and competitive actions. The latter also have an influence in defining the perceived innovation characteristics and affecting the personal influence process" (p. 850).

9.2 Word of Mouth and Innovation Diffusion

The role of word of mouth (WOM) as a promotional tool for new products and services has been recognised in the marketing literature for many years (Arndt 1967b), with numerous models having been developed to assess the role of WOM in the innovation diffusion process (Dodson and Muller 1978; Mahajan et al. 1990). Brooks (1957) was one of the first to note the influence of peer group on consumer purchase decisions, in particular the role of opinion leaders in word of mouth promotion. Of important is the recognition that the person giving positive WOM recommendations about a product or service is doing so without the expectation of commercial reward and therefore has credibility (Dichter 1966). Early adopters of a new product or service were noted to provide positive WOM and to have used a combination of media reports and positive WOM from other early adopters prior to deciding to trial the innovation (Engel et al. 1969). The positive relationship between advertising and WOM has been established within the marketing literature for both consumer (Day 1971; Lampert and Rosenberg 1975) and industrial markets (Martilla 1971). Moreover, while positive WOM helps to enhance the adoption of a new product, negative WOM has the opposite effect (Arndt 1967a), although the extent of this difference may be difficult to measure (Charlett et al. 1995). The severity of the dissatisfaction and the extent to which the vendor responds to the consumer's complaint with remedial action are likely to determine the level of negative WOM (Richins 1983). Consumers may also report more positive WOM about products or brands to which they have loyalty or familiarity, while giving negative WOM about those with which they have less experience (East et al. 2007).

Consumers make use of WOM as a means of reducing the perceived risk associated with a purchase decision (Roselius 1971), and frequently rely on opinion leaders within their social networks to guide their decision making (Myers and Robertson 1972). Such opinion leaders are typically early adopters of innovation and while their influence on other people should not be overstated, of importance is their credibility as an information source (Hovland and Weiss 1951). When faced with an innovation adoption decision such as the purchase of a new product, consumers make use of WOM as a mechanism to help reduce the perceived risk (Taylor 1974; Lampert and Rosenberg 1975; Woodside and DeLozier 1976). Within consumer markets WOM generally works in conjunction with advertising and promotion (Still et al. 1984), and is of particular value within services markets where the perceive risk of purchase is often higher than in the case of tangible products where there is more scope for pre-purchase trial and evaluation (Mitchell and Greatorex 1993). Branding is an important element for reducing perceived risk and brand loyalty can overcome or neutralise negative WOM amongst consumers (East et al. 2008). WOM works in conjunction with advertising which can stimulate WOM (Bayus 1985), and may also mitigate the detrimental influences of negative WOM if received in advance of the oral communication (Smith and Vogt 1995).

The process of WOM involves at least two individuals engaged in a dialogue with a number of important elements influencing its effectiveness and outcomes. Key antecedents to the generation of WOM are the perceived quality of the product or service and the level of commitment that the consumer has made to the organisation providing the product or service (Harrison-Walker 2001). Analysis of the factors influencing the WOM process within consumer markets undertaken by Mazzarol et al. (2007) suggests that the generation of positive WOM is more likely to take place where the giver perceives the quality of the product or service to be high; they are satisfied with the product or service, and have a high perceived value for the product or service. Mediating factors can include such triggers as advertising and promotion, the giver responding to a perceived need on the part of the receiver, or serendipity. The decision to give WOM may also be influenced by the giver's sense of advocacy or commitment to the organisation producing the product or service, as well as their social proximity to the receiver, their self-confidence, knowledge or experience with the product or service, and the perceived risk associated with giving such WOM.

From the receiver's perspective the WOM communication is more likely to have impact if the message is rich in information, contains strength of conviction and high valency. The receiver's likelihood of accepting the WOM is contingent on their own perception as to how credible the message is, the credibility of the giver, and such things as the complexity or perceived risk of the decision to take the advice, whether they are under time pressure to make a decision, and if there is any brand equity to support the endorsement (Sweeney et al. 2008). In the case of new products it has been suggested that marketing strategy should aim to build sufficient market awareness to boost WOM and then maintain a strong level of advertising to support the brand and mitigate any negative WOM (Mahajan et al. 1984). However, for innovations that lack the support of strong brand association or significant marketing communications investment, the reliance on positive WOM is often critical in the diffusion process (Mahajan and Muller 1979).

Radical innovations, particularly those generated by small firms, are unlikely to have the benefit of strong brand equity and marketing communications support. Under these conditions the entrepreneur within a small firm is likely to have to rely on positive WOM and their ability to leverage their social and business networks (Ostgaard and Birley 1994). The importance of marketing within the new product development (NPD) process within small firms has been demonstrated in past research (Huang et al. 2002). With evidence that the level of innovativeness can influence the effectiveness of the marketing communications, and that such promotion should seek to educate the consumer (Lee and O'Connor 2003). For small entrepreneurial firms with limited marketing budgets, the key element in the diffusion of innovation, ensuring success in the commercialisation of new products is their ability to secure a lead customer or set of leading customers and engage them in a continuous dialogue designed to reduce perceived adoption risk while developing customer commitment (Eng and Quaia 2009).

9.3 Third Party Voices in the Diffusion Decision

For managers in large organisations the decision to adopt an innovation follows a pattern defined by Rogers (1995) as consisting of problem identification and knowledge accumulation, evaluation and persuasion of options, adoption decision, implementation, and confirmation of the innovation's success. However, adoption must take place at two levels with the first occurring at the organisational level and requiring a succession of managerial authorities to take place, often from the top down. The second involves the end-users within the organisation and their willingness to accept or reject the innovation (Leonard Barton and Deschamps 1998). Decisions to adopt a new technology are typically shaped by the perceived usefulness and ease of use of the innovation (Davis et al. 1989). However, these factors are determined by the ability of the innovation's benefits to be measured, how relevant it is to an individual's job or the organisation's core purpose the adopter's experience of the technology and whether their adoption is voluntary or compulsory. However, other important factors influencing adoption are the subjective norms or relevant others' beliefs that this adoption should occur, and the positive image associated with the innovation or those who advocate it (Legris et al. 2003).

In a study of innovation diffusion within industrial markets Czepiel (1974) found evidence to support the social process theory and the influence of third party voices. A key factor was "the existence of a functioning informal community linking together the firms" (p. 178). Interpersonal relationships, WOM and the imitation of one firm's behaviour by another were all identified as critical to the diffusion of the innovation. These findings point to the role played within industrial markets by social networking in the innovation diffusion process. The importance of the social system's impact on the diffusion of innovation was further highlighted by Abrahamson (1991) who noted the role of managerial fads and fashion in the adoption and rejection of innovations. In his conceptual analysis he explained why organisations adopt technically inefficient innovations while rejecting efficient ones. It also explains the influence on organisational decision making of powerful external factors that may promote the adoption of inefficient innovations at the expense of more efficient ones. In this way the role of social influence can be seen within even organisational contexts. In particular the role played by those perceived by managers to be third party experts whose advice they seek about whether to adopt an innovation (Leonard Barton 1985). Such opinion leaders can have a significant influence on the rate of diffusion for an innovation (Valente and Davis 1999).

The innovation adoption process within large organisations therefore occurs at two levels whereby first the organisation, then its members make decisions regarding its acceptance. Third party influences take place at each stage. The marketing and sales activities of the suppliers promoting the innovation form part of this communication. These are typically targeted at key decision makers and aim to reduce the perceived risk of the adoption while demonstrating its benefits. Also playing a role is the influence of the social network of the senior managers making

the decision. Informal communications about the innovation that carry positive WOM will improve the likelihood of adoption (Frambach and Schillewaert 2002). The influence of such subjective norms upon organisational adoption of complex technological innovations has been acknowledge with such influential voices as peers, co-workers, professional contacts, customers, subordinates and senior managers all providing input (Gallivan 2001). At the individual level acceptance of an innovation is likely to be influenced by peer group adoption of the new initiative placing pressure on the individual to imitate. Also influencing individual adoption decisions are the social norms that suggest the innovation is desirable in the eyes of senior management or socially important role models (Frambach and Schillewaert 2002).

By contrast with their larger counterparts, entrepreneurs within small innovator firms are likely to proceed with the commercialisation of an innovation where they feel they have the necessary resources, capabilities, stakeholder support and leading customers who will value their new products or services (Choi and Shepherd 2004). Best practice in NPD and commercialisation requires attention to both the project management and market development in what has been described as the "fuzzy front end" of the development process (Dooley et al. 2002). The expected return on the investment into the commercialisation of the innovation is assessed by entrepreneurs within small firms through the anticipated acceptance of the new product by these lead customers (Mazzarol and Reboud 2005). Of all the external influencers likely to impact on the decision making of an entrepreneur within a small innovator firm, the most important is that of the customer (Mazzarol and Reboud 2006). However, small firms typically lack sufficient resources to enable them to undertake the commercialisation of an innovation alone. As a result they are likely to seek the support of third party complementary actors such as leading customers, key suppliers and resource network partners (Mazzarol and Reboud 2008). The ability for the entrepreneur to leverage strategic alliance partnerships can enhance the firm's market performance (Sarkar et al. 2001). These various stakeholders influence the strategic decision making of entrepreneurs and can involve both formal (e.g. supplier and customer), as well as informal (e.g. family members) channels (Atkins and Lowe 1994).

As noted by Kotabe and Swan (1995) in their study of 906 new product innovations a firm should be viewed as a "collection of technologies ranging from simple administrative procedures to applied sciences" (p. 631). Collaboration via strategic partnerships within the NPD/commercialisation process serves to leverage the firm's resources and those of its strategic network partners to best coordinate one or more of these technologies and remove any redundancies. However, collaboration is not always a successful innovation strategy. There must be a shared vision and overall strategic intent between the collaborating firms, with trust and good communications essential ingredients to success. This collaboration for NPD and commercialisation may be more difficult where the innovation is of a radical or disruptive nature as the ability to draw the various network actors together into an alliance becomes harder.

9.4 Commercialisation, Marketing and the Role of WOM

Let us turn now to the role played by marketing and WOM in the process of commercialisation of an innovation. Commercialisation involves taking the innovation to market and includes marketing, sales, distribution and the formation of joint ventures designed to ensure successful diffusion of the innovation. Despite its importance it remains one of the least developed areas of innovation management from an academic research perspective (Adams et al. 2006). Within the innovator firm the focus has been on how to better integrate the R&D and marketing aspects of the NPD process to ensure that these two, often conflicting, sub-cultures are reconciled. This has often involved the formation of multi-functional teams, matrix organisational structures and cross training and deployment of personnel (Griffin and Hauser 1996). There is evidence that communications across functional areas within the firm result in enhanced innovative performance, and while such dialogue with customers and other firms has a positive impact on the level of patents generated (Kivimaki et al. 2000).

The level of market orientation found within the firm and its ability to be proactive in its pursuit of market opportunities has been identified as playing a significant role in enhancing NPD and overall innovation (Vazquez et al. 2001). This appears to apply as well to service firms as to those engaged in the production of tangible goods (Agarwal et al. 2003). How proactive a firm is within its marketing is likely to be particularly important in circumstances where the innovation is radical or disruptive in nature (Sandberg 2002). This type of innovation involves the combination of new product and new market combinations and requires greater targeting of the marketing communications effort to win over influential early adopters and leverage points of market entry. Less disruptive innovations can be products that are seeking to enter new markets or new products being diffused within existing markets. Such innovations require different approaches to marketing depending on the conditions influencing their diffusion (Garcia and Calantone 2002). The coordination of the marketing and R&D elements within the commercialisation process is important, with the ability to communicate the benefits of the innovation to potential customers or to adapt platform intellectual property and technologies to suit the requirements of such customers (Dutta et al. 1999).

Generating positive WOM in order to enhance the commercialisation of an innovation and its subsequent diffusion within a target market remains a key challenge for managers. However, there is evidence that firms can encourage such WOM through a process of relationships marketing with attention given to opinion leaders (Buttle 1998). Firms seeking to commercialise new products and services must make a strong commitment to encouraging positive WOM. This can translate into listening actively to customer feedback and seeking to engage leading customers and early adopters as partners in the NPD/commercialisation process (Berthon et al. 1999; Brunner 2001). Building trust, loyalty, commitment, perceived quality and value plus source credibility in the mind of such customers is

crucial (de Matos and Rossi 2008), as is making sure that promises are kept and opinion leaders cultivated. Monitoring feedback from early adopters is important along with ensuring that there is a high level of information provided to the market to allow customers to make an informed choice (Haywood 1989). For example, Thomke and von Hippel (2002) have noted that in some instances firms have sought to bring their lead customers into the NPD process and have provided them with "tool kits" that allow the customer to trial new ideas and prototype products. They have also made their production systems more flexible to accommodate customised designs requested by such customers. However, such outsourcing of the NPD process to the lead customer is not without its challenges. It requires intense interpersonal communications and the potential need to modify the firm's business model. Yet such lead customers, particularly if they are prominent firms within their own industries, will serve as ideal opinion leaders.

Opinion leaders within markets tend to be more knowledgeable than non-leaders on particular topics and engage in more information search behaviour. They also tend to gain more satisfaction from providing WOM within their fields of interest (Corey 1971). Opinion leaders tend to be more innovative than non-leaders, or at least are willing to be early adopters. They also may have higher social status within their communities. However, there is little overlap across different types of opinion leaders with leadership in one sphere counterbalanced by non-leadership in another (Rogers and Cartano 1962). Within consumer markets some success has been found in launching new products and services with innovative marketing campaigns that generate a "buzz" of positive WOM within target communities via opinion leadership grassroots advertising (Dye 2000). The advent of the internet has given firms the ability to engage consumers and early adopters of innovation in a two-way dialogue utilising the power of Web 2.0 technologies (Riegner 2007). Consumer reviews of new products and services posted on web-logs offer an opportunity for timely dissemination of positive and negative market feedback and serve as a form of opinion leadership or electronic WOM (Chen and Xie 2008). However, as with face-to-face WOM, care must be taken to allow these e-WOM consumer web-logs to be seen as independent of manipulation by the firm or risk eroding source credibility (Sussan et al. 2006; Lee and Youn 2009).

9.5 Conclusions

In summary the diffusion of innovation is a social process in which interpersonal communication and WOM advocacy play a key role. The firm seeking to commercialise a new product or service must recognise this and focus attention on the generation of positive WOM within target market segments. The rate of diffusion will be influenced by the nature of the innovation, and the characteristics of both the innovators and the environment in which they exist. Positive WOM can play a critical role in enhancing the rate of diffusion of an innovation; however the

dynamics of this communication process must be understood before it can be usefully harnessed.

Opinion leaders can play an important role in providing positive WOM, but their propensity to do so is likely to depend on such antecedents as their past satisfaction with the firm's previous products and services, whether they perceive the innovation offers value, and their commitment and loyalty to the firm. This WOM is also likely to need triggering via marketing promotional activities. Providing such opinion leaders with early trials of the product or service, plus sufficient information to educate them as to its attributes and benefits is likely to boost their self-confidence in giving WOM. How well this WOM is accepted by the receivers may depend on the richness, strength and valency of the message, as well as the credibility of the source and brand equity of the supplier.

Engaging customers, particularly leading customers, in a proactive dialogue aimed at reducing the perceived risk and uncertainties associated with the innovation is a key aspect of any marketing commercialisation strategy. Customer education and collaboration in the NPD process builds trust, loyalty and commitment that result in early adoption and the generation of positive WOM. The dynamics of different markets and how disruptive the innovation is will influence the nature of any marketing communications strategy. Within business to business markets the innovator firm is best placed targeting key points of influence such as senior managers or third-party experts whose opinions are sought in relation to adoption decisions. In mass consumer markets the opportunities exist to generate a "buzz" with targeted promotions utilising databases, opinion leaders and the power of Web 2.0 social media technologies to generate e-WOM (Howell 2005; Ainsworth 2007).

Bibliography

Abrahamson, E. (1991). "Managerial Fads and Fashions: The Diffusion and Rejection of Innovations." *The Academy of Management Review* 16(3): 586–612.

Adams, R., Bessant, J., and Phelps, R. (2006). "Management Measurement: A Review." *International Journal of Management Reviews* 8(1): 21–47.

Agarwal, S., Erramilli, M.K., and Dev, C.S. (2003). "Market Orientation and Performance in Service Firms: Role of Innovation." *Journal of Services Marketing* 17(1): 68–82.

Ainsworth, L. (2007). "Word of Mouth Rules." *Brand Strategy* 5(November): 40–41.

Arndt, J. (1967a). "Role of Product-Related Conversations in the Diffusion of a New Product." *Journal of Marketing Research* 4(3): 291–298.

Arndt, J. (1967b). *Word of Mouth Advertising: A Review of the Literature*. New York: Advertising Research Foundation.

Atkins, M., and Lowe, J. (1994). "Stakeholders and the Strategy Formation Process in Small and Medium Enterprises." *International Small Business Journal* 12(3): 12–26.

Bala, V., and Goyal, S. (1998). "Learning from Neighbours." *The Review of Economic Studies* 65(3): 595–621.

Bayus, B.L. (1985). "Word of Mouth: The Indirect Effects of Marketing Efforts." *Journal of Advertising Research* 25(3): 31–39.

Berthon, P., Hulbert, J.M., and Pitt, L.F. (1999). "To Serve or Create? Strategic Orientation Toward Customers and Innovation." *California Management Review* 42(1): 37–58.

Brooks, R.C. (1957). "Word of Mouth Advertising in Selling New Products." *Journal of Marketing* 22(2): 154–161.
Brown, L. (1969). "Diffusion of Innovation: A Macroview." *Economic Development and Cultural Change* 17(2): 189–211.
Brozen, Y. (1951). "Invention, Innovation and Imitation." *The American Economic Review* 41(2): 239–257.
Brunner, G.F. (2001). "The Tao of Innovation." *Research Technology Management* 44(1): 45–51.
Buttle, F. (1998). "Word of Mouth: Understanding and Managing Referral Marketing." *Journal of Strategic Marketing* 6(1): 241–254.
Charlett, D., Garland, R., and Marr, N. (1995). "How Damaging Is Negative Word of Mouth?" *Marketing Bulletin* 46(1): 42–50.
Chen, Y., and Xie, J-H. (2008). "Online Consumer Review: Word of Mouth as a New Element of Marketing Communication Mix." *Management Science* 54(3): 477–491.
Choi, Y.-R., and Shepherd, D.A. (2004). "Entrepreneurs' Decisions to Exploit Opportunities." *Journal of Management* 30(6): 377–395.
Corey, L.G. (1971). "People Who Claim to Be Opinion Leaders: Identifying Their Characteristics by Self-Report." *Journal of Marketing* 35(4): 48–53.
Coughenour, C.M. (1964). "The Rate of Technological Diffusion among Locality Groups." *The American Journal of Sociology* 69(4): 325–339.
Czepiel, J.A. (1974). "Word of Mouth Processes in the Diffusion of a Major Technological Innovation." *Journal of Marketing Research* 11(2): 172–180.
Davis, F.D., Bagozzi, R.P., and Warshaw, P.R. (1989). "User Acceptance of Computer Technology: Comparison of Two Theoretical Models." *Management Science* 35(8): 982–1003.
Day, G.S. (1971). "Attitude Change, Media and Word of Mouth." *Journal of Advertising Research* 11(6): 31–40.
de Matos, C.A., Rossi, A.V. (2008). "Word-of-Mouth Communications in Marketing: A Meta-Analytic Review of the Antecedents and Moderators." *Journal of the Academy of Marketing Science* 36(4): 578–596.
Dichter, E. (1966). "How Word of Mouth Advertising Works." *Harvard Business Review* 44(6): 147–160.
Dodd, S.C. (1952). "Testing Message Diffusion from Person to Person." *The Public Opinion Quarterly* 16(2): 247–262.
Dodson, J.A., and Muller, E. (1978). "Models of New Product Diffusion Through Advertising and Word of Mouth." *Management Science* 24(15): 1568–1578.
Dooley, K.J., Subra, A., and Anderson, J. (2002). "Adoption Rates and Patterns of Best Practices in New Product Development." *Journal of Innovation Management* 6(1): 85–103.
Dutta, S., Narasimhan, O., and Rajiv, S. (1999). "Success in High-Technology Markets: Is Marketing Capability Critical?" *Marketing Science* 19(4): 547–568.
Dye, R. (2000). "The buzz on buzz." *Harvard Business Review* 78(6): 139–146.
East, R., Hammond, K., and Wright, M. (2007). "The Relative Incidence of Positive and Negative Word of Mouth: A Multi-Category Study." *International Journal of Research in Marketing* 24(2): 175–184.
East, R., Hammond, K., and Lomax, W. (2008). "Measuring the Impact of Positive and Negative Word of Mouth and Brand Purchase Probability." *International Journal of Research in Marketing* 25(3): 215–224.
Eng, T.-Y., and Quaia, G. (2009). "Strategies for Improving New Product Adoption in Uncertain Environments: A Selective Review of the Literature." *Industrial Marketing Management* 38(3): 275–282.
Engel, J.F., Kegerreis, R.J., and Blackwell, R.D. (1969). "Word of Mouth Communication by the Innovator." *Journal of Marketing* 33(3): 15–19.
Fliegel, F.C., and Kivlin, J.E. (1966). "Attributes of Innovations as Factors in Diffusion." *The American Journal of Sociology* 72(3): 235–248.

Frambach, R.T., and Schillewaert, N. (2002). "Organizational Innovation Adoption: A Multi-Level Framework of Determinants and Opportunities for Future Research." *Journal of Business Research* 55(2): 163–176.

Gallivan, M.J. (2001). "Organizational Adoption and Assimilation of Complex Technological Innovations: Development and Application of a New Framework." *The Data Base for Advances in Information Systems* 32(3): 51–85.

Garcia, R., and Calantone, R. (2002). "A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review." *Journal of Product Innovation Management* 19(2): 110–132.

Gatignon, H., and Robertson, T.S. (1985). "A Propositional Inventory for New Diffusion Research." *Journal of Consumer Research* 11(4): 849–867.

Griffin, A., and Hauser, J.R. (1996). "Integrating R&D and Marketing: A Review and Analysis of the Literature." *Journal of Product Innovation Management* 13(3): 191–215.

Grubler, A. (2000) "Time for a Change: On the Patterns of Diffusion of Innovation". *Journal of Regional Science Review* 125(3): 19–42.

Hagerstrand, T. (1966). "Aspects of the Spatial Structure of Social Communication and the Diffusion of Information." *Papers in Regional Science* 16(1): 27–42.

Hamblin, R.L., Miller, J.L., and Saxton, D.E. (1979). "Modelling Use Diffusion." *Social Forces* 57(3): 799–811.

Harrison-Walker, L.J. (2001). "The Measurement of Word-of-Mouth Communication and an Investigation of Service Quality and Customer Commitment as Potential Antecedents." *Journal of Service Research* 4(1): 60–75.

Haywood, K.M. (1989). "Managing Word of Mouth Communications." *Journal of Services Marketing* 3(2): 55–68.

Hovland, C.I., and Weiss, W. (1951). "The Influence of Source Credibility on Communications Effectiveness." *The Public Opinion Quarterly* 15(4): 635–650.

Howell, N. (2005). "Pass it on." *New Media Age* 2/10/05: 25-26.

Huang, X., Soutar, G.N., and Brown, A. (2002). "New Product Development Processes in Small to Medium-Sized Enterprises: Some Australian Evidence." *Journal of Small Business Management* 40(1): 27–42.

Katz, E., Levin, L., and Hamilton, H. (1963). "Traditions of Research on the Diffusion of Innovation." *American Sociological Review* 28(2): 237–252.

Kinnunen, J. (1996). "Gabriel Tarde as a Founding Father of Innovation Diffusion Research." *Acta Sociologica* 39(4): 431–442.

Kivimaki, M., Lansisalmi, H., Elovainio, M., and Heikkila, A. (2000). "Communication as a Determinant of Organizational Innovation." *R&D Management* 30(1): 33–42.

Kotabe M., Swan, K.S. (1995). "The Role of Strategic Alliances in High-Technology New Product Development." *Strategic Management Journal* 16(8): 621–636.

Lampert, S., and Rosenberg, L.J. (1975). "Word of Mouth Activity as Information Search: A Reappraisal." *Journal of the Academy of Marketing Science* 3(4): 337–354.

Lee, Y., and O'Connor, G.C. (2003). "The Impact of Communication Strategy on Launching New Products: The Moderating Role of Product Innovativeness." *Journal of Product Innovation Management* 20(1): 4–21.

Lee, M., and Youn, S. (2009). "Electronic Word of Mouth (eWOM): How eWOM Platforms Influence Consumer Product Judgement." *International Journal of Advertising* 28(3): 473–499.

Legris, P., Ingham, J., and Collerette, P. (2003). "Why Do People Use Information Technology? A Critical Review of the Technology Acceptance Model." *Information & Management* 40(2): 191–204.

Leonard Barton, D. (1985). "Experts as Negative Opinion Leaders in the Diffusion of a Technological Innovation." *The Journal of Consumer Research* 11(4): 914–926.

Leonard Barton, D., and Deschamps, I. (1998). "Managerial Influence in the Implementation of New Technology." *Management Science* 14(9): 1252–1265.

Mahajan, V., and Muller, E. (1979). "Innovation Diffusion and New Product Growth Models in Marketing." *Journal of Marketing* 43(4): 55–68.
Mahajan, V., Muller, E., and Kerin, R.A. (1984). "Introduction Strategy for New Products with Positive and Negative Word-of-Mouth." *Management Science* 30(12): 1389–1404.
Mahajan, V., Muller, E., and Bass, F.M. (1990). "New Product Diffusion Models in Marketing: A Review and Directions for Research." *Journal of Marketing* 54(1): 1–26.
Mangan, J., Lalwani, C., and Fynes, B. (2008). "Port-Centric Logistics." *International Journal of Logistics Management* 19(1): 29–41.
Martilla, J.A. (1971). "Word of Mouth Communication in the Industrial Adoption Process." *Journal of Marketing Research* 8(2): 173–178.
Mazzarol, T., and Reboud, S. (2005). "Customers as Predictors of Rent Returns to Innovation in Small Firms – An Exploratory Study." *International Journal of Entrepreneurship and Innovation Management* 5(5/6): 483–494.
Mazzarol, T., and Reboud, S. (2006). "The Strategic Decision Making of Entrepreneurs Within Small High Innovator Firms." *International Entrepreneurship and Management Journal* 2(2): 261–280.
Mazzarol, T., and Reboud, S. (2008). "The Role of Complimentary Actors in the Development of Innovation in Small Firms." *International Journal of Innovation Management* 12(2): 223–253.
Mazzarol, T., Sweeney, J.C., and Soutar, G.N. (2007). "Conceptualizing Word-of-Mouth Activity, Triggers and Conditions: An Exploratory Study." *European Journal of Marketing* 41(11/12): 1475–1494.
Mitchell, V., and Greatorex, M. (1993). "Risk Perception and Reduction in the Purchase of Consumer Services." *The Services Industries Journal* 13(4): 179–200.
Myers, J.H., and Robertson, T.S. (1972). "Dimensions of Opinion Leadership." *Journal of Marketing Research* 9(February): 41–46.
Nan, L., and Burt, R.S. (1975). "Differential Effects of Information Channels in the Process of Innovation Diffusion." *Social Forces* 54(1): 256–274.
Ostgaard, T., and Birley, S. (1994). "Personal Networks and Firm Competitive Strategy – A Strategic or Coincidental Match?" *Journal of Business Venturing* 9(4): 281–306.
Richins, M.L. (1983). "Negative Word of Mouth by Dissatisfied Consumers: A Pilot Study." *Journal of Marketing* 47(1): 68–78.
Riegner, C. (2007). "Word of Mouth on the Web: The Impact of Web 2.0 on Consumer Purchase Decisions." *Journal of Advertising Research* 47(December): 436–447.
Rogers, E.M. (1976). "New Product Adoption and Diffusion." *The Journal of Consumer Research* 2(4): 290–301.
Rogers, E.M. (1995). *Diffusion of Innovations*. New York: Free.
Rogers, E.M., and Cartano, D.G. (1962). "Methods of Measuring Opinion Leadership." *The Public Opinion Quarterly* 26(3): 435–441.
Roselius, T. (1971). "Consumer Rankings of Risk Reduction Methods." *Journal of Marketing* 35(1): 56–61.
Ryan, B., and Gross, N. (1943). "The Diffusion of Hybrid Seed Corn in Two Iowa Communities." *Rural Sociology* 8(1): 15–24.
Sandberg, B. (2002). "Creating the Market for Disruptive Innovation: Market Proactiveness at the Launch Stage." *Journal of Targeting, Measurement and Analysis for Marketing* 11(2): 184–197.
Sarkar, M.B., Echambadi, R., and Harrison, J. (2001). "Alliance Entrepreneurship and Firm Market Performance." *Strategic Management Journal* 22(6/7): 701–711.
Schumpeter, J. (1934). *The Theory of Economic Development*. New York: Harvard University Press.
Schumpeter, J. (1939). *Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process*, *Volume II*. New York & London: McGraw-Hill.

Smith, R.E., and Vogt, C.A. (1995). "The Effects of Integrating Advertising and Negative Word-of-Mouth Communications on Message Processing and Response." *Journal of Consumer Psychology* 4(2): 133–151.

Still, R.R., Barnes, J.H., and Kooyman, M.E. (1984). "Word-of-Mouth Communication in Low Risk Product Decisions." *International Journal of Advertising* 3(4): 335–345.

Sussan, F., Gould, S., and Weifeld-Spolter, S. (2006). "Location, Location, Location: The Relative Roles of Virtual Location, Online Word-of-Mouth (eWOM) and Advertising in the New-Product Adoption Process." *Advances in Consumer Research* 33(1): 649–650.

Sweeney, J.C., Soutar, G.N., and Mazzarol, T. (2008). "Factors Influencing Word of Mouth Effectiveness: Receiver Perspectives." *European Journal of Marketing* 42(3/4): 344–364.

Sweezy, P. (1943). "Professor Schumpeter's Theory of Innovation." *The Review of Economics and Statistics* 25(1): 93–96.

Tarde, G. (1903). *The Laws of Imitation*. New York: Henry Holt.

Taylor, J.W. (1974). "The Role of Risk in Consumer Behaviour." *Journal of Marketing* 38(2): 54–60.

Thomke, S., and von Hippel, E. (2002). "Customers as Innovators: A New Way to Create Value." *Harvard Business Review* 80(4): 74–82.

Valente, T.W., and Davis, R.L. (1999). "Accelerating the Diffusion of Innovations Using Opinion Leaders." *Annals of the American Academy of Political and Social Science* 566(November): 55–67.

Vazquez, R., Santos, M.L., & Alvarez, L.I. (2001). "Market Orientation, Innovation and Competitive Strategies in Industrial Firms." *Journal of Strategic Marketing* 9(1): 69–90.

Wejnert, B. (2002). "Integrating Models of Diffusion of Innovations: A Conceptual Framework." *Annual Review of Sociology* 28: 297–326.

Woodside, A.G., and DeLozier, M.W. (1976). "Effects of Word of Mouth Advertising on Consumer Risk Taking." *Journal of Advertising* 5(4): 12–18.

Chapter 10
An Integrated Approach to Communications in the Open Innovation Process

Manfred Bruhn and Grit Mareike Ahlers

Contents

10.1 New Challenges for Communicating Innovations

10.1.1 From Closed Innovation to Open Innovation

Corporate innovation management has always faced multiple challenges. Progressive internationalization, shortened product lifecycles as well as a dramatic growth in information relating to products and services pose substantial risks for product development. The sobering failure rates for new products (up to 70%) in the

M. Bruhn
Wirtschaftswissenschaftliches Zentrum – Abteilung Marketing und Unternehmensführung, Universität Basel, Petersgraben 51, 4051 Basel, Switzerland
e-mail: manfred.bruhn@unibas.ch

G.M. Ahlers (✉)
Prof. Bruhn & Partner AG, Feldstr. 55, 8004 Zürich, Switzerland
e-mail: mareike.ahlers@bruhn-partner.com

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, DOI 10.1007/978-3-642-17223-6_10,

consumption goods markets clearly indicate that innovation processes, more often than not, fail to meet the needs of the target groups (N.U. 2006). In this context, the quest for strategies promising sustainability and promoting innovation has become critically important, especially with regard to the organization of the innovation's development proposal. Up until a few years ago, the innovation process was primarily aimed at the company's internal processes, being organized as a so-called *Closed Innovation*. According to this concept, the company's own staff, in particular its researchers and developers, are seen as the central contributors to innovation. The ideas produced are handled confidentially and the new products are developed on the drawing board. Collaboration with clients and research institutes is not prohibited by the process, but usually only takes place at the beginning of the innovation process. The problem-solving phase, and thus the innovation process itself, is conducted extensively within the closed confines of the company (Chesbrough 2003; Trott 2008).

While a "closed" innovation policy can be seen as offering the advantages of minimal complexity and maximal controllability, the disadvantages and risks of such a strategy become more apparent in a global, dynamic competitive environment. On the one hand, internal innovation demands that a company invests heavily in accumulating internal know-how and establishing internal technical facilities. On the other hand, an absence of an adequate information transfer between product developers and product users presents the danger that innovations will not correspond to client needs and that development processes will be protracted (Lindman 2002; Ernst 2004; Herzog 2007; Reichwald and Piller 2009).

The concept of *Open Innovation* was introduced in 2003, extending the discussion beyond the confines of Closed Innovation (Chesbrough 2003; Prahalad and Krishnan 2009). The fundamental idea here is to establish a corporate innovation policy that is collaborative in its outlook and that aims to integrate internal and external stakeholders within the innovation process, thereby closing gaps between technology and the market. Innovations, ready for market launch, are no longer developed solely within the confines of the corporation, but are the product of processes that dovetail internal and external processes. New external parties such as suppliers, competitors, end-clients and online communities (Ayuso et al. 2006) are increasingly joining the ranks of the traditional innovation partners (research institutes, market research consultancies, etc.). In the United States, 30% of a basketball community will be engaged in innovation activities, for example. Involvement in the innovation process is, in fact, the main stimulus driving the majority of members to join the club (Jawecki et al. 2009). In particular, the new use of consumer-based knowledge and creativity is the result of developments in the media environment, in the applications of social networking, and the "you-too"-Internet, now such important aspects of daily experience. Modern forms of innovation research such as "crowdsourcing" (e.g., Howe 2008; Kleemann et al. 2008), Consumer-Co-Creation (e.g., Payne et al. 2008) and Nethnography (e.g., Kozinets 2002; Bartl 2007) are subsequent developments of this trend and an expression of a change in attitude to innovation policy.

10.1.2 Consequences for Innovation Communication

In addition to reflecting an open and modern innovation culture, open innovation policy is charged with the task of identifying all the relevant internal and external stakeholders and drawing them into the innovation process (Trott 2008). While within the closed innovation concept most interactions take place within the company, the open innovation process is characterized by numerous real and virtual interfaces liaising internal and external activities. This requires a process of control and alignment that spans the length of the innovation process in order to avoid friction losses that would jeopardize the opportunities that the open innovation policy has to offer (Reichwald and Piller 2009; Vesshoff and Freiling 2009). *Effective and efficient communication management* is therefore essential to the success of an open innovation policy. From this perspective, *innovation communication* assumes a new importance in the context of the innovation process. Its function is no longer to simply communicate innovations to the external environment, but is now also responsible for aligning all internal and external interfaces throughout the innovation process. Academic and business communities are increasingly discussing the consequence that this has on the organization and management of innovation communication [see Mast and Zerfaß (2005), Zerfaß and Möslein (2009) as well as the study by Zerfaß and Ernst (2008)]. So far, no consistent approach has yet established itself definitively.

Many valuable impulses for innovation communication can be drawn from *integrated communication*. Integrated Communication Management is primarily aimed at aligning all internal and external communication instruments and messages – with the goal of conveying a consistent image of the communication's reference object (see in detail Bruhn 2010). The referenced object of the communication might be the company itself, a specific trade name, a product or, as in this case, an innovation. The alignment decisions for integrated communication are primarily based on conceptual criteria. Later, when it comes to the innovation's implementation phase, organizational and company-specific measures also have to be considered. The next section discusses the approaches for innovation communication derived from this in more detail.

10.2 The Concept of Integrated Communication as the Basis for Integrated Communication in the Innovation Process

10.2.1 Starting with Communication Deficiencies

With the advent of the twenty-first Century, integrated communication is no longer a novelty: It is a well recognized and long accepted necessity. As far back as the mid-1970s, the need to integrate communication instruments and measures has been defined as the most important challenge facing companies. This imperative has not

lost any of its force; instead, it has gained more and more momentum. Many developments have contributed to this: in particular, increasing competition in communications, the atomization of the media, the flood of information and stimuli inundating the consumer, as well as the dynamic increase in new channels of communication such as the social media. Developments such as these present new tasks and challenges for the integration of communication measures (Peltier et al. 2003). A central task of integrated communication is to eradicate *communication deficiencies* in companies. Communication deficiencies occur where various implemented measures are not harmonized with regard to content, form or time. Certain communication interfaces present a basis for systematizing communication deficits: the relationship between locations where communication takes place (internal and external) and the relationships between levels where communication takes place (horizontal and vertical). Classic deficiencies in company communications occur where there is a mismatch between *internal and external communications,* where a company's staff is not informed about proposed communication measures. *Internal communication deficiencies* may also occur, either horizontally in the alignment of inter- or intra-departmental communications or vertically in the hierarchical communication of messages between functions where the messages between staff and management do not share consistency in form or content. Communication deficiencies in *external communications* on a horizontal level will occur because a company employs different market-related tools for communication, which are non-aligned with regard to content, form or time. On the other hand, communication deficiencies may occur on multiple market levels because the marketing intermediaries that are engaged to provide services to supply end users have not had the required message content communicated to them (Johnson and Chang 2000).

The deficiencies sketched here serve to highlight a corporation's need for integration and thus the necessity of instituting integrated communication. In view of the increasing importance of open innovation, the need for integration can be extended to the innovation process. The more acute communication deficiencies are between internal and external, and horizontal and vertical interfaces, the greater the danger is that important information will fail to be exchanged or will be late, that ideas will get lost, innovations will miss their targets, or costly time will be wasted (Sleeswijk et al. 2007; Vesshoff and Freiling 2009).

10.2.2 Conceptual, Organizational and Employment Approaches to Integrated Communication

The concept of integrated communication provides a framework for making conceptual, organizational and employment decisions to eradicate communication deficiencies and achieve the optimum level of effectiveness and efficiency in communications.

On a *conceptual level,* three types of *communication integration* take place: content, form and time integration. While the first type is principally concerned

with guaranteeing consistency by using thematic associations, formal integration aims to strengthen recognition by employing uniform design principals. Time integration deals with aligning communications instruments during and between planning periods. In the framework of innovation communication, content and time integration are particularly important, where content integration presents the greatest challenges. Here, clearly defined guiding principles have to align communication goals, messages and measures across all points of contact between internal and external groups. This process employs a so-called *conceptual framework of integrated communication*: On the one hand this gives general rulings on the composition of communication content, and on the other hand, it provides explicit instructions on how the communication content should be implemented in daily work.

Beside the planning measures, the *organizational implementation* of integrated communication is extremely important. This entails setting up a management process that is capable of involving all the relevant departments and employees in the communication effort. This has implications for organizational implementation: It means that all overly rigid forms of structural organization have to be dropped and replaced by flexible methods of process organization, in particular process management and forms of team organization (Ahlers 2006).

Employment measures are closely associated with organizational structures and processes. These have to be specified within the context of the individual company, whereby integrated communication basically supports the case for institutionalizing the roles of a superordinate communications manager or team of specialists (Sonnenwald 1999; Johnson and Chang 2000).

This position functions as a kind of coordination office and is responsible for the supra-disciplinary planning, implementation and monitoring of communication (Sonnenwald 1999; Johnson and Chang 2000). Basic conceptual as well and organizational and employment information can be adopted from integrated communication for innovation communication. The integrated innovation communication process will illustrate this more clearly.

10.3 Development of a Process for Integrated Innovation Communication

Identifying the relevant integration needs is a precondition for planning and implementing innovation communication successfully. The innovation process maps the way for this and has to be specified more clearly for this purpose; it has to be structured within an innovation process for development and implementation (see Fig. 10.1).

The *innovation development process*, in this context, refers to the cycle of innovation during which the integration requirements are considered for the generation of the ideas, for the selection of a specific idea, and for its realization. The innovation *implementation process* covers the product or service lifecycle and thus

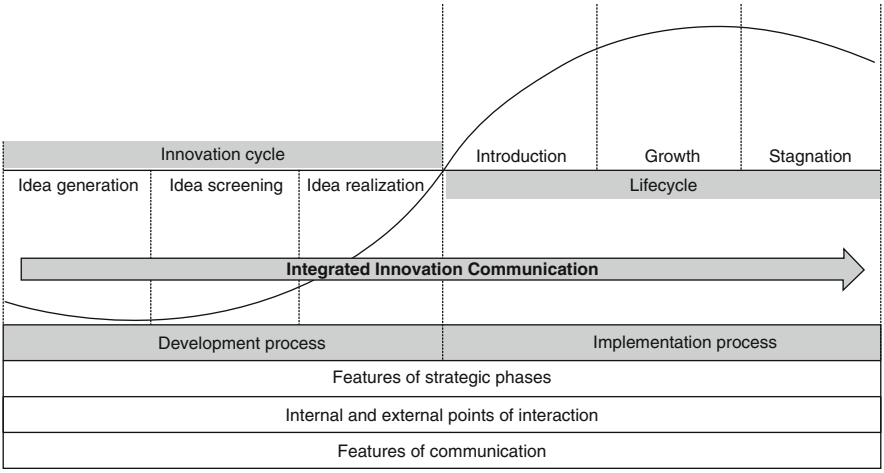


Fig. 10.1 Integrated Innovation Communication Process

also the transfer of the innovation to the market. The requirements for integration are assessed along the course of the innovation's market life from market introduction, to market growth, and on to stagnation. In accordance with this systematization, the concept of Integrated Innovation Communication (IIC) can be defined as follows:

> *Integrated Innovation Communication* is a process that aims to identify internal and external contact points in the development and implementation process of an innovation, as well as to develop and implement communicative measures that guarantee the alignment of these interaction points in order to achieve a maximum level of development efficiency and effectiveness internally as well as optimal market saturation externally.

Integrated Innovation Communication covers a multilevel process, the phases of which are marked by different characteristics and points of interaction. Consequently, communication plays a particular role in the individual phases, being defined by different goals and target groups as well as by specific communication instruments and contents. The interplay of these factors, again, has an influence on the alignment and integration needs between departments and employees as well as between internal and external stakeholders. Figure 10.2 summarizes the features of innovation communication in the innovation development and implementation process. The following sections will discuss the individual phases more closely.

10.3.1 Integrated Innovation Communication in the Development Process

Within the framework of innovation planning, multilevel planning processes are employed to provide a systematic base for decision making in product innovations.

Features	Idea generation	Idea screening	Idea realization	Introduction	Growth	Stagnation
Points of interaction						
Internal points of interaction	Organisation of the innovation process, idea acquisition procedure	Appraisal and/or broad and narrow selection of the product ideas	Product test procedure	Product training	Interaction with product users	Interaction with product users
External points of interaction	Information about the innovation project, activation of the innovation community, acquisition of ideas	Broad and narrow selection of product ideas; feasibility studies	Testing procedure for products	Distribution of the of the new product on the market, communication and marketing mix	Sales process, communication and marketing mix, Interaction with product users	Sales process, interaction with product users
Features of communication						
Internal communication target groups	R&D, market research, Customer Service, product marketing, etc.	Compare target groups for acquisition of ideas as well as production and finance areas	Person responsible for product testing	Product marketing, Product-PR, Customer Service, Distribution, etc.	Product Marketing, Product-PR, Customer Service, distribution, etc.	R&D, market research, customer service, product marketing, etc.
External communication target groups	Research institutes, consultants, lead-users, clients, opinion makers, online-community, etc.	Innovation community, selected target groups for special test processes	"True" customers in e.g., laboratory and field experiments	Innovators, early adopters, first customers	First and subsequent buyers, broad mass, product users, online community	Latecomers, second-time purchasers, broad mass, product users, online-community
Communication objectives	Identification and motivation of the innovators, stimulating a fast rate of ideas, steering the production of ideas	Steer and control idea testing, emotional bonding of innovation community, generating positive word-of-mouth	Acquiring suitable test individuals, information exchange between test procedures, and efficient feedback	Announcements, stimulating initial sales, activating networks, positive word-of-mouth, contagious effects	Emotionalization, Raising/stabilizing purchase frequency, observing user-buzz on the Internet	Cushioning emotionalization, identifying the reasons for the fall in sales, and improvement opportunities
Internal communication instruments	Personal communication, internal blogs	Personal communication	Personal and written communication / documentation	Training, workshops, personal communication, Intranet, internal blogs	Internal blogs	Personal communication
External communication instruments	Relevant homepages, blogs, communities, social networks, special online-platforms	Blogs, communities, social networks, special online platforms, personal communication	Blogs, communities, social networks, special online platforms, personal communication	Media advertising, sales promotions, direct marketing, online-communication, social media, etc.	Supportive media advertising, sales promotions, online monitoring, social media	Online-monitoring, Social Media, personal communication
Communication content	Innovation framework, stimuli	Realistic assessment of Innovation idea, emotional bonding of the innovation community.	Data and facts of the test results	Sales arguments, product merits, price advantages, product image	Consolidating sales arguments, reaction to user responses	Reaction to user-responses
Integration requirements	In particular, alignment between internal and external acquisition of ideas	Coordination of internal and external appraisals of the idea.	Information exchange between product development and product testing	Coordination or market communication, alignment of internal and external communication	Coordination of market communication, harmonization of user responses and internal communications	Harmonization of user responses and product improvements

Fig. 10.2 Features of integrated innovation communication in the development and implementation process

Classically, the process follows an established sequence of phases: searching for product ideas, gathering a broad selection of ideas, testing product concepts, making a narrow selection, and finally introducing the new product onto the market (e.g., Meffert et al. 2007; Homburg and Krohmer 2009). For simplicity,

a three-stage innovation process can be introduced here, consisting of three phases: "idea generation", "idea screening" and "idea realization".

10.3.1.1 The Idea Generation Phase

The phase of generating new product ideas marks the beginning of the development process. Product ideas are both systematically gathered and generated here. The objective here is to accumulate as many ideas as possible to compensate for subsequent rejections. The company can decide to generate its ideas for the product or service either internally or externally. The varying number of internal and external *interaction points* that have to be managed by communications depends of the degree of "openness" that the innovation process has. Information communicated here relates to initiating the innovation process, giving instructions on procedure, to actually recording product ideas.

The *communication target groups* are closely associated with the specified interaction points. The internal staff engaged here are primarily drawn from R&D, Market Research, Customer Service and Product Marketing.

Ideally, a cross-functional idea pool should be established, enabling a constant exchange of ideas and information. In this phase, companies typically access external providers such research institutes or market researchers and collaborate with information brokers or work together with lead-users (Lilien et al. 2002; Ernst et al. 2004). In line with the concept of open innovation, an ever-growing body of customers, opinion makers and interested parties are also involved in generating ideas. This open procedure offers the company substantial advantages; for example, an increased wealth of ideas, sharpened concentration on target groups and speed in producing ideas. On the one hand, the "right" external agents have to be drawn into the development process and, on the other hand, the "right" ideas have to be generated for these advantages to be exploited. In this phase, communication goals aim at identifying suitable external innovators as well as motivating them to participate in the innovation process. A major goal of communication is to elicit the best ideas in the shortest time. In addition to motivating the "innovation community", communications has a lead function in issuing timely and detailed information regarding the innovation's requirements and objectives, be these "hard" factors such as technical framework conditions or "softer" factors such as "the cultural fit" of the product ideas (Ernst 2004).

At the onset of the innovation process, *communications instruments* are also employed to enlist the help of external parties in generating ideas, and in organizing and directing the process. To accomplish this, the development proposal has to be publicized to the relevant target groups through technology or design institutes and blogs or social networks such as Facebook and StudiVZ in order to mobilize "creative masses" by "crowdsourcing" (Füller and Mühlbacher 2004; Herstatt and Sander 2004). OSRAM, for example, brought their development of a new "emotional lighting" concept to the attention of more than 200 websites, communities and blogs and was able to attract 910 participants from nearly 100 countries in

under 11 weeks to participate in the development of their product. While OSRAM brought its own online-platform to life, in the mean time numerous publically accessible "idea marketplaces" have sprung up (e.g., Innocentive, Fellowforce or Openinnovators), where companies can call upon their target groups to submit ideas for product development. The possibilities offered by Web 2.0 extend even further by offering internal company support in the innovation process as well (McAfee 2006). In addition to the classic forms of personal communication, special blogs can also be set up within innovation teams for the purpose of exchanging and collecting product ideas. Whether one chooses to setup a blog for specialists or a blog inviting staff from other departments will depend on the degree of openness that innovation process offers.

With regard to communication contents, during the phase of idea generation, communication focuses on directing the quantity and quality of the product ideas. In addition to stimulating participation in the innovation process, information relating to the central framework conditions for the development process should be fed into the "fuzzy front end" of the innovation process as early as possible. This applies internally, but at the same time pays particular attention to the external "innovation community".

In connection with the communication deficiencies discussed earlier at the beginning of this paper, the greatest *need for integration* arises in the idea generation phase in order to align internal and external communication. Here, especially, the product ideas that have been generated internally have to be aligned with those generated externally so that they can be jointly evaluated later on in the process, and, if necessary, developed further. If communication deficiencies arise at this stage, there is the danger that promising ideas (in particular, those acquired externally) may go unnoticed and "founder". Apart from aligning internal and external communication processes, the requirements for innovation can also be positioned internally: This may be done horizontally within the individual development teams, or vertically by aligning operational units with management. This insures that the innovation framework conditions are clearly communicated (Rothwell and Robertson 2002). Improvements to external communications should also be considered, where the use of different communication facilities cause deficiencies (e.g., idea generation via blogs, communities, etc.). The more comprehensively that a company can satisfy its coordination needs in the idea generation phase, the better prepared it will be in the idea screening phase.

10.3.1.2 Idea Screening Phase

In the framework of the idea screening phase, the main task is to sort out less promising ideas effectively and efficiently, reducing the risk of failure so that available resources can be concentrated on the ideas that have the best chance of success (Trott 2008).

Points of interaction occur throughout the idea screening process from the broad and narrow selection of ideas through to the feasibility check. While the phases of

the selection processes have both internal and external interaction points, the points of interaction in the feasibility analysis phase are mainly internal.

During the idea screening phase, the *principle communication target groups* consist of employees who have been commissioned with individual ideas. In addition to the R&D departments, these areas also have direct contact with customers and have first-hand experience of the product's use. At this stage, the production area and the finance area should also be viewed as communication target groups and thus guarantee the smooth running of the economic feasibility study. With regard to the external online community, communication at this stage concentrates on the active innovation community: Starbucks, for example, at www.mystarbucksidea.de asks its customers and readers not only to suggest product ideas, but also to discuss and appraise the ideas of other participants. Moreover, select customers may even be personally contacted and enlisted for special phases of the idea screening process, such as (Web-based) Conjoint analyses (Gustafsson et al. 2007).

The *communication goals* of this stage are concerned principally with directing and controlling monitoring activities. It is not only important for a company to gather information: The information has to subsequently be actively fed back into the innovation process so that a real exchange of ideas is guaranteed. This is important as it demonstrates the company's recognition of the innovation community's contribution and cements its commitment to the on-going innovation process. In this phase, generating positive word-of-mouth is an important communication goal. Members of the innovation community should be inspired to publicize the innovation process in their context and, in so doing, either bring more innovators on board or arouse curiosity in the new product (Horbel and Woratschek 2009).

Personal communication has an important role internally as one of the *communication instruments* in the monitoring phase. Communication can be conducted externally via online platforms. Where select external target groups are to be drawn more tightly into the process, a transition to more personal forms of communication is recommended.

The content of communication can be subdivided into rational and emotional messages during the idea screening phase. While, on a rational level, products are primarily appraised on a technical basis, companies will employ emotional communication to strengthen and extend the bonds they have with innovation communities, not simply allowing the associations to fade out once the idea has been acquired (Kunz and Mangold 2004; Teichert et al. 2004). It is not unusual for communication managers to assume the role of moderator during this phase and to mediate between parties when critical idea appraisals take place.

The *requirements for integration* during the monitoring phase primarily concern coordinating the evaluation of the idea. A large number of employees and departments may be involved in the innovation process, which spans from product idea selection to the feasibility analysis, and only an on-going and comprehensive information policy can ensure that ideas are monitored and justified as being suitable and consistent. This is all the more important when external target groups are also drawn into the process. Basically, the requirements for integration are

satisfied in this phase, once all the relevant ideas have been thoroughly checked, all the internal and external innovators have been informed about the monitoring process and the selected ideas have gained a high level of acceptance.

10.3.1.3 Idea Realization Phase

The idea realization phase focuses on building and testing prototypes as inexpensively and as quickly as possible, terminating the development process: The aim is to secure the product's market success with appropriate budgeting and to plan its market introduction.

Interaction points between internal and external target groups arise principally during the individual product tests of the idea's realization. A wide range of procedures is available here, from the concept test to mini test markets, each of these occasioning different interactions (Mahajan and Wind 1992).

When following a closed innovation approach, the innovation process is opened for the first time to technically unqualified people during the product tests. Acceptance tests are conducted to determine specific design features such as color matches and packaging sizes. The importance of external interaction points is well established with open innovation. In this phase, the communication target group is no longer the Internet innovation community, but is now made up of "real" customers who actually test the products in the field or in laboratory experiments.

During the idea realization phase, communication measures concentrate on promoting the efficiency of the realization process. *Communication goals* are particularly concerned with sustaining the exchange of information between staff involved in the realization process. Feedback from the test procedure has to be obtained, evaluated and fed back into product development process. With regard to external target groups, communication primarily focuses on securing suitable test individuals as well as informing the innovation community about main developments and sustaining their commitment.

Communication instruments that transmit information on the results of the relevant product tests are especially important during the realization phase. This may be communicated personally, and also impersonally in the form of protocols and experiment documentation. Established blogs and online forums can be used for external communications. For the recruitment of test subjects, individuals must be contacted personally or at least in writing. The larger the company's data repository of customer contacts is, the smoother this process usually is.

The idea realization phase is all about exchanging information on the test results and forwarding suggestions for improvements. *Communication contents* consist of rational data and facts. In spite of the large number of external interfaces, the requirements for integration in the realization phase should, primarily, take place internally. Here, a continual exchange of information between the development team and the managers in charge of the test procedure must be guaranteed. The external requirement for integration consists in keeping the innovation community regularly informed about the realization process.

Once the test phase has been successfully completed, commercialization begins when the new product is introduced to the market. Innovation communication as part of the development process is followed by innovation communication as part of the implementation process.

10.3.2 Integrated Innovation Communication in the Implementation Process

The implementation process for innovation communication consists of the communication phases that involve internal and external target groups that are involved in scheduling the market development of a product or service. This process usually consists of the phases: introduction, growth, maturity, saturation and decline (i.e., Meffert et al. 2007, p. 822f.; Bruhn 2008, p. 63f.). To simplify this somewhat, a three-stage lifecycle is also introduced here, consisting of the phases: introduction, growth and stagnation (see, Fig. 10.2).

While innovation communication still focuses on a limited target group in the development phase – even if this is relatively broad where open innovation is concerned, in the implementation phase the communication process is open to as wide a public as possible in order to achieve the greatest possible market saturation.

10.3.2.1 Introduction Phase

The introduction phase is often the most important phase for a new product. Here one decides whether the original product ideas can be feasibly turned into a financially successful product. Often the introduction phase carries the greatest marketing and communication costs, which often means calculating with losses. It is all the more important, therefore, that communication measures are specified by precise directives and synergy effects are exploited.

Interaction points are established in the introduction phase through the sales and distribution of the new product on the market as well as through the launch of supportive, sales-promoting communication activities.

Often these measures are aimed at external *communication target groups* during the product's introduction. In particular, innovators and early adopters should be identified as potential customers and measures aimed at stimulating purchases should be used to provide them with information about the new product. In addition to potential customers, media representatives and other opinion makers should be considered as an important target groups during the introduction phase. Ideally, these target groups will have already participated in the innovation process, producing synergy effects across the different phases. In addition to customers and opinion makers, internal target groups should be purposefully involved in innovation communication during product introduction. Where the communication

of innovation is directed towards the outside arena, (product-) marketing and (product-) PR assume a central role. These departments can only fulfill this function however, if they have received adequate and timely information about the new product. The same applies to staff working in Sales and Distribution or in Customer Service or all staff in general who deal with customers and make use of the new product themselves or issue information on its use.

A central *communication goal* during the introduction phase is the goal of advertising the new product, its features and advantages in order to stimulate trial samples and first purchases. In addition to this, communication measures aim at activating opinion makers and generating positive word-of-mouth and contagion effects. Opinion makers are not necessarily or solely taken from the ranks of press representatives, but are to be found more and more in the Internet, and often have a substantial negative or positive influence on product appraisals (Helm et al. 2010). Only recently the biggest diaper innovation in 25 years by Procter & Gamble almost failed due to negative word-of-mouth on the internet claiming the new pampers would cause itchiness (N.U. 2010).

When selecting *communication instruments*, the company has more or less the whole spectrum of marketing communication at its disposal in the introduction phase. This spans from traditional media advertising, to direct marketing and sales promotion at the point of sale, and on to the interactive possibilities of online and social media communication. The possibilities offered by social media can also be employed for addressing internal target groups, promoting the new product through blogs, for example, and by simultaneously setting up a platform for exchanging experiences (McAfee 2006); however, workshops and user training courses are necessary for conveying more detailed product information relating to particularly demanding business areas.

Communication content in the introduction phase features both factual and emotional messages. While factual *communication content* deals primarily with sales arguments relating to product features, price advantages, and application possibilities, emotional communication content deals with building up a particular image of the new product.

The *requirements for integration* during the introduction phase correspond largely to the classic alignment requirements for integrated communication: The coordination of the content and scheduling of all the market communication measures is of particular importance in order to create a uniform and convincing market appearance. Here, it is equally necessary to integrate internal and external communication measures in order to guarantee that employees are informed about the product features that are advertized on the market and respond adequately to them.

10.3.2.2 Growth Phase

The use of marketing and communication measures usually increases awareness of the product, leading to above-average rates of growth.

The *points of interaction* in this phase correspond substantially to those in introduction phase, whereby, having gained initial experience in using the new product, the focus, here, is on the external interaction points.

Communication activities thus focus on external *target groups* in the growth phase. Here, early-adopters are no longer of prime interest, but rather first-buyers and recurrent purchasers who contribute to the increasing market saturation of the product. Media representatives usually become less important in this phase, while the (critical) online community is more important. In view of the fact that product descriptions gain a high level of credence in online-user forums and other communities, they can both positively and negatively impact the success of a product.

On the one hand, *Communication goals* in the growth phase are associated with increasing emotionalization, and an increase in purchasing frequency. On the other hand, the observation of Internet target groups once again becomes more important in this phase, for the purpose of identifying evidence of product faults and clues to product improvements.

Communication investments are generally recouped in the growth phase, whereby, depending on the level of communication pressure one wishes to apply, media advertising and sales promotion are still employed as *communication instruments*. A professional monitoring system should be set up for observing target groups in the Internet and be capable of not only analyzing product commentaries but also of entering into direct dialogues with the target groups (Berkman 2008).

In the growth phase, companies do not usually channel new *communication content* into the communication process. Here, it is more a matter of ensuring that the messages already communicated in the introduction phase are consistently repeated and reinforced. Beyond this, communication content consists of consumer comments, complaints about insufficient information ascribed directly or indirectly to the company, and how the company responds.

In the growth phase, *integration requirements* are concerned with aligning the different forms of market communication. At the same time, the need for alignment between external and internal communication increases as commentaries on products are picked up externally and have to be referred to internal desks.

10.3.2.3 Stagnation Phase

In the stagnation phase product turnover becomes regressive for the first time. Market potential has been exhausted and the market is saturated. Consequently, the intensity of communication activities also declines.

This does not mean, conversely, that the *interaction points* between internal and external target groups become less important: On the one hand, the sales process has to be precisely aimed at target groups just as before. On the other hand, it is now important to engage more intensively with product users in order to discover the reasons why sales have fallen as well as to identify new ways of improving or adapting the product.

External *target groups* therefore are of central importance during this phase. Current product users should be observed on online platforms and "listened to", to gain indications of the product's weak points (Berkman 2008). Beyond this, one can seek direct contact with select customer groups in order to collect concrete details for improving specific product features. At the same time, internal target groups can also be drawn into the communication process in order to pursue possible (further) product development from within the firm. Most often, the core team of developers is permanently occupied with product improvements; however, in the phase, they should be more involved in confronting requests for improvement from external sources.

Communication objectives are met by following two tracks in the stagnation phase. On the one hand, they aim to stabilize sales at the highest possible level by using emotionalization to limit the trend. On the other hand, the company must prepare a transition from the implementation phase to a fresh phase of development by identifying the reasons for the drop in sales and seizing strategies to renew stimulus. This does not necessarily mean that a renewed innovation process will develop out of the stagnation: It is more likely that products will simply be improved or new varieties of the product devised.

In the stagnation phase, costly *communication instruments* are usually dispensed with; however, it is all the more important in this phase, to exploit forms of "passive social media communication" by monitoring, and communicating with members via user-forums and blogs (Berkman 2008).

The communication content used in the stagnation phase corresponds to the content used in the growth phase. No new communication content is created; however, it is the way in which a company responds to its customers' enquiries – be these from the Internet, the company's Service Center or via sales field services – that is extremely important here. The more open and personal a company's approach to its customers is here, the more able it will be to win over customer support in a renewed process of innovation and improvement.

Where the *requirements for integration* had essentially concerned the alignment of external communications during the introduction and growth phases, in the stagnation phase the coordination between internal and external communications becomes much more important. This involves systematically gathering opinions expressed outside the company and presenting these to internal development teams. The achievement of this opens a path to recovery, from product stagnation to a new product idea.

10.3.3 Elements of Strategic Communication as Joining Brackets

The description of the individual phases of the innovation process highlights the complexity of the process, from idea generation through to market implementation. Coordination requirements arise in response to communication goals,

communication instruments and contents, and, not least, in response to the communication target groups.

In order to guarantee the integration of these components, a strategic concept is required that can stipulate and coordinate communication programs that are consistent over the long term, plausible and synergistically aligned. The development of a comprehensive *integrated communication strategy* is core to such a concept. This strategy must apply throughout, irrespective of the actual phase of innovation communication, in specifying the common framework for all communication measures. There are fundamentally three core components for guaranteeing integration in this context (Fig. 10.3):

1. *Strategic positioning of the innovation*: Strategic positioning is the desired image that a company aims to achieve for its innovation: what it wishes to communicate about its product. Here the company decides which of its new product's features should primarily be promoted, where the main customer benefit is, what advantages the innovation has over competitive products. Independent of how definitive and concrete the innovation's image is within the company and of how "open" the company's innovation process is, the innovation's strategic positioning can be decided early at the beginning of the development process or concretized during the idea generation phase. Strategic positioning provides a map for all of the communication measures and presents

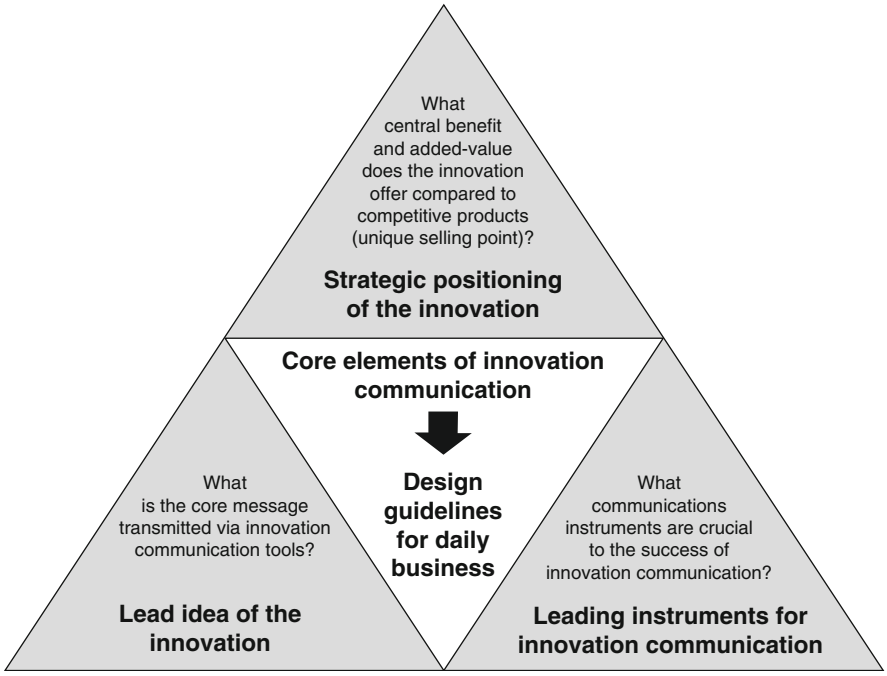


Fig. 10.3 Core components of an integrated innovation communication strategy

communications' overriding aim. To achieve this, it has to be formulated in general terms on a composite level so that it is not compromised by the component interests of specific target groups. The relevant features of the innovation have to be reduced to a "common denominator".

2. *Lead idea of the innovation*: The strategic positioning of the innovation has to recur in all communication messages. A lead idea is developed for the innovation for this purpose; i.e., a fundamental statement containing the most predominant features of the innovation. This lead idea has to be considered for all phases of the innovation process and lays the guidelines governing communication with both internal and external groups. The characteristic "optimized user friendliness" thus provides the innovation community with bearings for its activities in the development process as well as a core message for advertising the innovation in the implementation process.
3. *Specifying the leading communication instruments for innovation*: The palette of communication measures available to innovation communication is almost limitless today. However, these communication measures, which are so essential to the success of an innovation and which provide the crash barriers for implementing other communication instruments, have to be defined. Here, it is recommended that a maximum of two leading instruments are employed for the development and the implementation phase together. During the development phase Internet forums and communities are suitable in the framework of open innovation processes, in addition to personal internal and external communications. Media advertising, as ever, holds a position of major importance in the implementation phase for many branches of industry, whereby forms of social media communication are becoming ever-increasingly important, in particular for stimulating contagion effects.

The three core elements outlined above, the definition of strategic positioning for an innovation, the formulation of a lead idea and the specification of leading communication instruments, constitute the essential guidelines for establishing consistent innovation communication during the development and implementation phase of innovation. The formulation of these guidelines must necessarily remain relatively abstract at this level and need to be substantiated and elaborated explicitly for the purpose of practical application in communication and innovation activities. These three strategic elements have to be specifically defined for each of the individual phases so that they are provided with explicit procedural instructions. The strategic positioning of the innovation has to be explicitly laid out, stipulating which communication goals have to be realized in each of the individual phases so that the strategic positioning of the innovation is achieved on the market. In the development phase, these goals may relate to activating the "right" external innovators, for example, or in the implementation phase, to building up a sufficiently high level of brand awareness for the new product. The lead idea should be "broken down" until the central core statements addressing the internal and external target groups are documented for each phase of the innovation process. In the development phase, the core messages contain the requirements that are demanded of the

innovation, while in the implementation phase, the formulation of the unique selling propositions (USP) of the innovation focuses on real target groups. Ultimately, it is a matter of defining a kit of communication tools that will provide optimal support at each phase of the innovation process and facilitate the exploitation of synergy effects. This serves, particularly in the implementation phase of innovation communication, to substantially increase the effect of media advertising through the use of promotions and targeted PR-sales promotions.

The strategic components of innovation communication constitute the content of the mission statement for coordinating all communication activities within the framework of the innovation process. They establish the conceptual foundation for efficient and effective innovation communication and are of central importance to the innovation process. Apart from providing this conceptual basis, successful innovation communication also places demands on cultural, employment and organizational measures within the company. The major success factors arising from a company's culture of open innovation are its willingness to collaborate across departmental boundaries as well as its cooperation with external innovators and the establishment of cross-functional forms of collaboration.

Communication thus presents companies, researchers, developers and communication managers with numerous new challenges in the open innovation process. The opportunities and enormous innovation potential that are made available in this way can only boost impetus to embrace these challenges.

Bibliography

Ahlers, G.M. (2006). Organisation der Integrierten Kommunikation (The Organization of Integrated Communications). Wiesbaden: Gabler Verlag.

Ayuso, S./Rodriguez, M.A./Ricart, J.E. (2006). Using Stakeholder Dialogue As a Source for New Ideas: A Dynamic Capability Underlying Sustainable Innovation. Corporate Governance, 6, 475–490.

Bartl, M. (2007). Netnography. Einblicke in die Welt der Kunden (Insights into the World of the Customer). Planung & Analyse, 5, 83–89.

Berkman, R. (2008). The Art of Strategic Listening – Finding Market Intelligence Through Blogs and Other Social Media. Ithaca: Paramount Books.

Bruhn, M. (2008). Marketing. Grundlagen für Studium und Praxis (Foundations for Study and Practice) (9th ed.). Wiesbaden: Gabler Verlag.

Bruhn, M. (2010). Integrierte Unternehmens- und Markenkommunikation (Integrated Corporate and Brand Communications) (5th ed.). Stuttgart: Schäffer-Poeschel.

Chesbrough, H. (2003). Open Innovation: New Imperative for Creating and Profiting from Technology. Boston: Harvard Business School Press.

Ernst, H. (2004). Virtual Customer Integration – Maximizing the Impact of Customer Integration on New Product Performance, in: Albers, S. (publ.). Cross-Functional Innovation Management – Perspectives from Different Disciplines. Wiesbaden: Gabler Verlag.

Ernst, H./Soll, J.H./Spann, M. (2004). Möglichkeiten der Lead-User-Identifikation in Online-Medien (Possibilities of lead user identification in online media), in: Herstatt, C./Sander, J.G. (Hrsg.). Produktentwicklung mit virtuellen Communities – Kundenwünsche erfahren und Innovationen realisieren (Product development with virtual communities – Identifying customer wishes and realizing innovations). Wiesbaden: Gabler Verlag.

Füller, J./Mühlbacher, H. (2004). Community-based Innovation – Ein Ansatz zur Einbindung von Online Communities in die Entwicklung neuer Dienstleistungen (An Approach for Incorporating Online Communities in the Development of New Services), in: Bruhn, M./Stauss, B. (Hrsg.). Dienstleistungsinnovationen (Service innovations). Wiesbaden: Gabler Verlag.

Gustafsson, A./Herrmann, A./Huber, F. (2007). Conjoint Analysis as an Instrument of Market Research Practice, in: Gustafsson, A./Herrmann, A./Huber, F. (Hrsg.). Conjoint Measurement. Heidelberg: Springer Verlag.

Helm, R./Möller, M./Rosenbusch, J. (2010). Offline- versus Online Multiplikator: Eine kritische Betrachtung des klassischen Meinungsführerkonzepts (Offline- versus online opinion makers: A critical appraisal of the classical opinion leader concept) Jena Research Papers in Business and Economics - Working and Discussion Papers, 03/2010.

Herstatt, C./Sander, J.G. (2004). Online-Kundeneinbindung in den frühen Innovationsphasen (Online customer bonding in early phases of innovation), in: Herstatt, C./Sander, J.G. (Hrsg.). Produktentwicklung mit virtuellen Communities – Kundenwünsche erfahren und Innovationen realisieren (Product development using virtual communities – Identifying and realizing customer wishes). Wiesbaden: Gabler Verlag.

Herzog, P. (2007). Open and Closed Innovation: Different Cultures for Different Strategies. Wiesbaden: Gabler Verlag.

Homburg, Ch./Krohmer, H. (2009). Marketingmanagement. Strategie – Instrumente – Umsetzung – Unternehmensführung (Marketing Management. Strategy – Instruments – Implementation and Corporate Management) (3rd ed.). Wiesbaden: Gabler Verlag.

Horbel, C./Woratschek, H. (2009). Integration von Weiterempfehlungsgebern als Erfolgsfaktor für die Vermarktung komplexer Dienstleistungen (Integrating Recommendations as a Success Factor in Marketing Complex Services), in: Bruhn, M./Stauss, B. (Hrsg.). Kundenintegration. Wiesbaden: Gabler Verlag.

Howe, J. (2008). Crowdsourcing: Why the Power of the Crowd Is Driving the Future of Business. New York: Crown Business.

Jawecki, G./Füller, J./Matzler, K. (2009). Innovation Creation in Online Consumer Groups. Der Markt, 48, 117–123.

Johnson, J.D./Chang, H.-J. (2000). Internal and External Communication, Boundary Spanning, and Innovation Adoption: An Over-Time Comparison of Three Explanations of Internal and External Innovation Communication in a New Organizational Form. The Journal of Business Communication, 37, 238–263.

Kleemann, F./Voss, G.G./Rieder K. (2008). Un(der)paid Innovators: The Commercial Utilization of Consumer Work Through Crowdsourcing. Science, Technology & Innovation Studies, 4, 5–25.

Kozinets, R. (2002). The Field Behind the Screen. Using Netnography for Marketing Research in Online Communications. Journal of Marketing Research, 39, 61–72.

Kunz, W.H./Mangold, M. (2004). Hybride Communities als Treiber des Kundenwertes (Hybride communities as generators of customer value), in: Herstatt, C./Sander, J.G. (Hrsg.). Produktentwicklung mit virtuellen Communities – Kundenwünsche erfahren und Innovationen realisieren (Product Development with Virtual Communities – Identifying and Realizing Customer Wishes). Wiesbaden: Gabler Verlag.

Lilien, G.L./Morrison, P.D./Searls, K./Sonnack, M./von Hippel, E. (2002). Performance Assessment of the Lead User Idea-Generation Process for New Product Development. Management Science, 48, 1042–1059.

Lindman, M.T. (2002). Open or Closed Strategy in Developing New Products? A Case Study of Industrial NPD in SMEs. European Journal of Innovation Management, 5, 224–236.

Mahajan, V./Wind, J. (1992). New Product Models: Practice, Shortcomings and Desired Improvements. Journal of Product Innovation Management, 9, 128–139.

Mast, C./Zerfaß, A. (Hrsg.) (2005). Neue Ideen erfolgreich durchsetzen. Das Handbuch der Innovationskommunikation (Successfully Implementing New Ideas. Innovation Communication Manual). Frankfurt am Main: Frankfurter Allgemeine Buch.

McAfee, A.P. (2006). Enterprise 2.0: The Dawn of Emergent Collaboration. MIT Sloan Management Review, 47(3), 21–28.

Meckel, M. (2007). Innovationskommunikation 2.0 – Das Beispiel Apple iPhone (Innovation Communication 2.0 – The Example of the Apple iPhone). Marketing Review St. Gallen, 26, 42–46.

Meffert, H./Burmann, Ch./Kirchgeorg, M. (2007). Marketing: Grundlagen marktorientierter Unternehmensführung. Konzepte – Instrumente – Praxisbeispiele (Foundations of Market-Oriented Corporate Management) (10th ed.). Wiesbaden: Gabler Verlag.

N.U. (2006). Innovationsflops kosten zehn Milliarden Euro (Innovation flops cost ten billion euro). absatzwirtschaft, 6/2006, 35

N.U. (2010). Diaper Battle Being Waged Over New Pampers Product. http://www.topnews.com.sg/content/21702-diaper-battle-being-waged-over-new-pampers-product. Accessed 20 May 2010.

Payne, A.F./Storbacka, K./Frow, P. (2008). Managing the Co-Creation of Value. Journal of the Academy of Marketing Science, 36, 83–96.

Peltier, J.W./Schibrowsky J.A./Schultz, D.E. (2003). Interactive Integrated Marketing Communication: Combining the Power of IMC, the New Media and Database Marketing. International Journal of Advertising, 22, 93–115.

Prahalad, C.K./Krishnan, M.S. (2009). Die Revolution der Innovation. Wertschöpfung durch neue Formen in der globalen Zusammenarbeit (The Revolution Of Innovation. Value Creation Using New Forms of Global Collaboration). München: Redline Verlag.

Reichwald, R./Piller, F. (2009). Interaktive Wertschöpfung – Open Innovation, Individualisierung und neue Formen der Arbeitsteilung (Interactive Value Creation – Open Innovation, Individualization and New Forms of Labor Division). Wiesbaden: Gabler Verlag.

Rothwell, R./Robertson, A.B. (2002). The Role of Communications in Technological Innovation. Research Policy, 2, 204–225.

Sleeswijk Visser, F./van der Lugt, R./Stappers, P.J. (2007). Sharing User Experiences in the Product Innovation Process: Participatory Design Needs Participatory Communication. Creativity and Innovation Management, 16, 35–45.

Sonnenwald, D.H. (1999). Communication Roles that Support Collaboration During the Design Process. Design Studies, 17, 277–301.

Teichert, Th./Rost, K./von Wartburg, I. (2004). Aufbau von Sozial- und intellektuellem Kapital in virtuellen Communities of Practice (Building social and intellectual capital in virtual communities of practice), in: Herstatt, C./Sander, J.G. (Hrsg.). Produktentwicklung mit virtuellen Communities – Kundenwünsche erfahren und Innovationen realisieren (Product Development with Virtual Communities – Identifying and Realizing Customer Wishes). Wiesbaden: Gabler Verlag.

Trott, P. (2008). Innovation Management and New Product Development (4th ed.). Essex: FT Prentice Hall.

Vesshoff, J./Freiling, J. (2009). Kundenintegration im Innovationsprozess – Eine kompetenztheoretische Analyse (Customer integration in the innovation process – An expertise-based theoretical analysis), in: Bruhn, M./Stauss, B. (Hrsg.). Kundenintegration. Wiesbaden: Gabler Verlag.

Zerfaß, A./Ernst, N. (2008). Kommunikation als Erfolgsfaktor im Innovationsmanagement. Ergebnisse einer Studie in deutschen Zukunftstechnologie-Branchen (Communication As a Success Factor in Innovation Management). Leipzig.

Zerfaß, A./Möslein, K. M. (2009). Kommunikation als Erfolgsfaktor im Innovationsmanagement – Strategien im Zeitalter der Open Innovation (Communication As a Success Factor in Innovation Management – Strategies in an Age of Open Innovation). Wiesbaden: Gabler Verlag.

Chapter 11
Managing Emotions Matters: A Balanced Framework for Communicating Innovations in Companies

Claudia Mast

Contents

11.1 Introduction

The global economic crisis has caused a major rift for the communication experts in the companies. The conditions for the communication management have changed dramatically. More and more companies have to cope with negative media coverage and a sceptical public atmosphere. Employees, customers, journalists and politicians have begun to question the social and ecological responsibility of the companies and they care about whether the technologies, products and services offered by companies are truly an advantage to them. In addition, editorial offices have emphasized the arising uncertainties of innovations and the consequences more than the opportunities.

That means innovation communication poses more and more particular challenges. In this article innovation communication is defined as two way interactions between organizations and their stakeholders, dealing with new products, services and technologies. These innovations are often novel and complex. Their positive and negative implications may be hidden for some time and their concrete applications may be explained later on. Therefore, the environment for the emerging field

C. Mast
Fachgebiet Kommunikationswissenschaft insb. Journalistik, Universität Hohenheim, Fruwirthstr. 49, 70599 Stuttgart, Germany
e-mail: sekrkowi@uni-hohenheim.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, 153
DOI 10.1007/978-3-642-17223-6_11,

of innovation communication has changed and the most important stakeholders in this field (employees, customers and journalists) have to deal with growing uncertainty, mistrust and sometimes fear. In their eyes innovations and developments of change often go together. Many innovations initiate a change process or are an essential part of it. So far, some experiences made in the wide field of change communication can be transferred to communicating innovations (Mast 2008). This is essentially the management of emotions, time and the way of reporting news to stakeholders who are emotionally affected and involved.

11.2 Creating a Communication Strategy for Innovations

The accelerating process of innovations causes the fear of individual, organizational and social risks, which may dominate the hope, the confidence and the chances in parts of societies and companies as well. In this case, the communication system is critical to business success as long as it enables a constant process of change and manages the balance between cognitions and emotions. On the opposite side, communication can destroy the company's values, including support, involvement and employee commitment.

Strong companies are those which manage innovations and change quickly, without public trouble or damaging the motivation of stakeholders. But, first of all they have to win the hearts, minds and participation of their employees who are more and more worried about the individual and social impact of new products, services and technologies. Some examples are job cuts, increasing stress in the office, media coverage of dangerous products, environmental pollution and unfair trade. People tend to re-evaluate who is taking advantage of an innovation, which kind of innovations are acceptable and the social costs of new products or procedures.

Changes and innovations (from the employee's point of view) have become nearly one in the same. Here are some reasons why it is so difficult to communicate innovations:

1. *Lack of insight*: If people do not understand why a certain innovation is necessary for their company, they are not motivated. They will resist the change process: Why change?
2. *Lack of acceptance*: People emotionally desire a break in the never ending process of change. Most of them feel that they are captured by anonymous forces and cannot really participate: Who benefits from this innovation?
3. *Lack of trust*: The trust of many employees in their managers has become fragile. In some companies the trust and the credibility has been decreasing dramatically for several years. Many people do not believe any longer that the public announcements and reasons for the flood of changing projects are really true: Why should we trust the managers this time?

The crucial point for a successful communication strategy is: How can communication support the ability of companies and employees to innovate? How can communication contribute to the "innovation readiness" (Zerfaß 2005: 7)? No

doubt, one important influential factor is corporate communication. But there is no doubt, that the topicality, comprehensibility and meaning of the messages are just as important as the basic attitude of the communicators towards the stakeholder's interests and needs. And one of the main interests of the stakeholders is to be well informed in a trustful way with meaningful concrete statements from their executives.

Therefore, using buzz words is not a solution. But "innovation" and "change" are buzz words of our time. Nobody knows exactly what they mean. Nevertheless, these terms are constantly used in our daily business lives. Many authors emphasize the importance and impact of innovations for the economic and the social system of countries. Others stress the aspect, that an innovation must be something really new and successful in the market (Zerfaß and Möslein 2009; Hauschildt and Salomo 2007). This is – from their point of view – the difference between an idea and an innovation. The survey INNOVATE (Mast et al. 2005) however highlights: it is the inflation of buzz words like innovation which causes a general mistrust amongst stakeholders. The misuse of these terms has increased the stakeholders scepticism about technologies and products which are described as "innovative".

Similar effects can be seen when analyzing change processes. What comes to mind when employees hear the word "change"? Is it "Yes, we can" or rather "Please, not another change project"? Employees and executives all have their own perspectives on changes affecting the daily routine in their companies (Deekeling and Barghop 2009). Literature is full of advice about what can go wrong in change management and how people should act (Klewes and Langen 2008; Pfannenberg 2009). There is, however, very little empirical evidence about how the change processes actually proceed and how they affect people's emotions (Mast 2008, 2010b).

But consistently over the past years roughly two thirds of all change projects have had little or no success (Houben et al. 2007). Of course, communication is only one of the many drivers for organizational change within companies. But even well planned communication management fails almost half of the time. The most important success factors for change communication are (these are the results of the survey among communication directors in the top 250 companies in Germany) a strategic concept with a clear focus on stakeholders, organizational conditions which foster cooperation and a quick flow of information (Mast 2008, 2009).

To get better results in communicating innovations in our time there is some work to be done on creating new and adequate strategies. Taking the current results of studies on change communication into account innovation communication management from now on should stress the following three factors (see Fig. 11.1).

1. *Value-based communication*: Are tangible and especially intangible corporate values points of reference for the communication practice (Mast 2010a)? Do employees really understand the corporate vision, mission and current objectives? And do they know the written and unwritten rules of how to behave in case of struggling corporate values? Could they produce their own picture of how the value innovation applies to their job and can they contribute to the creation of new products or procedures? And the most important point: What about "Making the Connections" (Quirke 2008) and turning strategy into action?

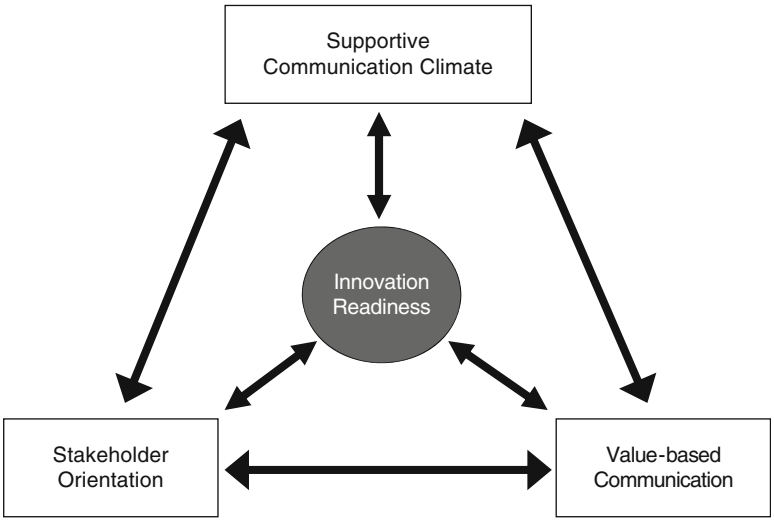


Fig. 11.1 Framework for creating a communication strategy for innovations

Does communication really paint pictures of a "strategic alignment" (Van Riel and Fombrun 2007: 209) so that employees understand and are able to enact their company's objectives?

2. *Stakeholder orientation*: What kind of image crosses the mind of communication managers when they are planning communication activities and talking to employees, customers and journalists? In their eyes are they just "target" groups which are easy to handle if the right "tool" has been chosen? Are they purely considered as "objects" for certain applications of "tools" or furthermore as "subjects" who are balancing the rational and emotional side of communication? Above all, stakeholder orientation means that innovation communication reflects two sides of the coin – the rational and emotional needs of stakeholders – especially when communicating complex innovations (Mast 2010b).
3. *Supportive climate*: Companies are often unaware of the fact that how they communicate is as important as what they say. Stakeholders who are unsure or even mistrusting are very sensitive to the tonality of corporate communication, to the nuances of statements and the choice of which person says something in which channel and especially when. Stakeholders, including employees, feel like a seismograph whether they are respected by a communicator and told the truth. Managers in their role as communicators can change the climate in a company more quickly and lasting than media ever could (Wright and Robertson 2009; Kinter et al. 2009). This kind of micro-climate has a great effect on the business nowadays and is often neglected.

Recent surveys (Mast 2008, 2009; Houben et al. 2007) have revealed that most of the change projects have failed because the communication managers misjudged the emotional state of mind of the stakeholders that they wanted to convince. Major reasons were: The messages were not translated for the needs and questions of

employees, relevant information was transmitted late and the employees could not paint a picture of how they should behave, whom they could trust and rely on and whether they could feel as a part of the company going forward. There was no dialogue with stakeholders, too much media communication and too few conversations, insufficient management communication or cultural characteristics were ignored. All together – the strategic communication of innovations neglected the most important point: Managing emotions matters.

11.3 Success Factors of Strategic Communication of Innovations

Stakeholders are weighing up manifest and latent messages, time lags, symbolic functions of communication channels and especially, meaningful statements being addressed without using buzz words. Their daily balanced decisions are based on the following factors:

- *Consistency*: Messages should signal an alignment to corporate values like innovations and current objectives alike. Otherwise, stakeholders perceive mixed signals and watch more carefully to see how these inconsistencies will be resolved.
- *Credibility*: Leaders are credible when their communication behavior is seen as open, honest and reliable and when they are telling the truth and the "whole story" of an innovation, not just the good news.
- *Orientation*: People want to see a clear direction, where a company is going and how it is doing. Stakeholders want to understand how they fit in, how they can contribute or how they are affected by innovations.
- *General attitude and esteem towards stakeholders*: Do stakeholders play an active or passive role in the practice of innovation communication? Are they estimated as partners, sources of ideas and experiences or even handled as "target" groups which are only expected to show desired "reactions"?
- *Participation*: Innovation Communication has to avoid producing feelings of being captured or subjected to anonymous processes or procedures. Communication is challenged to make the connections between the concerns, preoccupations and agendas of stakeholders and those of the company and also to keep its finger on the pulse of stakeholder's sentiment. And finally it should explain apparent and hidden contradictions between the desires of people and the realities of business processes.

11.4 Transferring Experiences from Change Communication

These, and more, are key success factors for innovation communication, which can be transferred from the change communication. These factors play a role in the background when the top 250 companies in Germany think about their experience as to why communication was successful (Mast 2008) (see Fig. 11.2).

11.4.1 Success Factor 1

Almost two thirds of the companies point out the need for a long-term strategy including precise goals and consistent implementation. This includes thorough preparation of all measures, the right timing ("as early as possible") as well as detailed implementation plans and – in the case of campaigns – an elaborate dramaturgy of all the elements. Formulating a consistent, intelligible and vivid "change" or "innovation" story is considered to be as important as issues management which reduces complex issues to core statements and clear and simple messages. It is also vital to truly involve all stakeholders in the concept and not to forget anybody.

In the communication directors' self-critical judgment clear strategies are rarely established in the bustle of everyday life. This, communications experts claim, is often due to inconsistent decisions the management surprises them with. Others admit they simply underestimated the challenges of change communication or communicating innovations. Thus, a strategic approach, including a concept, is missing, resulting in erratic issues planning without "one-voice-policy" or "key speaker". When the top management is quick in laying the blame for bad news on others the effects on the communication climate can be disastrous. One out of four companies admits that bad timing resulted in the creation of rumors. Some companies start too late, others plan communication programs which do not last long enough. Stakeholders are still interested in news, but can no longer learn about them through official media channels.

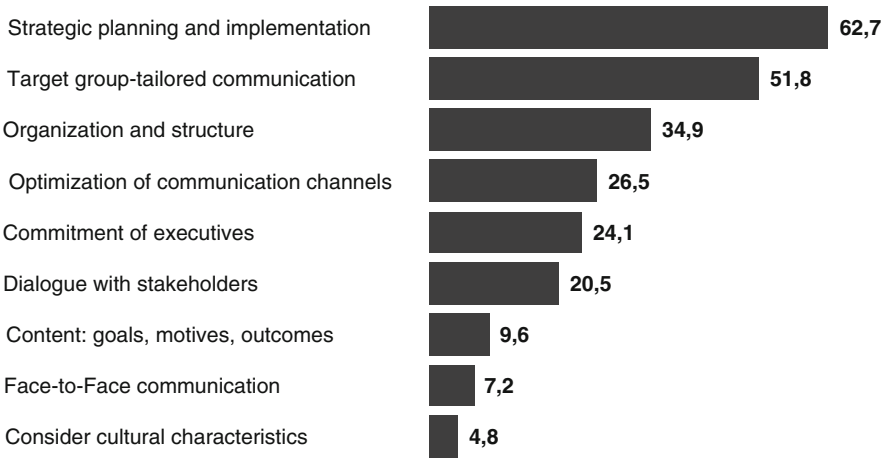


Fig. 11.2 Success factors of change communication. Sample: DAX enterprises and TOP-250 enterprises (turnover) of Germany; n = 83; percentage values. Question: "Thinking about your experience with change communication: In your opinion why was communication successful?" (multiple answers permitted)
Source: Mast (2008)

11.4.2 Success Factor 2

Target group aligned communication – a matter of course – is identified as the reason why about half of the companies succeeded change projects or innovations. This implies a continuous information process including all employees and their respective cognitive and – even more importantly – emotional needs. Even the news that there is no news is important information in change processes. Whether trust and confidence can develop depends on openness, honesty and transparency. Feedback channels and especially the quickness in which questions are answered, are important measures which create trust.

Even though one should communicate consistently via all channels many companies underline the importance of personal communication by executives and the top management's commitment as a decisive stimulus. According to one company the "direct, simple approach including an emotional element" is the pivotal factor of success, or – in other words – the communicative integration of employees into effective communication networks, as well as managers operating as communicators often leads to success. The culture of management is under suspicion when a company self-critically admits: "The employees have been treated as objects and not as subjects". It is no surprise, then, that change encounters resistance and innovations are not accepted.

11.4.3 Success Factor 3

One out of three companies polled pointed out that organizational processes, responsibilities and structures of cooperation between human resources, public relations, marketing and investor relations are important. This coordination and the quick transfer of information between departments are just as critical for success as the early integration of communication experts in the top management's planning process. The adoption of project teams is generally judged positively.

11.5 Innovation Communication in the Face of the Economic Crisis

The economic crisis has changed the conditions for innovation communication. Many companies have recognized that the growing uncertainty, mistrust or even anger in parts of societies and companies have become a severe risk for their future business. The emotional basis of their daily business is evaporating. That is why two thirds of the top 500 companies in Germany changed their strategy maps by conveying information to stakeholders in a more effective and meaningful way (Mast 2010b). The new strategy, "Realigning Communication", means intensifying

communication activities and also integrating an outside-in-perspective while using another tonality (see Fig. 11.3).

Instead of marketing language or even advertising slogans corporate statements, arguments and applications are now more and more explained by the words of people like you and me. To avoid inconsistencies in the perception of stakeholders two out of three companies have focused on a strong expansion of crisis and issues management. Risks should be discovered as early as possible in order to protect the fragile public image.

Editorial offices are now considered as a main source for hardly calculable "media risks". Intensifying media relations has become a current answer to nearly 60% of the surveyed companies in order to cope with the more and more emotionalizing and scandalizing media coverage. Complex innovations have become especially risky to handle in media relations. Therefore, companies can be successful in positioning an innovation in reference to a current media issue. This context can be used as a frame of reference for novel innovations and helps the audience perceive and evaluate a new product, service or technology. Furthermore, it is necessary to illustrate an innovation with the help of concrete examples and applications.

According to the survey INNOVATE (Mast et al. 2005) emotional news value and dramaturgy is crucial in media relations when innovations are hard to explain. Storytelling, personalization and visualization are preconditions for a positive media image of innovations. Because of this, media relations for new products, services and technologies need to work – much more than other kinds of communication –

Fig. 11.3 Successful strategies in the face of the economic crisis. Sample: Top 500 enterprises in Germany (n = 160); accumulated percentage values ("Agree" and "Strongly agree"); question: "The worldwide economic crisis poses a big challenge for enterprises. Altogether: Which of the following strategies has stood the crisis test?"
Source: Mast (2010b)

with illustrations and examples, stories, personalization, and concrete benefits for the individual. Innovations have to be prepared to journalists and other stakeholders in such a way that they can be experienced and felt.

However, managers have become the pivotal point for successful corporate communication. They are in charge of shaping the meaning and mind frames of the stakeholders focussing on the individual, organizational and social benefits. Of course, the CEO has to act as the key communicator for an effective presentation of companies in the media. CEOs have stood the crisis test in over 80% of the top 500 companies in Germany. But the strategy to focus on managers as communicators has been completed and supplied by pushing dialogues with stakeholders and adding other top managers to the "public face" of a company.

To date the emerging field of management communication as an essential part in communicating innovations has been underestimated. Zerfaß and Huck (2007: 112) identified four different types of promoters: "Expert promoters" who have an intensive knowledge about the topic concerned, "authority promoters" who have power and resources as a result of their hierarchical position, "process promoters" who have an excellent organizational knowledge to foster the collaboration of people and the "relationship promoters" who have a large personal network and know the right people. These are only some roles of managers communicating innovations.

Altogether: Managers as communicators have to be analyzed in further research. How do they see themselves as communicators? What is their view of stakeholder's roles? What about their ability to tell stories? Do they appreciate their communicator role as a central duty in order to create a supportive climate? Do they really recognize that the "license to operate" of many companies has slipped into danger?

Over 60% of the surveyed top 500 companies in Germany have increased communication activities to demonstrate corporate responsibility (CR). They are convinced that CR-issues are the basis of rebuilding public trust and credibility. Innovations therefore have to be communicated in a way that the economic as well as the social and individual benefit is evident to everybody. In this way innovation communication can contribute to reinforcing the public legitimization of companies.

Curious as it may sound, developing stakeholder aligned change or innovation communication continues to be the most important challenge for the near future – for managers in their role as communicators as well as for communication experts. It is a paradox, however, that on the one hand executives believe that innovation communication programs can be planned and need to be managed, while on the other hand there is a lack of intuition and knowledge about stakeholders' interests, desires and emotional needs. The orientation towards stakeholders often called for in science and practice is implemented rather slowly in innovation communication.

Bibliography

Deekeling, E., & Barghop, D. (Eds.) (2009). Kommunikation im Corporate Change: Maßstäbe für eine neue Managementpraxis (2nd ed.). Wiesbaden: Gabler.

Hauschildt, J., & Salomo, S. (2007). Innovationsmanagement (4th ed.). München: Vahlen.

Houben, A., Frigge, C., Trinczek, R., & Pongratz, H.J. (2007). Veränderungen erfolgreich gestalten: Repräsentative Untersuchung über Erfolg und Misserfolg im Veränderungsmanagement. Düsseldorf: C4 Consulting.

Kinter, A., Ott, U., & Manolagas, E. (2009). Führungskräftekommunikation: Grundlagen, Instrumente, Erfolgsfaktoren: Das Umsetzungsbuch. Frankfurt a. M.: F.A.Z.-Institut.

Klewes, J., & Langen, R. (2008). Change 2.0: Beyond organisational transformation. Berlin, Heidelberg: Springer.

Mast, C. (2008). Change Communication zwischen Gefühl und Kalkül: Theoretische Überlegungen und Ergebnisse aus Umfragen. Kommunikation & Management 8. Stuttgart: Universität Hohenheim.

Mast, C. (2009). Sizing up change challenges. Communication Director, 02/2009, 60–63.

Mast, C. (2010a). Unternehmenskommunikation: Ein Leitfaden (4th ed.). Stuttgart: Lucius & Lucius.

Mast, C. (2010b). Gang in die Offensive. Pressesprecher, 01/2010, 44–47.

Mast, C., & Zerfass, A. (Eds.) (2005). Neue Ideen erfolgreich durchsetzen: Das Handbuch der Innovationskommunikation. Frankfurt a. M.: F.A.Z.-Institut.

Mast, C., Huck, S., & Zerfass, A. (2005). Innovation communication: Outline of the concept and empirical findings from Germany. Innovation Journalism, 2(7), 1–14.

Mast, C., Huck, S., & Zerfaß, A. (2006). Innovationskommunikation in dynamischen Märkten: Empirische Ergebnisse und Fallstudien. Berlin: LIT.

Pfannenberg, J. (Ed.) (2009). Veränderungskommunikation: So unterstützen Sie den Change-Prozess wirkungsvoll: Themen, Prozesse, Umsetzung (2nd ed.). Frankfurt a. M.: F.A.Z.-Institut.

Quirke, B. (2008). Making the connections: Using internal communication to turn strategy into action (2nd ed.). Aldershot: Gower.

Van Riel, C.B.M., & Fombrun, Ch.J. (2007). Essentials of corporate communication: Implementing practices for effective reputation management. London, New York: Routledge.

Wright, M., & Robertson, F. (2009). Creating an internal communication strategy. In M. Wright (Ed.). Gower handbook of internal communication (2nd ed.). Farnham: Gower, 19–48.

Zerfaß, A. (2005). Innovation readiness: A framework for enhancing corporations and regions by innovation communication. Innovation Journalism, 2(8), 1–27.

Zerfaß, A., & Huck, S. (2007). Innovation, communication, and leadership: New developments in strategic communication. International Journal of Strategic Communication, 1(2), 107–122.

Zerfaß, A., & Möslein, K. (Eds.) (2009). Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation. Wiesbaden: Gabler.

Chapter 12
The Scent of Innovation: Towards an Integrated Management Concept for Visual and Scent Communication of Innovation

Nicole Pfeffermann

Contents

12.1 Need for an Integrated Management Concept to Communicate Innovation

Innovation has become a necessity for almost every organization in the global business environment. Among other things, innovations can particularly represent a valuable, rare, and inimitable resource of a corporation (Sher and Yang 2005) and, thus, can translate into profitability. Innovations also tend to lead to strategic competitiveness according to the resource-based view (e.g., Barney 1991; Grant 1991; Hall 1992, 1993). Relating to Open Innovation and the innovation economy (e.g., Chesbrough 2003, 2006; Davenport et al. 2006), communication may represent one essential impact factor to strengthen innovation diffusion and innovation reputation (e.g., Daschkovska et al. 2010; Zerfaß and Möslein 2009).

Hence, as a communication field of an organization in the innovation economy, innovation communication (ICOM) is concerned with communication management of innovations and innovative issues at the same time and over a period of time in

N. Pfeffermann
NP Pfeffermann Consulting, Benquestr. 49, 28209 Bremen, Germany
e-mail: n.pfeffermann@jacobs-university.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, 163
DOI 10.1007/978-3-642-17223-6_12,

order to manage communication processes, tools, and activities related to a company's innovation portfolio and to constantly and sustainably present the innovative capability on the organizational and innovation network levels (e.g., Daschkovska et al. 2010; Pfeffermann 2011). In this context, ICOM tends to re-configure a resource base of a company. For instance, ICOM may

- Create and extend ideas, knowledge, and reputation
- Re-shape collaborative networks and markets
- Extend the innovative capability
- Manage, create and extend capabilities such as knowledge management, innovation management, reputation management, marketing capabilities, and organizational communication competences (see also Pfeffermann 2011). The following nominal definition of ICOM can be deduced:

> ICOM, as one of a company's dynamic capabilities, can be understood as the transactional procedures of transmitting information between an organization (sender) or many organizations (network) and its/their stakeholder groups (receivers) pertaining to
> (1) Ideas, concepts, prototypes, practices, objects, etc. that are perceived as new by stakeholder groups
> (2) Context-issues related to these ideas, concepts prototypes, practices, objects, etc. and
> (3) Innovative capability of an organization or network
> The objective is to create value through the re-configuration of an organization's or network's resource-base in terms of knowledge creation, strengthened innovation reputation and management of strategic assets (based on Pfeffermann et al. 2008; Pfeffermann 2011).

ICOM management refers to activities (strategic ICOM management, operational ICOM management, and ICOM performance measurement) in planning, executing and evaluating transactional procedures of information transmission on an organizational and network level considering (a) three types of external markets (resource markets, communication markets, and sales markets) and environmental factors (technological, social, political, and legal factors); (b) internal management of resources, capabilities and structures; and (c) interrelated ICOM networks and stakeholder groups (based on Pfeffermann 2011).

Hence, ICOM calls for a management concept to systematically communicate an innovative portfolio, context-issues of innovations, and the innovative capability of an organization or network in the long-run. However, a closer look at past and current research in ICOM shows that the development of an ICOM management concept is still deficient.

12.2 Integrated Management Concept for Innovation Communication

Based on management concepts and corporate communication frameworks, such as the St. Gallen Management Model and extended versions of it (e.g., Bleicher 1991, 1999; Müller-Stewens and Lechner 2001; Ulrich and Krieg 1972) and the Competing Value Framework for Corporate Communication (CVFCC) (Belasen 2008) and

the concept of value creation by corporate communication (van Riel and Fombrun 2008), an integrated ICOM management concept can be developed according to the conceptual dynamic ICOM capability definition (Pfeffermann 2011) and the basic framework in strategic management (Grant 2008).

Figure 12.1 shows the *elements of the integrated ICOM management concept*:

- Four main system perspectives based on the CVFCC by Belasen (2008): Change/re-configuration and innovation (transform), knowledge and value creation (perform); regulation and standards/policies (conform); integration and profile/positioning (reform) on the horizontal integration dimension internal to external ICOM and the vertical integration dimension decentralized to centralized ICOM networks
- Basic framework of the linkage between structures/resource base and stakeholders/environment adapted from Grant (2008): structures/resource base; ICOM value strategy and goals; stakeholder and transactions
- Three horizontal levels based on the St. Gallen Management Model by Bleicher (1991, 1999): Structures level; activities level; and behavior level for strategic management and operational management; the normative management could be added but here it is understood as an integral factor in corporate communication management, which influences ICOM.

These concepts and frameworks are selected to develop an integrated ICOM management concept because they provide an integrated management approach with a communicative perspective and focus on value creation, resources/structures, stakeholders/transactions, and strategic management, which are essential aspects of the conceptual basis definition of ICOM.

12.2.1 Integrated ICOM Management Concept

The ICOM management concept consists of strategic ICOM management, operational ICOM management, and ICOM performance measurement on the *ICOM activities level*, which is influenced by the corporate vision and strategy including corporate philosophy and values, corporate communication strategy and goals, and the ICOM value strategy and goals (see also Pfeffermann 2011). On the other hand, the dynamics of three types of markets (resource markets, communication markets, and sales markets) and several environmental factors have an impact on the ICOM activity level. For instance, new legal and political requirements in transport logistic chains can affect ICOM in logistic companies as well as stakeholder's adoption of an innovation (Daschkovska et al. 2010).

The *structures and resource-base* for ICOM are illustrated on the left hand of the ICOM activities level in Fig. 12.1. This structures and resource-base dimension includes:

1. The organizational structure and ICOM management system in strategic ICOM management, such as a web-based management system for ICOM (Jäger and Jäger 2011)

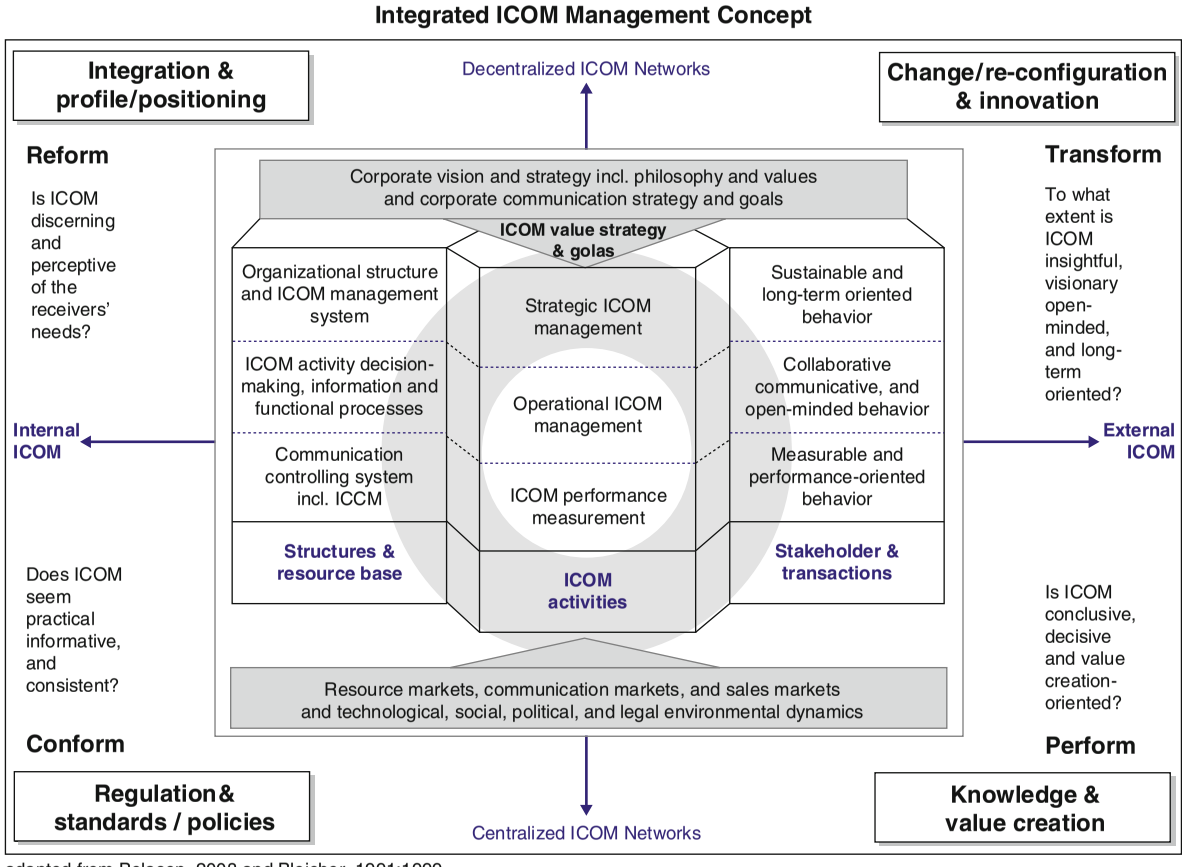


Fig. 12.1 Integrated ICOM management concept based on the dynamic ICOM capability

2. The process-oriented dimension in operational ICOM management, such as information processes or function-related ICOM processes in collaborative innovation networks or cross-functional collaboration of an organization and
3. The communication controlling system incl. ICOM controlling

The *stakeholder and transaction dimension* is shown on the right hand of the ICOM activities level in Fig. 12.1. Different stakeholder behaviors regarding various transactional procedures of information transmission between an organization/network and its stakeholder groups are enumerated in this dimension. For example, on the operational level employees can be communicative, open-minded and collaborative in order to create knowledge related to innovations for the execution of ICOM.

Based on the CVFCC by Belasen (2008), four main communication perspectives represent the four basic quadrants for ICOM that reflect sociological paradigms (Burrell and Morgan 1979) and serve as a fundamental basis for the construct of corporate communication, i.e., also for the ICOM construct, as a part of corporate communication, in this context:

1. Functionalism: concentrates on the process and measurement of communication performance, roles, and behaviors (e.g., external image, goals, strategy, performance, accountability)
2. Interpretivism: concentrates on the regularization of systems of interactions (e.g., identity, coordination, symbolic convergence, compliance)
3. Radical humanism: concentrates on relational-inter-personal communication and human communication (e.g., culture, shared beliefs, concerns of human resources)
4. Radical structuralism: concentrates on alignment of communication activities with external requirements through innovative and informative systems of communication (e.g., markets, reputation management)

According to the four quadrants, the following four main system perspectives can be identified to represent ICOM in corporate communication:

1. *Change/re-configuration and innovation (transform):*

The innovative system aims at maintaining the organizational ability to adapt to change and re-configuration of the resource base, such as the human resource base through knowledge creation related to innovations or emerging issues. The key question is: "To what extent is ICOM insightful, visionary, open-minded, and long-term oriented?"

2. *Knowledge and value creation (perform):*

The information/knowledge and value creation system aims at performing productively and meet stakeholders' expectations related to ICOM, such as information transparency to strengthen innovation reputation and global ICOM value strategy to create knowledge world-wide. The key question is: "Is ICOM conclusive, decisive and value-creation oriented?"

3. *Regulation and standards/policies (conform):*

The regulative system aims at supporting the flow and dissemination of structured administrative ICOM, such as the use of ICOM standards and policies. The key question is: "Does ICOM seem practical, informative, and consistent?"

4. *Integration and profile/positioning (reform):*

The integrative and profile/positioning system aims at providing formal structures and information communication network platforms within an organization or network and creating opportunities to exchange regarding the alignment of corporate strategy/goals and receivers' needs in Open Innovation projects or in general in the Open Innovation economy (see new stakeholder demands (Davenport et al. 2006), such as the creation of stakeholder's trust through the informative transparency (de la Fuente Sabate and de Quevedo Puente 2003) in formal structures, which can lead to innovation reputation (positioning). The key question is: "Is ICOM discerning and perceptive of the receivers' needs?"

To understand ICOM management in the four system perspective, the interdependency of all perspectives has to be considered: effective ICOM tends to be realized through a balance among the four system perspective based on the requirements of effective corporate communication (Belasen 2008).

From an activity-related level view, several strategic and operational ICOM tools are needed to plan, implement, and assess ICOM. Thus, an ICOM toolbox is developed for ICOM management. It is derived from a literature review (e.g., Huck 2009; Mast and Zerfaß 2005; Zerfaß et al. 2004; Zerfaß and Möslein 2009) and an industry-oriented application within the 4-year research project "ParcelRobot" (see Chap. 25). The toolbox is illustrated in Fig. 12.2.

First of all, the ICOM value strategy and goals for an organization or network have to be determined and to derive the strategic and operational ICOM tools (for strategy and goals see Pfeffermann 2011). In fact, the following strategic and operational tools can be used to implement ICOM in corporate communication management.

12.2.2 Strategic ICOM Tools

- *Scenario planning* (e.g., Hill and Jones 2008; Lindgren and Bandhold 2009; Ringland 2006): strategic ICOM tool to create future visions and new options for innovations, for instance, the use of innovation cases for potential customers
- *Framing* (e.g., Dahinden 2006; Huck 2009; Orlikowski and Gash 1994; Pfeffermann et al. 2008; Putman and Fairhurst 2004): strategic ICOM tool to offer a "frame of reference" to improve understanding of radical newness or emerging innovative issues, such as the related communication concept *agenda setting* to transmit information regarding specific important innovation-related issues from organizational agendas to public agendas

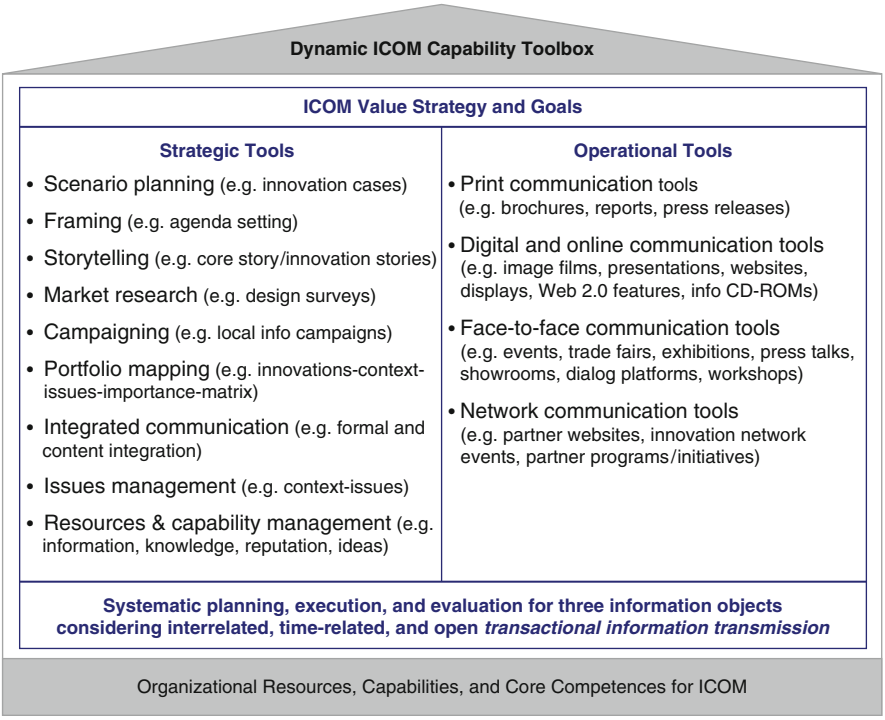


Fig. 12.2 Toolbox for innovation communication (ICOM) management on strategic and operational levels
Source: author; based on the ICOM definition and strategic tools (Pfeffermann 2011)

- *Storytelling* (e.g., Denning 2005; Fog et al. 2005; Frenzel et al. 2006; Simmons 2007): strategic ICOM tool to build a core story of the innovative capability of an organization or network and/or a storyboards of several specific and interrelated innovation stories for innovations or an innovation cluster with the aim to facilitate stakeholder's mental application of innovations (Rogers 2003) and to create trust (Frenzel et al. 2006)
- *Market research* (e.g., Trommsdorff and Steinhoff 2007): strategic ICOM tool to gather market information on the one hand and on the other hand systematically distribute information regarding specific topics, for instance, online market surveys, product design surveys, etc.
- *Campaigning* (e.g., Huck 2009): strategic ICOM tool to communicate innovations and innovative issues using interrelated communication tools, for instance, for a local info campaign to strengthen the local awareness of innovations and innovative capability in public, business and politics
- *Portfolio mapping* (e.g., Cornelissen 2008; Goodman and Hirsch 2010; Kane and Trochim 2007): strategic ICOM tool to plan and visualize opportunities for innovations and context-issues of innovations with the aim to further develop

strategies for innovations and ICOM, such as the innovations-context-issues importance matrix

- *Integrated communication* (e.g., Bruhn 2003, 2005, 2008, 2009; Bruhn and Ahlers 2010): strategic ICOM tool to continuously and consistently present ICOM integrated in communication/marketing activities, for instance, on a formal and content-related integration level
- *Issues management* (e.g., Cornelissen 2008; Goodman and Hirsch 2010; Ingenhoff and Röttger 2008): strategic ICOM tool to manage context-issues of innovations, innovative issues, and emerging and future issues related a corporation's innovative capability
- *Resource and capability management* (e.g., Barney 2007; Grant 2008): strategic ICOM tool to manage needed resources and capabilities for ICOM, such as information/knowledge management, reputation management, and communication network management

Operational ICOM tools are divided into four communication channels based on corporate communication, innovation communication, and marketing communication channels (e.g., Argenti 2007; Mohr et al. 2009; Zerfaß and Möslein 2009). The tools are not directly related to relationships, such as media relations, internal relations, investor relations or government relations, because in the Open Innovation view both known and unknown, second-order stakeholder groups have to be addressed (e.g., Daschkovska et al. 2010; Pfeffermann 2011) and thus different tools with its underlying characteristics should be considered primarily in choosing an operational ICOM tool. For instance, face-to-face communication allows a exchange of information in inter-personal communication situations, which may lead to a positive influence on decision-making to invest in the innovation, as may be the case for word-of-mouth communication (Mazzarol 2011).

- *Print communication*: operational ICOM tool to disseminate ICOM-related information in printed versions, such as flyers, brochures, reports, and press releases
- *Online and digital communication*: operational ICOM tool to present innovations, context-issues of innovations, organizational innovative capability and/or network innovative capability online and in digital version, such as image films, presentations, websites, displays, Web 2.0 features, and informational CD-ROMs
- *Face-to-face communication*: operational ICOM tool to exchange in inter-personal communication situations regarding innovations, context-issues of innovations, and organizational innovative capability or network innovative capability, such as events, trade fairs, exhibitions, press talks, showrooms, dialog platforms, and workshops/seminars
- *Network communication*: operational ICOM tool to use communication channels of partnerships, for instance, partner websites, innovation network events, partner programs/initiatives, with the aim to communicate innovations, context-issues of innovations, organizational innovative capability and/or network innovative capability

Table 12.1 Examples for resources and capabilities for ICOM

Type	Examples for ICOM
Tangible resources	Financial resources (e.g., firm's ability to generate funds)
	Organizational resources (e.g., firm's controlling system)
	Technological resources (e.g., technology stock)
Intangible resources	Human resources (e.g., knowledge, managerial abilities)
	Innovation resources (e.g., ideas, capacity to innovate)
	Reputational resources (e.g., reputation, brand name)
Organizational capabilities	Marketing capabilities (e.g., innovative merchandising)
	Management (e.g., effective organizational structure)
	Research and development (e.g., rapid transformation of technology into new products and processes)

Source: adapted from Ireland et al. (2009); see also Barney (1991), Grant (1991), Hall (1992)

The ICOM strategic and operational tools for three information objects (innovations, context-issues of innovations, and innovative capability) require systematic planning, execution, and evaluation considering the interrelated, time-related, and open transactional information transmission based on the conceptual ICOM definition (Pfeffermann 2011).

Finally, as shown in Fig. 12.2, a fundamental basis for ICOM tools is represented by the organizational resource base, which encompasses resources and capabilities (e.g., Barney 1991; Grant 1991, 2008; Hall 1992, 1993; Helfat 2003; Prahalad and Hamel 1990) as well as strategically oriented core competences (e.g., McGee et al. 2005; Prahalad 1997; White 2004).

Table 12.1 provides examples for resources and capabilities for ICOM.

12.3 Visual and Scent Communication of Innovation

12.3.1 Visual Communication

Imagery communication can offer an alternative means to overcome an individual's information overload in the information age and communicate new product/innovation characteristics (e.g., Esch and Michel 2008; Kroeber-Riel 1993).

> Visual communication is the "communication through visual aid [and]... includes art, signs, typography, drawing, graphic design, illustration, colour, and electronic resources [...] to explore the idea that a visual message with text has a greater power to inform, educate or persuade a person" (Martin 2008: 1).

Frames and framing have a crucial role in visual communication; in particular uinnate, unlearned frames, frames of society and culture as a type of learning, and frames of media, which are open to manipulation, are powerful communication aids (Jamieson 2007). Visual communication can transmit information to trigger emotions and create a world of experiences for consumers in marketing (e.g., Esch and Michel 2008; Kroeber-Riel and Esch 2004). The use of visual communication plays

also a key role in complex information transmission (Kroeber-Riel and Weinberg 2003) and imagery communication can be used to trigger direct and indirect image associations, such as free associations as an instrument for innovative product launches (e.g., Esch and Michel 2008; Morgan and Welton 1992).

Regarding the implementation, visual stimuli in marketing requires strategic planning in order to be effective (Esch and Michel 2008).

12.3.2 Scent Communication

The sense of smell is the slowest, most emotional and primitive human sense. Its use in marketing currently offers new opportunities for business (e.g., Brumfield et al. 2008; Herz 2010; Knoblich et al. 2003). Scent communication is an emerging issue in research (e.g., Herz 2010; Krishna 2010; Rempel and Esch 2008), where new marketing opportunities are sought in response to information overload of individuals in the information age (Brumfield et al. 2008) and the potential effects of scent communication on branding (Rempel and Esch 2008) and on an individual's mood and behaviour (Herz 2010) in consumption of new products and services.

> Scent communication can be understood as the interactions through the aid of scent stimuli to send messages and address an individual's sense of smell.

The different use of scents in marketing (Morrin 2010):

1. *Primary or secondary product attributes* (e.g., perfumes, room deodorizers, and added-value of products through distinguishable scents);
2. *Advertising and sales promotion* (use of scent communication e.g., PoS; public relations; trade fairs, etc.);
3. *Ambient scents* (e.g., more favourable stores, hotels, retail rooms, etc.; and product evaluation for an increase in sales revenues); and
4. *Signature scents* (e.g., unique combinations of scents as a potential competitive differentiator)

In particular, the third and fourth points are growing fields of interest in scent marketing because of the positive effects on sales revenues and competitive differentiations (Morrin 2010).

12.3.2.1 Positive Effects of Odour Impacts on an Individual's Behavior

- If a correct congruent scent is used in a specific retail environment, purchase behavior and sales were found to increase (e.g., Herz 2010; Rempel and Esch 2008; Spangenberg et al. 2006)
- Positive associations with scents can trigger specific positive or negative emotions that have a direct influence on an individual's mood and behavior (e.g., Ehrlichman and Bastone 1988, 1992; Herz 2010; Rempel and Esch 2008)

- Branding-related advantages of scent communication are as follows (Rempel and Esch 2008): strong emotional ties to brands; improved learning and efficiency in branding; improved clear, attractive, and active mental imagery of brands; and consumer disposition to buy and pay

12.3.2.2 Negative Effects of Odour Impacts on an Individual's Behavior

- When an odour is below the level of perceptual detection there is no behavioural and psychological consequences (e.g., Herz 2010)
- A lack of attention to odours can lead to a decrease of the odor detection ability (e.g., Herz 2010; Plailly et al. 2008; Zelano et al. 2005)
- The phenomenon of cross-adaptation can affect the recognition of specific odours, such as the differentiation of scents after several samples (Herz 2010)

If practical, physiological, and psychological factors are considered in scent communication, "an ambient fragrance that is emotionally and thematically associated to a product [or innovation] should be able to alter perception, cognition, and behaviour with positive consequences for revenue" (Herz 2010: 103). Thus, the implementation of scent communication should strategically be planned in sensory communication to achieve positive effects in scent communication of innovation.

12.3.3 Theoretically Driven Implications for Innovations

Regarding a literature review on the effects of visual and scent stimuli on consumer behaviour in (sensory) marketing, theoretically-driven implications for communicating innovation should first be deduced. A number of implications are found for both visual and scent communication.

12.3.3.1 Visual Communication of Innovation

- Frames and framing of visual communication to create a "frame of reference" to improve understanding of novelties (e.g., Huck 2009; Pfeffermann et al. 2008; Pfeffermann 2011)
- Imagery communication offers a means for information transmission of complex information (e.g., Kroeber-Riel 1993; Kroeber-Riel and Weinberg 2003), such as image films for radical innovations (see best practice "ParcelRobot": Rohde et al. 2011)
- Free associations and imagery analogies in systematic interrelations of visual communication to introduce new products and service (Esch and Michel 2008; Morgan and Welton 1992) and to cluster innovations in innovative ways

12.3.3.2 Scent Communication of Innovation

- Congruent scents of innovative products, services, issues, etc. or scents of stores, showrooms, etc. can lead to a higher attraction and mental imagery, which in turn tends to positively affect innovation adoption through mental application (for mental application: Rogers 2003)
- Ambient fragrance, which is emotionally and thematically associated to an innovation, can positively change the perception and thus tends to influence an individual's decision-making to adopt an innovation (e.g., Rogers 2003)
- Scent communication can be used to introduce new products through the improvement of learning (e.g., Brumfield et al. 2008; Rempel and Esch 2008), which may lead to positive associations and can activate or change schemas to influence innovation adoption (e.g., Kroeber-Riel 1993; Rogers 2003)

Hence, both visual and scent communication of innovation can influence stakeholder attention (e.g., Brumfield et al. 2008; Esch and Michel 2008; Herz 2010), an individual's mental application through mental imagery, as well as strong emotional recalls and learning processes to positively affect innovation adoption through the activation and modification of schemas (for schema theory: e.g., Bartlett 1932; Brewer and Nakamura 1984; Rumelhart and Ortony 1977; Rumelhart and Norman 1988; Waldmann 1990) in a communication context (e.g., Bruhn 2009; Esch 2006; Kroeber-Riel 1993).

12.4 Visual and Scent Communication of Innovation Integrated in Innovation Communication Management

Visual and scent communication of innovation can represent one means to communicate innovation, which may result in attracting a stakeholder's attention and creating emotional ties to innovations and innovation clusters. But a strategy-oriented multi-sensory model is required to consistently and congruently communicate with scent communication for innovation (see for sensory marketing: e.g., Herz 2010; Morrin 2010; Rempel and Esch 2008).

Figure 12.3 illustrates the integration of visual and scent communication, as a part of sensory communication of organizations or collaborative networks, in the ICOM toolbox on the strategic ICOM tool dimension.

On the operational level, a combination of visual and scent communication facilitates innovative face-to-face communication and network communication of innovation, illustrated in Fig. 12.4, for instance:

- *Exhibitions*: Exhibitions represent a communication means that offers a dialog platform for organizations and stakeholders (e.g., public, employees or customers) for inter-personal discussions regarding the presented innovations. A mixture of visual design elements and scent communication technologies can

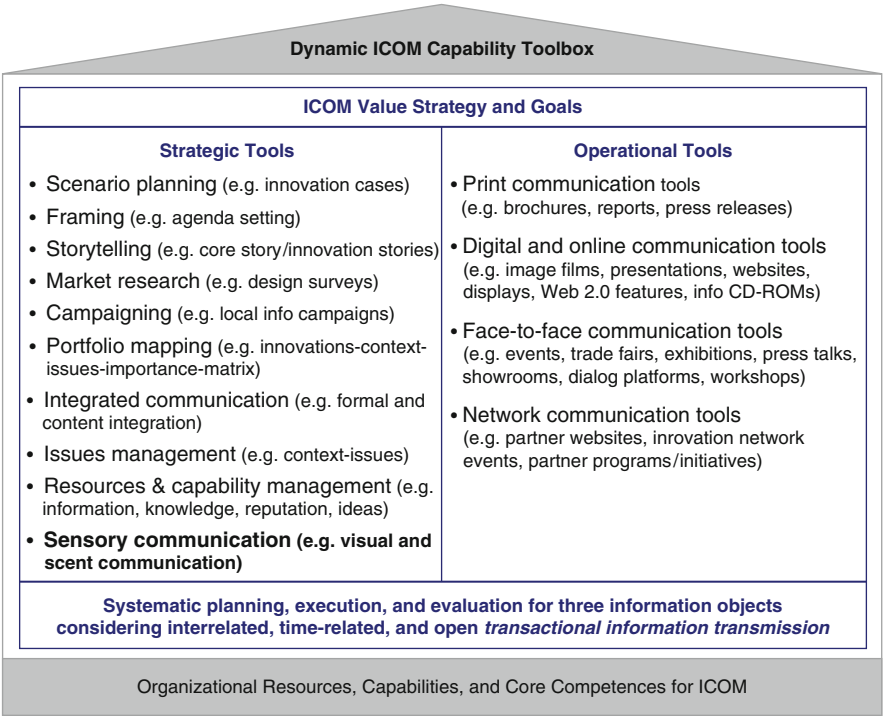


Fig. 12.3 Toolbox for innovation communication (ICOM) incl. sensory communication
Source: based on the ICOM definition (Pfeffermann 2011)

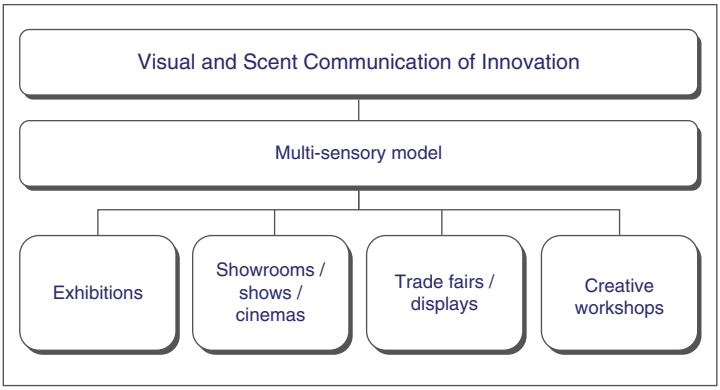


Fig. 12.4 Four ways for visual and scent communication of innovation
Source: author

be used to transmit information related to innovations, innovation clusters, context-issues of innovations and the innovative capability of an organization or collaborative network (*Scents in Arts* 2010).

- *Showrooms/shows/cinemas/live entertainment*: Showrooms and shows are communication platforms for interactions among organizations and their stakeholder groups. For instance, the DHL Innovation Center uses its showroom to present innovative solutions in logistics industry to its stakeholder groups (Ulrich 2011). Moreover, fashion design, as one of the most innovative industries, can use visual and scent communication in creative fashion shows to enhance brand memory and also facilitate positive emotions in the fashion rooms while the show is underway. Brumfield et al. (2008) also identifies several possibilities to apply scent communication, such as in stores, theatres, cinemas, concerts, and hotels because all possibilities "share the common intention to elicit emotion from the viewer" (Brumfield et al. 2008: 247; see also Drobnick 2009; Knoblich et al. 2003). For example, product placement of perfumes in scent cinemas can effectively communicate the emotional positioning of perfumes in movies (Knoblich et al. 2003).
- *Trade fairs/displays*: The tool *trade fairs* are commonly used in marketing to present new products and services as well as the innovative capability of an organization. Knoblich et al. (2003) mention the implementation of scent communication in a trade fair, for instance, to trigger a positive emotional mood for a product (innovation) or the complete presentation of a corporation. Among other things, creative displays can be implemented at a stall to introduce new products and services (innovation) and can use a combination of visual stimuli and scent stimuli (e.g., expected or unexpected scents) in order to attract visitor's attention and create interest in a product or services (Knoblich et al. 2003). According to Knoblich et al. (2003) the communication tool *displays* used with scent communication can positively influence the emotional product/innovation's positioning. This development can lead to new advertising and film formats and new means to communicate innovative brands as well as innovations.
- *Creative workshops/seminars*: "Among other cognitive benefits, aroma can increase comprehension, learning, and recall", thus education is a "natural application for scent" (Brumfield et al. 2008: 255). Thus, new creative techniques can be developed to facilitate learning in seminars based on scent communication effects on individual's memory and recall function. Moreover, a combination of visual and scent communication of innovation can be used to create new associations in idea generation workshops, as a crucial part in innovation management.

12.5 Conclusion and Outlook

To summarize the main contributions, this book chapter presents an integrated ICOM management concept based on an integrated management concept (Bleicher 1991, 1999) and corporate communication framework (Belasen 2008). The chapter also

provides an ICOM toolbox which includes sensory communication tools with a focus on visual and scent communication of innovation.

The presented ICOM toolbox can be applied to develop and strengthen the dynamic ICOM capability of an organization or innovation network. Regarding visual and scent communication of innovation, a strategic multi-sensory model has to be developed for ICOM in order to appropriately use visual and scent communication of innovation to attract attention and positively influence a stakeholder's decision-making process to adopt an innovation and to strengthen innovation reputation in the long-run (see for sensory marketing model Krumm 2010). In fact, sensory communication can be used as a strategic ICOM tool, for instance, in terms of implementing visual and scent communication instruments in art exhibitions, showrooms, fashion design shows, cinemas or creative workshops. Hence, sensory communication can be used on the organizational or innovation network level, particulary the use of a combination of visual and scent communication of innovation, with the aim to achieve a positive effect on sales revenues and competitive differentiations (for scent marketing effects see Morrin 2010).

However, the research on sensory marketing and on sensory communication of innovation on the organizational communication level is still in an emergent phase, and interest in research has been raised in the investigation of different research questions, such as "whether and under what conditions [. . .] behaviors do indeed tend to result from scent marketing efforts" (Morrin 2010: 77). This implies for this book chapter that only first research results and theoretically-driven implications for ICOM could be presented. Future research should examine in more detail several aspects of sensory communication on the organizational communication level. For instance, researchers can examine differences in cultural behaviors related to innovation or investigate underlying mechanisms for knowledge creation through the use of ICOM tools (e.g., innovative exhibitions, scent-based shows, creative workshops for idea generations, and showrooms for the presentation and dialog of innovation).

Bibliography

Argenti, P.A. (2007). *Corporate communication*. (4th ed.). New York, NY: Mc-Graw Hill.

Barney, J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1): 99–120.

Barney, J.B. (2007). *Gaining and sustaining competitive advantage*. (3rd ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Bartlett, F.C. (1932). *Remembering. A study in experimental and social psychology*. Cambridge, UK: Cambridge University Press.

Belasen, A.T. (2008). *The theory and practice of corporate communication. A competing values perspective*. Thousand Oaks, CA: Sage.

Bleicher, K. (1991). *Das Konzept integriertes Management*. Frankfurt am Main, Germany: Campus Verlag.

Bleicher, K. (1999). *Das Konzept integriertes Management*. Frankfurt am Main, Germany: Campus Verlag.

Brewer, W.F. & Nakamura, G.V. (1984). The Nature and Functions of Schemas. In R.S. Wyer Jr., & T.K. Srull (Eds.), *Handbook of Social Cognition* (Vol. 1; pp. 119–160). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bruhn, M. (2003). *Integrierte Unternehmens- und Markenkommunikation*. (3rd ed.). Stuttgart, Germany: Schäffer-Poeschel.

Bruhn, M. (2005). *Unternehmens- und Marketingkommunikation. Handbuch für ein integriertes Kommunikationsmanagement*. München, Germany: Vahlen Verlag.

Bruhn, M. (2008). Planning Integrated Marketing Communications. In H. Sievert, & D. Bell (Eds.), *Communication and Leadership in the 21st Century* (pp. 13–34). Gütersloh, Germany: Verlag Bertelsmann Stiftung.

Bruhn, M. (2009). *Integrierte Unternehmens- und Markenkommunikation: Strategische Planung und operative Umsetzung*. (5th ed.). Stuttgart, Germany: Schäffer-Poeschel.

Bruhn, M. & Ahlers, G.M. (2011). Integrated Communication in the Innovation Process. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations (Chapter 10)*. Berlin, Germany: Springer-Verlag.

Brumfield, C.R., Goldney, J. & Gunning, S. (2008). *Whiff. The revolution of scent communication in the information age*. New York, NY. Quimby Press.

Burrell, G. & Morgan, G. (1979). *Sociological paradigms and organizational analysis: Elements of the sociology of corporate life*. Brookfield, VT: Ashgate.

Chesbrough, H.W. (2003). The era of open innovation. *MIT Sloan management review*, 44(3): 35–41.

Chesbrough, H.W. (2006). Open Innovation: A New Paradigm for Understanding Industrial Innovation. In H.W. Chesbrough, J. West, & W. Vanhaverbeke (Eds.), *Open Innovation: Researching a New Paradigm* (pp. 1–14). Oxford, UK: Oxford University Press.

Cornelissen, J. (2008). *Corporate communication: A guide to theory and practice*. Los Angeles, CA: SAGE Publication.

Dahinden, U. (2006). *Framing. Eine integrative Theorie der Massenkommunikation*. Konstanz, Germany: UVK Verlagsgesellschaft mbH.

Daschkovska, K., Pfeffermann, N., Meyer-Larsen, N. & Hülsmann, M. (2010). Adoption Framework for Innovations in Logistic Transport Chains. In W. Kersten, T. Blecker, & C. Lüthje (Eds.), *Pioneering Solutions in Supply Chain Management. A Comprehensive Insight into Current Management Approaches* (pp. 347–364). Berlin, Germany: Erich Schmidt Verlag.

Davenport, T.H., Leibold, M. & Voelpel, S. (Eds.) (2006). *Strategic Management in the Innovation Economy. Strategy Approaches and Tools for Dynamic Innovation Capabilities*. Erlangen, Germany: Publics Publishing and Wiley-VCH.

de la Fuente Sabate, J.M. & de Quevedo Puente, E. (2003). The concept and measurement of corporate reputation: An application to spanish financial intermediaries. *Corporate Reputation Review*, 5(4): 280–301.

Denning, S. (2005). *The leader's guide to storytelling: Mastering the art and discipline of business narrative*. San Francisco, CA: John Wiley & Sons Inc.

Drobnick, J. (2009). Sense and *reminiSCENT*: Performance and the Essences of Memory, *Canadian Theatre Review* 137/Winter 2009: 6–12.

Ehrlichman, H. & Bastone, C. (1988). Affect and memory: effects of pleasant and unpleasant odors on retrieval of happy and unhappy memories. *Journal of Personality and Social Psychology*, 55(5): 769–779.

Ehrlichmann, H. & Bastone, C. (1992). The Use of Odor in the Study of Emotion. In S. Van Toller, & G.H. Todd (Eds.), *Fragrance: The Psychology and Biology of Perfume* (pp. 143–159). London, UK: Elsevier.

Esch, F.-R. (2006). Wirkung integrierter Kommunikation. Ein verhaltenswissenschaftlicher Ansatz für Werbung. (4th ed.) Gabler, Germany: Wiesbaden.

Esch, F.-R. & Michel, M. (2008). Visuelle Reize in der Kommunikation. In M. Bruhn, F.-R. Esch, & T. Langer (Eds.), *Handbuch Kommunikation: Grundlagen, innovative Ansätze, praktische Umsetzungen* (pp. 713–734). Wiesbaden, Germany: Gabler Verlag.

Fog, K., Budtz, C., Munch, P., & Blanchette, S. (2005). *Storytelling: Branding in practice*. Berlin, Germany: Springer.

Frenzel, K., Müller, M. & Sottong, H. (2006). *Storytelling. Das Praxisbuch*. Wien: Carl Hanser Verlag.

Goodman, M. B. & Hirsch, P.B. (2010). *Corporate communication. Strategic adaption for global practice*. New York, NY: Peter Lang.

Grant, R.M. (1991). The resource-based theory of competitive advantage. Implications for strategy formulation. *California Management Review*, 33(3): 114–135.

Grant, R.M. (2008). *Contemporary strategy analysis*. (6th ed.). Oxford, UK: Blackwell.

Hall, R. (1992). The strategic analysis of intangible resources. *Strategic Management Journal*, 13(2): 135–144.

Hall, R. (1993). A framework linking intangible resources and capabilities to sustainable competitive advantage. *Strategic Management Journal*, 14(8): 607–618.

Helfat, C.E. (2003). Stylized Facts Regarding the Evolution of Organizational Resources and Capabilities. In C.E. Helfat (Ed.), *The SMS Blackwell Handbook of Organizational Capabilities. Emergence, Development, and Change* (pp. 1–14). Malden, MA: Blackwell.

Herz, R. (2010). The Emotional, Cognitive, and Biological Basics of Olfaction. Implications and Considerations for Scent Marketing. In A. Krishna (Ed.), *Sensory Marketing: Research on the Sensuality of Products* (pp. 87–107). New York, NY: Routledge.

Hill, C.W.L. & Jones, G.R. (2008). *Strategic management theory: An integrated approach*. Boston, MA: Houghton Mifflin.

Huck, S. (2009). Innovationskommunikation in den Arenen der Medien. Campaigning, Framing und Storytelling. In A. Zerfaß, & K.M. Möslein (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement. Strategien im Zeitalter der Open Innovation*. Wiesbaden, Germany: Gabler.

Ingenhoff, D. & Röttger, U. (2008). Issues Management. Ein zentrales Verfahren der Unternehmenskommunikation. In M. Meckel, & Schmid, B.F. (Eds.), *Unternehmenskommunikation: Kommunikationsmanagement aus Sicht der Unternehmensführung* (pp. 323–354). Wiesbaden, Germany: Gabler Verlag.

Ireland, R.D., Hoskisson, R.E. & Hitt, M.A. (2009). *The management of strategy: Concepts*. Mason, OH: South Western, Thomson.

Jäger, H.-W. & Jäger, A. (2011). Communication Management via Web – The Web-based Tool ICOM Compass. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations (Chapter 21)*. Berlin, Germany: Springer-Verlag.

Jamieson, H. (2007). *Visual communication. More than meets the eye*. Bristol, UK: Intellect Ltd.

Kane, M. & Trochim, W.M.K. (2007). *Concept mapping for planning and evaluation*. Thousand Oaks, CA: Sage Publications Inc.

Knoblich, H., Scharf, A. & Schubert, B. (2003). *Marketing mit Duft*. (4th ed.). München, Germany: R. Oldenbourg Verlag.

Krishna, A. (2010) (Eds.) *Sensory marketing: research on the sensuality of products*. New York, NY: Routledge.

Kroeber-Riel, W. (1993). *Bildkommunikation : Imagerystrategien für die Werbung*. München, Germany: Vahlen.

Kroeber-Riel, W. & Esch, F.-R. (2004). *Strategie und Technik der Werbung. Verhaltenswissenschaftliche Ansätze*. (6th ed.). Stuttgart, Germany: Kohlhammer Verlag.

Kroeber-Riel, W. & Weinberg, P. (2003). *Konsumentenverhalten*. (8th ed.). München, Germany: Vahlen Verlag.

Krumm, K. (2010). Sensory Impulses in Consumer Behaviour. In H. Jodlbauer (Ed.), *Conference Day 2010: Proceedings; Session Global Business Management* (pp. 143–150). Aachen, Germany: Shaker Verlag.

Lindgren, M. & Bandhold, H. (2009). *Scenario planning. The link between future and strategy*. (2nd ed.). Basingstoke, UK: Palgrave Macmillan.

Martin, P. (2008). *Visual communications*. New Delhi, India: Global Vision Publishing House.

Mast, C. & Zerfaß, A. (2005). *Neue Ideen erfolgreich durchsetzen. Das Handbuch der Innovationskommunikation*. Frankfurt am Main, Germany: F.A.Z.-Institut für Management-, Markt- und Medieninformation.

Mazzarol, T. (2011). The Role of Word of Mouth in the Diffusion of Innovation. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations (Chapter 9)*. Berlin, Germany: Springer-Verlag.

McGee, J., Thomas, H. & Wilson, D. (2005). *Strategy: Analysis and practice*. New York, NY: McGraw Hill.

Mohr, J., Sengupta, S. & Slater, S. (2009). *Marketing of high-technology products and innovations*. (3rd ed.). Upper Saddle River, NJ: Pearson.

Morgan, J. & Welton, P. (1992). *See what I mean. An introduction to visual communication*. London, UK: Edward Arnold.

Morrin, M. (2010). Scent Markting. An Overview. In A. Krishna (Ed.), *Sensory Marketing: Research on the Sensuality of Products* (pp. 75–85). New York, NY: Routledge.

Müller-Stewens, G. & Lechner, C. (2001). *Strategisches Management. Wie strategische Initiativen zum Wandel führen. Der St.Galler Management Navigator*. Stuttgart, Germany: Schäffer-Poeschel.

Orlikowski, W.J. & Gash, D.C. (1994). Technological frames – making sense of information technology in organizations. *ACM Transactions on Information Systems*, 12(2): 174–207.

Pfeffermann, N. (2011). Innovation Communication As a Cross-Functional Dynamic Capability: Strategies for Organizations and Networks. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations (Chapter 18)*. Berlin, Germany: Springer-Verlag.

Pfeffermann, N., Hülsmann, M. & Scholz-Reiter, B. (2008). Framing Innovations to Grasp Stakeholders' Attention: A Dynamic Capability-based Conception of Innovation Communication. *Research Report 2007/08 International Graduate School for Dynamics in Logistics*, Vol. 01, 2008, pp. 40–44.

Plailly, J., Howard, J.D., Gitelman, D.R. & Gottfried, J.A. (2008). Attention to odor modulates thalamocortical connectivity in the human brain. *Journal of Neuroscience*, 28: 5257–5267.

Prahalad, C.K. (1997). The role of core competences in the corporation. In M.L. Tushman, & P. Anderson (Eds.), *Managing strategic innovation and change* (pp. 172–182). Oxford, UK: University Press.

Prahalad, C.K. & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, 4/5: 79–91.

Putman, L.L. & Fairhurst, G.T. (2004). Discourse Analysis in Organizations. Issues and Concerns. In F.M. Jablin, & L.L. Putman (Eds.), *The New Handbook of Organizational Communication: Advances in Theory, Research, and Methods* (pp. 78–136). Thousand Oaks, CA: Sage Publications, Inc.

Rempel, J.E. & Esch, F.-R. (2008). Olfaktorische Reize in der Kommunikation. In M. Bruhn, F.-R. Esch, & T. Langer (Eds.), *Handbuch Kommunikation: Grundlagen, innovative Ansätze, praktische Umsetzungen* (pp. 285–315). Wiesbaden, Germany: Gabler Verlag.

Ringland, D. (2006). *Scenario planning, managing for the future*. (2nd ed.). Chichester, UK: Wiley.

Rogers, E.M. (2003). *Diffusion of innovations*. (5th ed.). New York, NY: The Free Press.

Rohde, M., Pfeffermann, N., Echelmeyer, W., & Rasch, C. (2011). The High-Tech Innovation 'ParcelRobot' – Patent Strategy and Communication Tools. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations (Chapter 25)*. Berlin, Germany: Springer-Verlag.

Rumelhart, D.E. & Norman, D.A. (1988). Representation in memory. In R.C. Atkinson (Ed.), *Stevens' handbook of experimental psychology: Vol. 2 Learning and cognition* (2nd ed., pp. 511–587). New York: Wiley.

Rumelhart, D.E. & Ortony, A. (1977). The Representation of Knowledge in Memory. In R.C. Anderson, R.J. Spiro, & W.E. Montague (Eds.), *Schooling and the Acquisition of Knowledge* (pp. 99–135). Hillsdale, NJ: Erlbaum.

Scents in Arts (2010). Available at http://www.scents-in-arts.com [date: 01-08-2010].
Sher, P.J. & Yang, P.Y. (2005). The effects of innovative capabilities and R&D clustering on firm performance: the evidence of Taiwan's semiconductor industry. *Technovation*, 25: 33–43.
Simmons, A. (2007). *Whoever tells the best story wins: how to use your own stories to communicate with power and impact*. New York, NY: Amacon.
Spangenberg, E.R., Sprott, D.E., Grohmann, B. & Tracy, D.L. (2006). Gender-congruent ambient scent influences on approach and avoidance behaviors in retail store. *Journal of Business Research*, 59: 1281–1287.
Trommsdorff, V. & Steinhoff, F. (2007). *Innovationsmarketing*. München, Germany: Franz Vahlen.
Ulrich, K. (2011). DHL Open Innovation – Program for the Development, Deployment, and Promotion of Innovative Solutions in Logistics. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations (Chapter 20)*. Berlin, Germany: Springer-Verlag.
Ulrich, H. & Krieg, W. (1972). *Das St. Galler Management-Modell*. Bern: Paul Haupt, updated version in: Ulrich, H. (2001). *Gesammelte Schriften* (Vol. 2). Bern: Paul Haupt.
van Riel, C. & Fombrun, C. (2008). *Essentials of corporate communication. Implementing practices for effective reputation management.* New York, NY: Taylor & Francis.
Waldmann, M.R. (1990). *Schema und Gedächnis: das Zusammenwirken von Raum- und Ereignisschema beim Gedächnis für Alltagssituationen*. Heidelberg, Germany: Roland Asanger Verlag.
White, C. (2004). *Strategic management*. New York, NY: Palgrave Macmillan.
Zelano, C., Bensafi, M., Porter, J., Mainland, J., Johnson, B., Brenner, E., et al. (2005). Attentional modulation in human primary olfactory cortex. *Nature Neuroscience*, 8: 114–120.
Zerfaß, A. (2009). Kommunikation als konstitutives Element im Innovationsmanagement – Soziologische und kommunikationswissenschaftliche Grundlagen der Open Innovation. In A. Zerfaß, & K.M. Möslein (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation* (pp. 23–56). Wiesbaden, Germany: Gabler.
Zerfaß, A. & Möslein, K.M. (2009). *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation*. Wiesbaden, Germany: Gabler.
Zerfaß, A., Sandhu, S. & Huck, S. (2004). Innovationskommunikation – Strategisches Handlungsfeld für Corporate Communications. In G. Bentele, M. Piwinger, & G. Schönborn (Eds.), *Kommunikationsmanagement. Strategien, Wissen, Lösungen* (August 2006; 1.24, 1–30) München: Luchterhand.

Part III
Integrated Perspectives on Innovation

Chapter 13
The Linkage Between Strategy and Communication for Innovation

Nicole Pfeffermann and Michael Hülsmann

Contents

Innovation has become an essential factor for companies of all sizes to survive and perform in the long-run. In particular in the competitive, dynamic environment of today's worldwide business, an organization's innovative capability and successfully launched innovations can represent a means for competitive advantage (e.g., Hitt et al. 2005; Trommsdorff and Steinhoff 2007). Besides the focus on innovation in an enterprise's strategy and the evolving resources, capabilities, and core competences required in order to be innovative, a prerequisite for the desired outcomes of strategic competitiveness and above-average returns are effective strategic actions, which are embedded in the strategic management process (Hitt et al. 2005). Hence, strategy formulation and implementation are crucial for a firm's long-term success. In this context, organizational communication can support strategy formulation through interactions with stakeholders, for instance, receiving feedback regarding market expectations (e.g., Argenti 2007; Cornelissen 2008).

On the other hand, communication strategies are needed to facilitate innovation, for instance, in collaborative innovation (Donaldson et al. 2011) and innovation communication strategies (Pfeffermann 2011b). Communication strategies also required to achieve market-leadership through communication of innovation (Viardot 2011). Moreover, concepts and tools are used to strategically plan communication of

N. Pfeffermann (✉) and M. Hülsmann
Systems Management, International Logistics, School of Engineering and Science, Jacobs University Bremen, Campus Ring 1, 28759 Bremen, Germany
e-mail: Nicole.Pfeffermann@googlemail.com; m.huelsmann@jacobs-university.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_13,

innovation, such as the use of social media technologies for organizations (Ferguson 2011) or strategies and approaches to deal with the stakeholder's resistance to adopting an innovation (Brem et al. 2011). In fact, both in science and business, communication of innovation linked to strategy is an emerging issue to strategically plan the communication of innovation or scientific results, and to foster innovation through communication from a strategic management perspective. *Part III* "*Integrated Perspectives on Innovation*" presents a status quo in this integrated field of linking strategy to communication for innovation and provides issues and challenging factors for future research agendas.

As far as the *integrated perspectives on innovation* are concerned, six key issues can be highlighted showing various topics for further examination by scientists.

13.1 Strategic Communication of Scientific Findings

In recent years a variety of communication means have been used to present scientific and technological findings to public; in particular through new media channels, for instance, strategic planning of storyboards and presentations of research diaries on the Internet film portal *DFG Science TV* (Streier et al. 2011). Science communication is thus an area of expanding interest (e.g., Kahlor and Stout 2009; Bucchi and Trench 2008; Stocklmayer et al. 2001) and is concerned with several issues such as environmental science communication, medical science communication, as well as technology and communication (Kahlor and Stout 2009). One characteristic of communication research related to science is its consideration of multi-disciplinary, sometimes also inter-disciplinary, perspectives and descriptions (Dunwoody 2009). Several communication tools used to present scientific results to non-scientists are, for instance, press releases in journalism, new media and Web 2.0, arts (museums, exhibitions, events), and research reports (e.g., Research*eu 2007; Schütz and Martos 2010).

13.2 Communication of Innovation Strategies Versus Communication Strategy for Innovations

Strategy and corporate communication are closely linked in communicating strategy to stakeholders. Communication managers are involved in the strategic management process in generating strategies for interaction with the internal and external environment and facilitate decision-making through market research activities for future business developments/scenarios (e.g., Argenti 2007; Cornelissen 2008). Successful communication consists of several steps such as the connection of messages to strategy and goals of an organization, the attraction and motivation of audience attention, and management of audience expectations (O'Rourke 2010). Related to

innovation strategies, communication needs to connect several verbal and non-verbal messages to the innovation strategy and innovation-related goals of an organization.

On the other hand, organizations need to have a communication strategy to facilitate innovation. Viardot (2011), identifies different communication strategies to communicate a technology and the organization behind a specific innovation, for instance, the "push" and "pull" communication strategy.

13.3 Strategic Perspective on New Media Communication and Technologies

More than only understanding new media as digital "media content that combine and integrate data, text, sound, and images of all kinds" (Flew 2008: 2), research in new media may need to be concerned of "the artifacts of devices that enable and extend our ability to communicate; the communication activities and practices we engage in to develop and use the devices; and the social arrangements and organizations that form around these devices and practices" (Flew 2008: 4). A literature review shows that scientists focus on several topics concerning the broader context of new media, such as "information overload" and misinformation (e.g., Kroeber-Riel and Esch 2004); interactivity and user-generated branding (e.g., Arnhold 2010; Balnaves et al. 2009); knowledge economy and the need for information technology (e.g., David and Foray 2002; Schilling 2008); and changing global media landscape in international communication research (Chang 2010). For instance, advanced information technology made information transmission easier, faster, and cheaper (Schilling 2008) and the user's co-production of content can be linked to the concept of *user-led innovation* (von Hippel 2005; Flew 2008).

In this context Ferguson (2011), states that one emerging issue is social capital and the use of social media technologies for organizations; in which crowdsourcing can represent a potential tool for practice to strategically plan communication of innovation. Jäger and Jäger (2011), mention that strategic communication management of innovation via the Web, including the use of different tools, such as portfolio mapping, storytelling and forums, can represent another means to use the advantages of information technologies.

13.4 Strategies for Innovative Communication and Collaborative Innovation

"The time is ripe for innovative communication" (Reichert and Reimann 2011). The ubiquitous availability of information may result in "information overload" and

it is difficult for consumers to distinguish between products, innovations, brands and stories (e.g., Davenport et al. 2006; Kroeber-Riel and Esch 2004; Töhlke et al. 2001). Thus, innovation-driven marketing is an emerging field in marketing research (e.g., Belz et al. 2007; Belz 2007).

Corporations can resort to a broad range of marketing planning and operational tools to attract stakeholder attention. For high-tech marketing, for instance, media advertising, public relations, direct marketing, trade shows/events, branding, new media, and personal selling are used (Mohr et al. 2009). Nevertheless, new requirements in the innovation economy requires new concepts and tools to communicate new issues or radical innovations, which was the cases with the DHL Open Innovation (Ulrich 2011), RWE mobility (Reichert and Reimann 2011), a holistic approach for Siemens (Eberl 2011), User-centered Innovation at Deutsche Telekom Laboratories (Steinhoff and Breuer 2011), and the ParcelRobot (Rohde et al. 2011).

Moreover, communication in collaborative innovation is useful for sharing ideas, creating knowledge and facilitating exchange with several involved and potentially involved parties. One way to deal with communication processes in collaborative innovation is the relational communication strategy, described by Donaldson et al. (2011). This relational communication strategy provides a basis for fostering an open and shared communication culture and climate in innovation projects. However, future empirical research is needed to investigate in more details the features and mechanisms for communication in collaborative innovation projects.

Regarding collaborative innovation and communication strategies, Brem et al. (2011), mention different approaches to convince internal and external stakeholders, for instance, informed and motivated front-line employees.

13.5 Strategic Management Perspective of Innovation Communication

Dynamic capabilities are one means for corporations to gain competitive advantage through the re-configuration, creation, and extension of the resource base (resources and capabilities) of a corporation (e.g., Ambrosini and Bowman 2009; Helfat et al. 2007; Teece et al. 1997; Teece 2007). In particular in the innovation economy dynamic capabilities are crucial to address rapidly changing environments (Davenport et al. 2006). In the context of an innovation economy, systematic, coordinated transactional communication of innovation is required to create knowledge and extend tacit knowledge, as a resource of a company, through several dialog situations with stakeholders and collaboration partnerships in open innovation processes; create a culture of innovation for the viability and profitability of a company; and reconfigure collaborative arrangements for innovation success. Hence, innovation communication can be understood as a dynamic capability from a strategic management perspective (Pfeffermann et al. 2008; Pfeffermann 2011b).

In the strategic innovation communication perspective, Pfeffermann (2011b), mentions different strategies, such as knowledge value strategy, as well as strategic planning tools, such as, scenario planning, market research, storytelling, and multi-sensory communication. Future research can focus on the creation, development and implementation of the dynamic innovation communication capability on organizational and collaborative network level.

13.6 Innovative Concepts in Strategic Corporate Communication

Due to new media technologies, the ubiquitous availability of information and rapid sharing of knowledge, strategic corporate communication is a complex, integrated and dynamic process (e.g., Belasen 2008; Papa et al. 2008). In the transactional conceptualization of communication (e.g., Bittner 1985; Miller 2005; Papa et al. 2008), strategic corporate communication has been of recent interest in organizational communication (e.g., Argenti 2009; Austin and Pinkleton 2006; Conrad and Poole 2004; Cornelissen 2008; Papa et al. 2008; Smith 2009). Hence, innovative concepts are needed for strategic purposes in organizational communication, such as the concepts for issues management, reputation management, crises communication, and innovation communication (e.g., Cornelissen 2008; Papa et al. 2008; Pfeffermann 2011a). One example is sensory communication as a new approach to

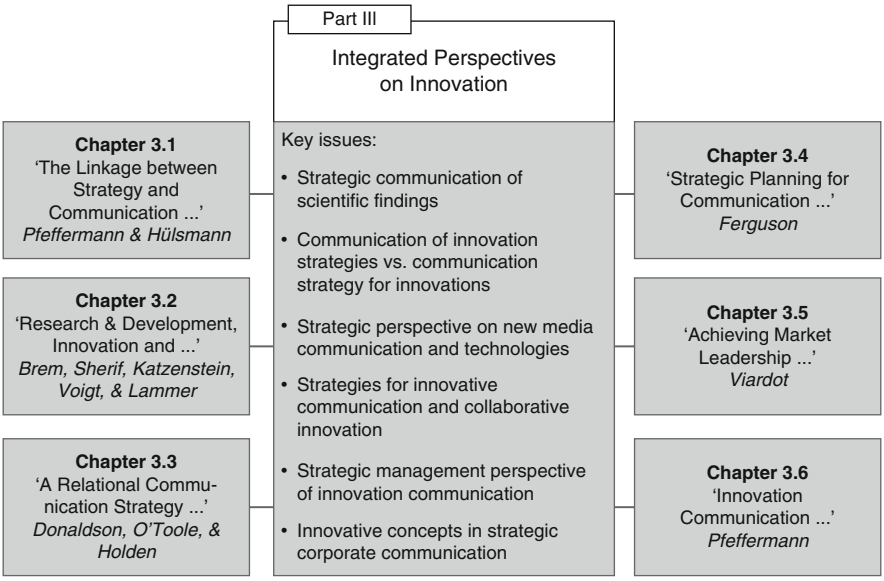


Fig. 13.1 Structure of Part III "Integrated Perspectives on Innovation"
Source: authors

transmit information through multi-senses stimuli (e.g., Brumfield et al. 2008; for marketing see Krishna 2010; see also Pfeffermann 2011a) (Fig. 13.1).

Bibliography

Ambrosini, V. & Bowman, V. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, 11(1): 29.

Argenti, P.A. (2007). *Corporate Communication*. (4th ed.). New York: Mc-Graw Hill.

Argenti, P.A. (2009). *Strategic corporate communication. A Global Approach for Doing Business in the New India*. New York: McGraw-Hill.

Arnhold, U. (2010). *User Generated Branding: Integrating User Generated Content into Brand Management*. Wiesbaden, Germany: Gabler.

Austin, E.W. & Pinkleton, B.E. (2006). *Strategic Public Relations Management*. (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Balnaves, M., Donald, S., & Shoesmith, B. (2009). *Media Theories and Approaches: A Global Perspective*. Basingstoke: Palgrave Macmillan.

Belasen, A.T. (2008). *The Theory and Practice of Corporate Communication. A Competing Values Perspective*. Thousand Oaks, CA: Sage.

Belz, C. (2007). Übersicht: Akzente im innovativen Marketing. In C. Belz, M. Schögel, & T. Tomczak (Eds.), *Innovation Driven Marketing. Vom Trend zum innovativen Marketing*. Wiesbaden, Germany: Gabler.

Belz, C., Schögel, M., & Tomczak, T. (2007). *Innovation Driven Marketing. Vom Trend zum innovativen Marketing*. Wiesbaden, Germany: Gabler.

Bittner, J.R. (1985). *Fundamentals of Communication*. Englewood Cliffs: Prentice-Hall.

Brem, A., Sherif, M.H., Katzenstein, L., Voigt, K.-I., & Lammer, D.M. (2011). Research & Development, Innovation and Marketing – How to Convince Internal and External Stakeholders of Technological Innovations. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 14). Berlin, Germany: Springer.

Brumfield, C.R., Goldney, J., & Gunning, S. (2008). *Whiff. The Revolution of Scent Communication in the Information Age*. New York: Quimby.

Bucchi, M. & Trench, B. (2008). *Handbook of Public Communication of Science and Technology*. New York: Routledge.

Chang, T.-K. (2010). Changing global media landscape, unchanging theories? International communication research and paradigm testing. In G.J. Golan, T.J. Johnson, & W. Wanta (Eds.), *International Communication in a Global Age* (pp. 8–35). New York: Routledge.

Conrad, C. & Poole, M.S. (2004). *Strategic Organizational Communication in a Global Economy*. (6th ed.). Belmont, CA: Wadsworth.

Cornelissen, J. (2008). *Corporate Communication: A Guide to Theory and Practice*. Los Angeles: Sage.

Davenport, T.H., Leibold, M., & Voelpel, S. (Eds.) (2006). *Strategic Management in the Innovation Economy. Strategy Approaches and Tools for Dynamic Innovation Capabilities*. Erlangen: Publics Publishing and Wiley-VCH.

David, P. & Foray, D. (2002). An introduction to the economy of the knowledge society. *International Social Science Journal*, 54(171): 9–23.

Donaldson, B., O-Toole, T., & Holden, M. (2011). A relational communication strategy for successful collaborative innovation in business-to-business markets. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 15). Berlin, Germany: Springer.

Dunwoody, S. (2009). Building a context for the next century of science communication research. In L. Kahler & P. Stout (Eds.), *Communicating Science: New Agendas in Communication* (Foreword: pp. ix–xii). New York: Routledge.

Eberl, U. (2011). A Holistic Approach to Communicating Innovation – Siemens and its Environmental Portfolio. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 23). Berlin, Germany: Springer-Verlag.

Ferguson, S.D. (2011). Strategic planning for communication of innovations: Crowsourcing as social capital. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 16). Berlin, Germany: Springer.

Flew, T. (2008). *New Media: An Introduction*. (3rd ed.). South Melbourne: Oxford University Press.

Helfat, C.E., Finkelstein, C., Mitchell, W., Peteraf, M.A., Singh, H., Teece, D.J., & Winter, S.G. (2007). *Dynamic Capabilities: Understanding Strategic Change in Organizations*. Malden, MA: Blackwell.

Hitt, M.A., Ireland, R.D., & Hoskisson, R.E. (2005). *Strategic Management. Competitiveness and Globalization*. Mason, Ohio: South Western, Thomson.

Jäger, H.-W. & Jäger, A. (2011). Communication management via web – the web-based tool ICOM compass. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 21). Berlin, Germany: Springer.

Kahlor, L. & Stout, P. (2009). *Communicating Science: New Agendas in Communication*. New York: Routledge.

Krishna, A. (2010) (Eds.). *Sensory Marketing: Research on the Sensuality of Products*. New York: Routledge.

Kroeber-Riel, W. & Esch, F.-R. (2004). *Strategie und Technik der Werbung. Verhaltenswissenschaftliche Ansätze*. (6th ed.). Stuttgart, Germany: Kohlhammer.

Miller, K. (2005). *Communication Theories: Perspectives, Processes, and Contexts*. (2nd ed.). New York: McGraw-Hill.

Mohr, J., Sengupta, S., & Slater, S. (2009). *Marketing of High-Technology Products and Innovations*. (3rd ed.). New Jersey: Pearson.

O'Rourke, J.S. (2010). *Management Communication: A Case-Analysis Approach*. Upper Saddle River, NJ: Prentice Hall.

Papa, M.J., Daniels, T.D., & Spiker, B.K. (2008). *Organizational Communication. Perspective and Trends*. Thousand Oaks, CA: Sage.

Pfeffermann, N. (2011a). The Scent of Innovation: Towards an Integrated Management Concept for Visual and Scent Communication of Innovation. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 12). Berlin, Germany: Springer.

Pfeffermann, N. (2011b). Innovation communication as a cross-functional dynamic capability: Strategies for organizations and networks. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 18). Berlin, Germany: Springer.

Pfeffermann, N., Hülsmann, M., & Scholz-Reiter, B. (2008). Framing Innovations to Grasp Stakeholders' Attention: A Dynamic Capability-based Conception of Innovation Communication. *Research Report 2007/08 International Graduate School for Dynamics in Logistics*, Vol. 01, 2008, pp. 40–44.

Reichert, C. & Reimann, K. (2011). Case study electro-mobility – RWE mobility. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 22). Berlin, Germany: Springer.

Research*eu (2007). Available at: http://ec.europa.eu/research/conferences/2007/bcn2007/researchers_en.pdf and http://ec.europa.eu/research/conferences/2007/bcn2007/journalists_en.pdf [2010-08-01]

Rohde, M., Pfeffermann, N., Echelmeyer, W., & Rasch, C. (2011). The High-tech Innovation 'ParcelRobot' – patent strategy and communication tools. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 20). Berlin, Germany: Springer.

Schilling, M.A. (2008). *Strategic Management of Technological Innovation*. (2nd Ed.). New York: McGraw Hill.

Schütz, B. & Martos, A. (2010). Available at http://www.science.co.at/ [2010-08-01]

Smith, R.D. (2009). *Strategic Planning for Public Relations* (3rd ed.). New York: Taylor & Francis.

Steinhoff, F. & Breuer, H. (2011). User-centered radical innovation at Deutsche Telekom laboratories. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 24). Berlin, Germany: Springer.

Stocklmayer, S.M., Gore, M.M., & Bryant, C.R. (2001). *Science Communication in Theory and Practice, Contemporary Trends and Issues in Science Education*. Dordrecht, The Netherlands: Kluwer Academic Publisers.

Streier, E.-M., Pfeffermann, N., & Grapp, J. (2011). Science comes alive! The Internet Film Portal DFG Science TV. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 19). Berlin, Germany: Springer.

Teece, D.J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13): 1319–1350.

Teece, D.J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7): 509–533.

Töhlke, J.M., Hultink, E.J., & Robben, H.S.J. (2001). Launching new product features: A multiple case examination. *Journal of Product Innovation Management*, 18: 3–14.

Trommsdorff, V. & Steinhoff, F. (2007). Innovationsmarketing. München, Germany: Franz Vahlen.

Ulrich, K. (2011). DHL Open Innovation – Program for the development, deployment, and promotion of innovative solutions in logistics. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 20). Berlin, Germany: Springer.

Viardot, E. (2011). Achieving market leadership for innovation through communication. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 17). Berlin, Germany: Springer.

Von Hippel, E. (2005). *Democratizing Innovation*. Cambridge, MA: MIT Press.

Chapter 14
Research and Development, Innovation and Marketing: How to Convince Internal and External Stakeholders of Technological Innovations

Alexander Brem, Mostafa Hashem Sherif, Liora Katzenstein, Kai-Ingo Voigt, and Dominique Marcel Lammer

Contents

A. Brem (✉)
Lehrstuhl für Industriebetriebslehre, Friedrich-Alexander Universität Erlangen-Nürnberg, Lange Gasse 20, 90403 Nürnberg, Germany
e-mail: brem@vend-consulting.de

M.H. Sherif
AT&T, 200 S. Laurel Avenue, Middletown, NJ 07748, USA
e-mail: hsherif@comcast.net

L. Katzenstein
ISEMI – Israel School of Entrepreneurial Management and Innovation (Swinburne University of Technology, Australia), P.O.Box 39163 61391, Tel-Aviv, Israel
e-mail: liora@isemi.org

K.-I. Voigt
School of Business and Economics, Friedrich-Alexander Universität Erlangen-Nürnberg, Lange Gasse 20, 90403 Nürnberg, Germany
e-mail: voigt@industriebetriebslehre.de

D.M. Lammer
London School of Economics and Political Science, Houghton Street, WC2A 2AE London, UK
e-mail: d.m.lammer@lse.ac.uk

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_14,

14.1 Introduction

"Today, maybe more than ever before, the survival of companies depends on gaining sustainable competitive advantages by offering continuously innovative products and services. This is why firms invoke the term 'innovation' nowadays as a badge of honour to inspire and mobilise their workforce and to attract investors. Many, however, overlook the fact that the implementation of innovations imposes changes, which can be misunderstood or provoke resistances" (Brem et al. 2009).

This chapter is based on articles published in a special issue of the International Journal of Technology Marketing (2009) on how to convince internal and external stakeholders to support technological innovations through improved knowledge management. First, we provide a theoretical framework for innovation with the goal of highlighting how basing knowledge on the technology life cycle and nature of the markets can improve the innovation process. Next, the perspectives of the various stakeholders are used to manage their respective expectations effectively. Guidelines for efficient management of stakeholders and for conducting multi-sector and open innovations are presented.

14.2 Innovation Processes and the Management of Knowledge

Technological innovations are at the intersection of market opportunities and new scientific and technological advances. They require a series of activities with the goal of acquiring value with the use of the innovation (Sherif and McGourty 1996). Innovations are essential for developing a competitive advantage and have to be managed efficiently and effectively from concept to commercial launch. Once an invention is conceived (Utterback 1971), it must be implemented (Roberts 2007) and becomes an innovation when it is commercialised (Hauschildt 2004). This requires organisational cohesion and the contribution of people within and outside the firm (Nayak and Ketteringham 1994). Only with successful innovations can companies increase their competitive advantage and generate growth.

Before looking at the challenges of knowledge management at each phase, let us consider first the various innovation categories in terms of market orientation and technology status.

14.2.1 Innovation: Technology and Market Orientation

In order to build a common understanding some fundamental considerations will be introduced. Dealing with technology means handling different stages of knowledge acquisition, each stage having its special requirements for the management of duties and responsibilities.

According to Specht (2002), technology management is concerned with converting knowledge into hardware, software or service that can be commercialised. In contrast, the focus of R&D management is the generation of that knowledge. Management of technology is thus market-oriented because it focuses on customers and competitors (Narver and Slater 1990). The learning capacity of an organisation parallels its ability to absorb the lessons from past decisions to define new courses of action. The literature demonstrates that learning affects positively customer satisfaction and loyalty (Kohli and Jaworski 1990), alliances and partnerships (Emden et al. 2005), long-term client relationship (Santos-Vijande et al. 2005), teamwork (Bunderson and Sutcliffe 2003), employee self-efficacy (Martocchio and Hertensein 2003), and managerial decision-making (Celuch et al. 2002). Thus, both market-orientation and learning are important for a company's long-term performance (Zhang 2009).

Innovation management is a subset of technology management in that it comprises "a systematic planning and controlling process, which includes all activities to develop and introduce new products and processes for the company" (Seibert 1998, p. 127) or, in short, the dispositive constitution of innovation processes (Hauschildt 2004). Following Thom (1980), these innovation processes can be divided into the stages of "idea generation", "idea acceptance", and "idea realization". These are the main innovation steps in terms of processes; however, these stages strongly depend on the type of innovation as well.

14.2.2 Innovation Types

The literature on different types of innovations is quite extensive, ranging from Rogers (1962) to Garcia and Calatone (2002). Although a variety of definitions exists in the literature, the model of Abernathy and Clark (1985) takes into account the changes in technology and market structure to propose four categories of innovations, as shown in Fig. 14.1:

1. *Radical innovations* embody a new technology that results in a new market arrangement. These innovations incorporate a new technology and cause market discontinuities at the macro (world, industry or market level) level and/or at the micro (enterprise) level. Examples include the steam engine, the telegraph, electronic amplification and cellular telephony.
2. *Architecture innovations* blend existing technologies to create a new product and service and satisfy unarticulated needs that have not been met by the legacy technologies. The World Wide Web, hand-free handsets or smart phones are examples of architectural innovations that blend existing technologies.
3. *Platform innovations* correspond to a quantum leap in performance due to a shift in technology within the existing market structure. Typically, these innovations require large capital investments and are complex to develop. Examples are the development of jetliners to replace propellers in commercial aviation and the

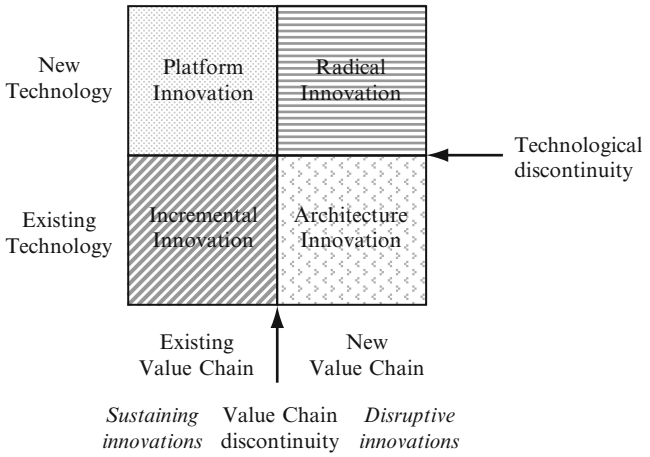


Fig. 14.1 The four categories of innovations (Sherif 2006, based on Abernathy and Clark 1985)

transition from analogue to the second generation (2G) of digital cellular telephony.

4. *Incremental innovations* provide new enhancements, or improvements to existing technology within the existing market structures. Most industrial innovations fall within this category. Examples today include new digital automotive controls systems and health foods.

This categorisation helps decision-making because each category requires a different type of knowledge management (Adams 2009). Incremental and platform innovations preserve the existing market structure and its value chains. They are sustaining innovations. Disruptive innovations, whether radical or architecture, change the market structure and its value chain or value network, so that some or most of past knowledge may not apply to the new situation.

Generally speaking, innovations face various degrees of uncertainties in technologies, in financial and human resources, in the markets. Adams (2009) has mapped the four categories of innovations into a portfolio based on the level and type of uncertainty, as shown in Fig. 14.2.

It should be noted that complex products combine several technologies, each of which is at a different point of its life cycle. Furthermore, the same technology can be perceived differently by organizations according to their position within the value chain. Some of the factors that influence organization perception are (1) whether the technology is implemented in equipment or services; (2) whether the technology significantly impacts an organization's core business and engineering competence; (3) whether the technology is emergent or mature. This perception varies by industry sectors and individual companies.

For example, digital photography is a platform innovation for camera manufacturers, while it is an architectural innovation for mobile handset manufacturers, because camera manufacturers did not need to reconfigure their value chains much,

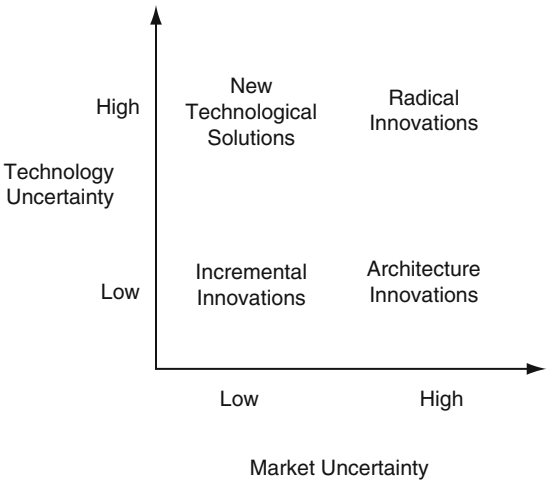


Fig. 14.2 A portfolio of innovation processes (modified from Adams 2009)

even though it was a discontinuous technology. However, mobile handset manufacturers had to realign their value chains to embrace digital photography technology into their products. This technology was not discontinuous by the time handset manufacturers adopted it and applied it in their products.

In the case of the Short Messaging Service (SMS), both handset manufacturers and service providers in the wireless telecommunications industry perceived it as an incremental innovation. To provide SMS functions, handset manufacturers just needed to improve the handset design and function for sending and receiving text without affecting the way they conduct their business or organize thieir value chains. For service providers, it was another service that could be offered on their existing networks and equipments (Sherif and Seo 2009).

Furthermore, Bunn et al. (2009) have shown how Intelligent Transport Systems (ITS) are architectural innovations at the system level because they combine a variety of products, services and organizational processes at different levels of maturity. To underline this fact and to highlight the marketing complexities involved, they denote these innovations as "multi-sector innovations". In these innovations, the complexities are increased because of the tension among the interests and perspectives of the various parties, particularly those coming from distinct industrial sectors.

14.2.3 Management of Knowledge

Knowledge management as a process has several objectives:

1. To select and develop the appropriate technology.
2. To define the market most receptive to the technologies being developed.

3. To spread the knowledge gained to all those involved in the innovation.
4. To generalize local knowledge in a form that can be used in a generic way within the firm or its customer.
5. To provide a framework to integrate new information so as to improve the innovation.

Adams (2009) distinguishes three aspects of knowledge management: identification of the types and sources of knowledge, the methods of knowledge acquisitions and the governance of knowledge flows both within and among organisations.

Incremental innovations are used to solve relatively well-defined problems that build on existing customers and technological platforms. As a result, working with users to gain contextual information on performance parameters and functional/technical preferences is possible in this case.

Similarly, new platform innovations rely on deep knowledge of the existing market structure. In this case however, a completely new technological platform is developed to improve on some performance parameter significantly (speed, volume, quality, power consumption, etc.). Users' input is less useful here because they are not familiar with the platform under development. Therefore, in that category of innovations, technologists must lead in the search for new ideas and in experimentation. In other words, the classical marketing tools of interviews concerning user preferences and wants and needs provide less information than in the case of incremental innovations.

In contrast, new architecture innovations depend on the re-use of existing technologies or a combination of existing technologies to meet latent needs and preferences of potential new users. Very often the resulting solution may change the ways in which the markets function and/or are regulated. The success of these innovations depends on technology intermediaries that have a wide knowledge of trends and are in contact with multiple application areas. It also depends on market savvy to identify unexpressed market needs and to identify opportunities.

Finally, radical innovations require the widest possible knowledge acquisition to digest and integrated basic research, technology trends as well as need-oriented and environment-oriented knowledge. The high levels of uncertainty call for much experimentation and learning by trial and error. In addition, training and education of all the stakeholders are important aspects of the innovation management. This is why radical innovations are few and in between and depend on long-term commitments to support the experimentation and research.

Knowledge management covers additional areas such as technology performance, systems performance, and service performance. Some aspects of knowledge management are firm-specific and may give that firm a competitive advantage. Aspects that are general to the industry and are common across several firms are typically within the purview of standardization activities.

There is another type of knowledge, namely, tacit knowledge or know-how that is embedded in the firm organization as a whole, or in a few key experts. Tacit knowledge is based on the cumulative experience that has been developed over the years and that is exchanged implicitly or explicitly through direct contacts at the

working level. This tacit knowledge is quite useful in sustaining innovations but may hinder disruptive innovations.

14.3 The Challenge of Convincing Internal and External Stakeholders

The term "innovation" is nowadays used in almost every context in daily life. There is almost no company that does not use it within its internal and external communications. Many, however, forget that innovations can provoke resistance to change. Therefore, stakeholders, whether internal or external, need to be permanently engaged to understand the reasons for change and to help define what should be changed and who should carry the necessary changes.

14.3.1 Stakeholder Perspective

The concept of stakeholder, which can be traced back to Barnard (1938), entered the academic world with Freeman (1984). Freeman (1984) defines stakeholders as "any group or individual who can affect or is affected by the achievement of the organization's objectives", encompassing both internal and external stakeholders. In other words, a stakeholder is a party-at-interest that can be affected, either positively or negatively, by an innovation.

Although stakeholder analysis is a typical project management tool used for identifying and developing the total project team (Milosevic 2003, pp. 330–335), Bunn et al. (2009, p. 133) state that "stakeholder theory has yet to have much impact in marketing". In fact, they identify three main characteristics of the scholarly marketing research: the emphasis on the stakeholders (e.g., shareholders) demands on enterprises, the relation between the enterprise and its individual stakeholders and ethical controversies and social responsibility of stakeholders.

Because stakeholders differ in their "values, needs and concerns" (Freeman 1984; Clarkson 1995), the influence of key stakeholders must be analysed and understood. Mitchell et al. (1997) and Milosevic (2003), for example, provide tools to assess their influence so that conflicts between the enterprise and the influential stakeholders during the innovation process can be managed.

14.3.2 Internal Stakeholder Involvement

Internal stakeholders are those influential parties within the enterprise. They include the idea generator, the project team, the project sponsor, the life-time

support personnel, the headquarters of the firm, the stock holders, etc. Many studies have been concerned with top-down innovations and have focused on overcoming employees' resistance to new ideas (Bond and Houston 2003). In contrast, the management of technology literature stresses that innovative ideas can arise from within. Bottom up innovations, however, do not emerge by accident but depend on a nurturing environment to support the exploration of alternatives and to benefit from mistakes and apparent failures to open up new directions for innovations. Integrative structures, open communication, multiple structural linkages (both inside and outside the organization) encourage innovations (Sherif and McGourty 1996). One possible way to stimulate these ideas is to bring different communities of practice together across organizational boundaries (Tidd et al. 2005, pp. 359, 361). Also, the technology capability of the firm is an essential factor to deal with the added complexities. This is why the long-term survival of a bottom up innovation depends on its congruency with the overall strategic thrust of the firm and its ability to meet the requirements of that innovation (Sherif and McGourty 1996).

The following provides an analysis of the challenges of internal stakeholder involvement, company politics and internal communication during the innovation process.

14.3.2.1 Challenges and Effective Problem Management

In a top-down approach, changing mindset and refocusing the organisation energies requires the articulation of a new vision and a shared organizational commitment o the long-term (Tidd et al. 2005, p. 470). In this case, front-line personnel are important stakeholders because they are the contact points with customers. They need to be trained and motivated to support the launch strategy and overcome the resistance that some external stakeholders may offer. In other words, "a successful new product launch requires firms to thoroughly inform their front-line personnel about the features of the new product and related changes both for internal processes and in the market situation" (Talke and Salomo 2009).

In any company, resources, whether material, financial or personnel, are limited and different groups and departments vie for them. This leads to the concept of the "product champion", well recognized in the literature on new product development (NPD) as a person with political clout guiding the technology inventor through organization politics to gain acceptance of the innovation (Chakrabarti 1974; Tushman and Nadler 1986; Howell and Higgins 1990). A particular challenge at the strategy level is to bring back a successful innovation to the main stream of the firm. Another concept is that of the innovator who uncovers interesting problems to solve, proposes solutions to these problems and develop products for commercialisation based on these solutions (Price et al. 2009). The role of a product champion is less conspicuous in incremental innovations, where most of the changes are in the form of feature enhancements.

A more beneficial way to look at the problem is to consider the main roles that are necessary to manage an innovation. The main roles are (1) the inventor or idea generator, (2) the product champion or the corporate entrepreneur, (3) the functional manager, (4) the boundary manager (or "gatekeeper") and (5) the mentor or coach. The inventor or subject matter expert promotes a technical solution. The product champion also called the promoter of power has the corporate resources and competence to make decisions and enforce them (Witte 1973). The boundary manager or the process promoter (Hauschildt 2004) has strong knowledge of the organization and can help resolve interorganisational issues that may prevent the project team from accomplishing its mission. The functional manager provides the human resources to the development of the product and may also act as the project manager. Depending on the complexity of the product development and the nature of the nature of the organization, all these roles can be carried exclusively by the same person or can be shared in different combinations among several individuals.

Gurtner and Dörner (2009) focus on the dynamic nature of the management structure. They start with the four-phase innovation process that Dörner et al. (2009) have proposed which consists of (1) idea generation, (2) concept development, (3) product development and, (4) product launch and market penetration, as shown in Fig. 14.3. They then argue that each phase requires different management skills. In fact, it is well known in the project management literature that the leadership style should match the project phase, the innovation type and the technology maturity (Sherif 2006). At the start-up phase, the emphasis is learning and experimentation and a transformational leadership is useful for both radical and architectural innovations. Information must be disseminated in an efficient and timely manner to improve the coordination among parallel activities and to allow early identification of unknown interdependencies. In disruptive innovations, in particular, new knowledge is generated at a rate that can overwhelm hierarchical distribution channels. During product development, the emphasis is on platform innovations to improve the performance of the product or service to be commercialised. The organisation changes to become networked (typically in the form of a matrix structure) and combine technical and marketing expertise. Finally, after the product is launched and commercialised, the objective is to respond quickly to market conditions and to reduce production and distribution costs, through incremental innovations and transactional efficiency.

Each phase has different objectives. For example, "the stimulation of creativity" is the main goal of the first phase; the main goal of the second phase is the transition from creativity management to management of production, including building coalitions and communicating with stakeholders. Institutionalisation is the main aim in the third phase and getting the front-line employees on board is the target of the fourth phase. As a result, of the communication tools will different in each phase.

Figure 14.3 gives examples of communication tools for each phase. As teams become global, linguistic and cultural differences affect the tools used and whether the communication will be verbal or written.

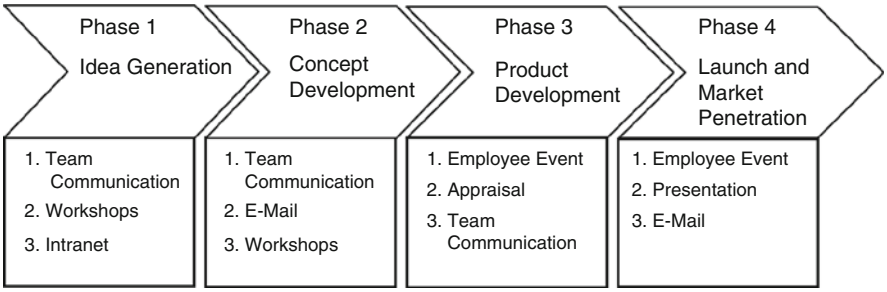


Fig. 14.3 The 4 × 3 method of internal communication in the innovation process (Dörner et al. (2009)

14.3.3 External Stakeholder Involvement

The Porter Model for the forces driving industry competition includes external factors, such environmental and regulatory changes, customers and suppliers and the rivalry among firms (Porter 1980). The literature on stakeholder management has addressed the resistance of customers and external market players (Hallikas et al. 2002; Montaguti et al. 2002) as well as other actors in the firm's environment (Kochan and Rubinstein 2000). Yet, external stakeholders can be a source of incremental innovations as well.

Porter's framework, however, does not consider explicitly potential rivalry among firms in an unrelated industry, which is important in architecture innovations, where the market is restructured. For example, digital compression technology affected many industries, such as movie and music production and distribution. Also, the anticipated market could suddenly disappear to due regulatory conditions. In fact, Hauschildt (2004) demonstrates how market players and the firm's broader environment affect successful launch strategies. Furthermore in a networked environment, other externalities have to be built. For example, cellular telephony took more than 40 years to take off because of technological and regulatory hurdles concerning the allocation of the same frequencies everywhere and due to technological limitations on the battery size and weight, the size of the handsets, quality of signal transmission, etc.

14.3.3.1 Effective Innovation Management

In an organization that is serving an existing market with an existing technology, any change will face obstacles. One insidious problem arises from the methods of performance assessment which may favour the status quo or are a disincentive to teamwork and collaboration. In the case of radical ("breakthrough") innovations, in particular, there is a need to take into account their long gestation time.

As indicated above, a major focus of the literature has been to overcome customer resistance to non-incremental innovations. Talke and Salomo (2009)

have shown that the so-called four Ps (Product, Price, Place and Promotion) are indeed important and that the launch strategy and launch tactics contribute positively in overcoming obstacles related to external market parties. In architecture innovations, segmenting the market based on a thorough analysis of potential customers to focus on the segments that would most likely be attracted to the new product directly improve its market performance. Furthermore, "positioning activities – composed of thorough analyses of buying criteria and competitor products, including related dynamics, as well as alternative positioning planning – contribute positively to new product market success" (Talke and Salomo 2009).

Talke and Salomo (2009) have also shown that external parties in the product ecology, such as suppliers, dealers and producers of complementary products, need to be recruited to support a disruptive innovation. In other words, the market perspective should be extended beyond customer management and the four P's to include the management of relationships and interactions with other external stakeholders. In other words, it is not possible to deliver a successful disruptive innovation without a major strategic re-orientation of the whole value chain.

The more radical the innovation is, the larger the uncertainties that external stakeholders face concerning the strategic and financial value of investments (Turnbull et al. 1996). This is because of the lack of information on the various characteristics and benefits of the innovation. Imagining new user's needs is indispensable because breaking new ground implies that there will be a scarcity in technical, managerial and marketing skills. Lack of experience with the technology or with the market can lead to unrealistic expectations about cost and/or performance, particularly that the users' requirements and profiles are not defined. This means that experimentation with its lots of mistakes is part of the environment and that technology transfer is a key part of the activities.

The uncertainties and information deficit have to be reduced whenever possible. The results of Talke and Salomo demonstrate that a positive performance of launch activities directed at convincing potential customers and other market players. Firms which address the uncertainties of stakeholders relevant to the new product launch, like suppliers or political and legal parties, through more proficient interaction with these stakeholders are more successful in the marketplace (Talke and Salomo 2009).

In summary, external stakeholders have an important role to play in the innovation process. An effective management strategy of external stakeholders has to look at both the customer and beyond.

14.4 Management of Multi-Sector and Open Innovations

In this section, we discuss the challenges that new developments in the innovation process, notably multi-sector and open innovations, pose to the management of innovations.

14.4.1 Multi-Sector Innovations

Bunn et al. (2009) define multi-sector innovations as those that "emerge over a long period of time and require the involvement and adaptations of numerous stakeholders from government agencies, non-profit organisations and commercial enterprises as well as society in general". An example of multi-sector innovations is the development of the Intelligent Transport Systems (ITS) described above. Another is the cross-enterprise business integration, such as for international trade or e-government initiatives.

A particular challenge in developing effective management strategies of stakeholders in multi-sector innovations is the number of complex cross-relationships. In this case, the social networks approach is a useful tool to understand how the various stakeholders are networked and how their relations have influenced the outcomes (Wasserman and Galaskiewicz 1994; Rowley 1997). Bunn et al. (2009) argue that the value of network analysis is that it "produces an alternate view, where the attributes of individuals are less important than their relationships and ties with other actors within the network".

The use of social networks has an explicative value of past events and can help learn from past experience but it may also lead to a faulty narrative (Taleb 2007, pp. 62–84). With the necessary precautions, however, they offer insights on what was used to convince the stakeholders in a given situation. The density of network (the proportion of possible connections that are present) can assist in interpreting behaviours and making predictions (Granovetter 1985). In addition, Granovetter (1973) has highlighted how "weak ties" that bridge actors across groups contributes to the shaping of opinions. This idea was developed further by Burt (1997), arguing that the social capital of individuals depends on the centrality of their position in a given network.

Bunn et al. (2009) build on all these ideas to propose an ecosystem that sustains multi-sector innovations. The idea is to mix stakeholders with a short-term focus with those with a long-term focus over the lifespan of the innovation development.

As stated, multi-sector innovations cannot be tracked easily, as they emerge over time. However, it is possible to anticipate and manage the innovation process using the various tools discussed in this chapter.

14.4.2 Open Innovations

Open innovation is a paradigm that Chesbrough (2003) has popularised based on the proposition that firms can and should use internal as well as external technological ideas and exploit all market channels available to them, whether internal or external to the firm. The basic premise is that the boundaries between a firm and its environment have become more permeable and that the locus of an innovation is more a network than an individual company (Powell et al. 1996). Furthermore, in a networked environment, knowledge is distributed and proprietary research and

development has to be complemented by inputs from other parties through licenses or joint programs.

Planning for open innovations could be greatly facilitated by providing some structured framework for the front-end activities and by agreeing on common purposes, shared set of expectations and a decision-making structure. A university environment can provide a neutral ground where the various shareholders' expectations can be balanced (Bourgault and Bendavid 2010).

Open innovation depends on the collaboration of suppliers, vendors and customers with service providers. With the associated exchange of ideas, there is a risk that proprietary information and trade secrets be divulged. This is particularly important for information communications through letters, e-mails, or casual conversations. It is important to ensure that all the interests of parties involved be protected; for example, the proprietary information from one vendor must be blocked from going to another competitor. Typically, during contract negotiation, the legal team inserts language with respect the obligation of each party to keep the other parties' information in confidence. The team may also insert some language corresponding to the rights of the developed work or to any potential patents that might ensure. However, these considerations cover essentially what can be described as codified knowledge. Also, in government or military contracts, it is possible to retain control of the technology by insisting that it not be sold to other parties without the funder's permission. Such an approach is typically too expensive in commercial environments (Sherif 2006).

A logical consequence of open innovation is the formation of virtual project teams, particularly when specialists are not in the same geographic area and do not report to the same authorities. Virtual teams face a number of challenges regarding training, information sharing, confidence building, etc. that may affect the performance of the team. Standardisation is particularly useful in the case of open and multi-sector innovations to provide a uniform and predictable structure to the intense interactions among internal and external stakeholders.

It should be noted that the practice of internal networking, subcontracting, strategic alliances, franchises, etc. has been around for a while. The implicit assumption in the organization of regional clusters is that such collaborations are worth nurturing. Open innovations however, relies on the capabilities that modern telecommunication networks offer to collaborate at a distance. This has required changes to stakeholder management with respect to leading, communicating, learning and knowledge sharing.

From a study of an Intelligent Utility project in the Danish energy sector, Goduscheit (2009) concludes that "anchoring the project on a strategic level intraorganisationally" in all organizations is necessary. This is to ensure that the project enjoy sustained support by senior managers of each organisation and to promote the sense of ownership at the operational level. In other words, open innovations face the challenge of remaining relevant to all organisations, both at the strategic and the working levels. Matching the composition of the support network with the project objects is also an important aspect that planners need to consider.

14.5 Conclusions

The chapter presented approaches to convincing internal and external stakeholders of the worth or pursuing a specific innovation. The main lessons to managers are as follows:

- All innovations are not alike. Incremental innovations typically require relatively small investments of capital but a large commitment of individual labour. This is different from innovations that require substantial financial investment and teamwork and/or a transition to a new technology. The types of stakeholders that need to be convinced differ in each case.
- Phase-specific governance of the innovation is a decisive factor of success. The governance covers the characteristic of the leadership, internal communication, risk management, learning and education, etc.
- Convincing customers and external stakeholders requires informed and motivated front-line personnel.
- In new structures of innovations such as multi-sector and/or open innovations, the front-end process may be helped by a semi-formal organization lead by universities or other neutral organizations.

Bibliography

Abernathy, W. J., Clark, V. B. (1985). Mapping the winds of creative destruction. *Research Policy*, 4 (1), pp. 2–22.

Adams, P. (2009). The management of marketing knowledge in the early phases of the innovation process. *International Journal of Technology Marketing*, 4 (2/3), pp. 113–128.

Barnard, C. I. (1938). *The Functions of the Executive*. Cambridge, MA: Harvard University Press.

Bond, E. U., Houston, M. B. (2003). Barriers to matching new technologies and market opportunities in established firms. *Journal of Product Innovation Management*, 20, pp. 120–135.

Bourgault, M., Bendavid, Y. (2010). Introducing complex technologies into the enterprise: The case of RFID. In: *Handbook of Enterprise Integration*, Sherif, M. H., ed., Boca Raton: Auerbach, pp. 579–608.

Brem, A. (2008). *The Boundaries of Innovation and Entrepreneurship – Conceptual Background and Selected Theoretical and Empirical Aspects*. Wiesbaden: Gabler Verlag.

Brem, A., et al. (2009). Editorial. *International Journal of Technology Marketing*, 4 (2/3), pp. 110–112.

Bunderson, J. S., Sutcliffe, K. M. (2003). Management team learning orientation and business unit performance. *Journal of Applied Psychology*, 88 (3), pp. 552–560.

Bunn, M. D., et al. (2009). Stakeholder perceptions and implications for technology marketing in multi-sector innovations: the case of intelligent transport systems'. *International Journal of Technology Marketing*, 4 (2/3), pp. 129–148.

Burt, R. (1997). The contingent value of social capital. *Administrative Science Quarterly*, 42, pp. 339–365.

Celuch, K. G., et al. (2002). The effects of perceived market and learning orientation on assessed organizational capabilities. *Industrial Marketing Management*, 31 (6), pp. 545–554.

Chakrabarti, A. K. (1974). The role of champion in product innovation. *California Management Review*, 17 (2), pp. 58–62.

Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Cambridge, MA: Harvard University Press.
Clarkson, M. B. E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of Management Review*, 20, pp. 92–117.
Dörner, N., Gurtner, S., Schefczyk, M. (2009). Overcoming resistance to innovations: an approach for the use of communication tools within the innovation process. *International journal of Technology Marketing*, 4 (2/3), pp 199–216.
Eisenhardt, K. (1999). Strategy as strategic decision making. *Sloan Management Review*, 40 (3), pp. 65–72.
Emden, Z., et al. (2005). Learning from experience in international alliances: antecedents and firm performance implications. *Journal of Business Research*, 58 (7), pp. 883–892.
Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach*. Boston: Pitman.
Garcia, R., Calatone, R. (2002). A critical look at technological innovation and innovativeness terminology: a literature review. *The Journal of Product Innovation Management*, 19, pp. 110–132.
Goduscheit, R. C. (2009). Leadership in interorganisational network-based innovation projects. *International Journal of Technology Marketing,* 4 (2/3), pp. 149–164.
Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 78, pp. 1360–1380.
Granovetter, M. (1985). Economic action and social structure: the problem of embeddedness. *American Journal of Sociology*, 91, pp. 481–510.
Gurtner, S., Dörner, N. (2009). From roles to skills – key persons in the innovation process'. *International Journal of Technology Marketing*, 4 (2/3), pp. 185–198.
Hallikas, J., Virolainen, V. M., Tuominen, M. (2002). Understanding risk and uncertainty in supplier networks – a transaction cost approach. *International Journal of Production Research*, 40 (15), pp. 3519–3531.
Hauschildt, J. (2004). *Innovations Management*. München: Vahlens Handbücher.
Howell, J. M., Higgins, C. A. (1990). Champions of technological innovation. *Administrative Science Quarterly*, 35, pp. 317–341.
International Journal of Technology Marketing (2009). Special Issue on *R&D, Innovation and Marketing – How to Convince Internal and External Stakeholders of Technological Innovations*. Guest Editors: Alexander Brem, Liora Katzenstein, Mostafa Hashem Sherif and Kai-Ingo Voigt, Volume 4 – Issue 2/3 – 2009, available at http://www.inderscience.com/browse/index.php?journalID=116&year=2009&vol=4&issue=2/3
Kahn, K. B., et al. (2006). Perspective: establishing an NPD best practices framework. *Journal of Product Innovation Management*, 23 (2), pp. 106–116.
Kochan, T. A., Rubinstein, S. A. (2000). Toward a stakeholder theory of the firm: the Saturn partnership. *Organization Science*, 11 (4), pp. 367–386.
Kohli, A. K., Jaworski, B. J. (1990). Market orientation: the construct, research propositions, and managerial implications. *Journal of Marketing*, 54 (2), pp. 1–18.
Martocchio, J. J., Hertensein, E. J. (2003). Learning orientation and goal orientation context: relationships with cognitive and affective learning outcomes. *Human Resource Development Quarterly*, 14 (4), pp. 413–434.
Milosevic, D. Z. (2003). *Project Management Toolbox: Tools and Techniques for the Practicing Project Manager*. Hoboken: Wiley.
Mitchell, R. K., Agle, B. R., Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: defining the principle of who and what really counts. *Academy of Management Review*, 22 (4), pp. 853–886.
Montaguti, E., Kuester, S., Robertson, T. S. (2002). Entry strategy for radical product innovations: a conceptual model and propositional inventory. *International Journal of Research in Marketing*, 19, pp. 21–42.
Narver, J. C., Slater, S. F. (1990). The effect of a market orientation on business profitability. *Journal of Marketing*, 54 (4), pp. 20–35.

Nayak, P. R., Ketteringham, J. M. (1994). *Breakthroughs*. San Diego: Pfeiffer.
Porter, M. (1980). *Competitive Strategy – Techniques for Analyzing Industries and Competitor*s. New York: Free.
Powell, W. W., Koput, K. W., Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: networks of learning in biotechnology. *Administrative Science Quarterly*, 41 (1), pp. 116–145.
Price, R. L., et al. (2009). Innovation politics: how serial innovators gain organisational acceptance for breakthrough new products. *International Journal of Technology Marketing*, 4 (2/3), pp. 165–184.
Roberts, E. B. (2007). Managing invention and innovation. *Research Technology Management*, 50 (1), pp. 35–54.
Rogers, E. M. (1962). *Diffusion of Innovations*. Glencoe: Free.
Rowley, T. J. (1997). Moving beyond dyadic ties: a network theory of stakeholder influences. *Academy of Management Review*, 22, pp. 887–910.
Santos-Vijande, M. L., et al. (2005). Organizational learning and market orientation: interface and effects on performance. *Industrial Marketing Management*, 34 (3), pp. 187–202.
Seibert, S. (1998). *Technisches Management: Innovations*management, Projektmanagement, Qualitaetsmanagement. Teubner: Stuttgart/Leipzig.
Sherif, M. H. (2006). *Managing Projects in Telecommunications Services*. Wiley/IEEE, Hoboken, New Jersey.
Sherif, M. H., McGourty, J. (1996). An analysis of successful and unsuccessful product innovations in US industrial and military organizations. *Management of Technology V: Technology Management in a Changing World, Proceedings of the Fifth International Conference on Management of Technology*, Mason, R.M., Lefebvre, L.A., Khalil, T.M., eds. Oxford, UK: Elsevier Advanced Technology, pp. 544–553.
Sherif, M. H., Seo, D. (2009). Government role in information and communications technology innovations. *Proceedings of ITU-T Kaleidoscope: Innovations for Digital Inclusion*, Mar del Plata, Argentina, 31 August – 1 September 2009, S7.1, available at http://www.itu.int/publ/T-PROC-KALEI-2009/en.
Specht, G. (2002). *F&E Management: Kompetenz im Innovationsmanagement*. Schaeffer-Poeschel, Stuttgart.
Taleb, N. N. (2007). *The Black Swan. The Impact of the Highly Improbable*. New York: Random House.
Talke, K., Salomo, S. (2009). Launching technological innovations: the relevance of a stakeholder perspective. *International Journal of Technology Marketing*, 4 (2/3), pp. 248–274.
Teece, D. (2003). *Essays in Technology Management and Policy: Selected Papers of David Teece*. Singapore: World Scientific.
Thom, N. (1980). *Grundlagen des betrieblichen Innovationsmanagements*. Hanstein, Koenigstein/Ts.
Thomke, S., Fujimoto, T. (2000). The effect of front loading problem solving on product development performance. *Journal of Product Innovation Management*, 17, pp. 128–142.
Tidd, J., Bessant, J., Pavitt, K. (2005). *Managing Innovation. Integrating Technological, Market and Organizational Change, 3rd edn*. Chichester: Wiley.
Turnbull, P., Ford, D., Cunningham, M. (1996). Interaction, relationships and networks in business markets: an evolving perspective. *Journal of Business and Industrial Marketing*, 11 (3/4), pp. 44–62.
Tushman, M., Nadler, D. (1986).Organizing for innovation. *California Management Review*, 28 (3), pp. 74–92.
Utterback, J. M. (1971). The process of technological innovation within the firm. *Academy of Management Journal*, 14 (1), pp. 75–88.
Wasserman, S., Galaskiewicz, G. (1994). *Advances in Social Network Analysis: Research in the Social and Behavioral Sciences*. Thousand Oaks: Sage.
Witte, E. (1973). *Organisation für Innovationsentscheidungen*. Göttingen: Otto Schwartz & Co.
Zhang, D. D. (2009). Absorptive capability and its mediating effect on the learning and market orientations' influences on performance. *International Journal of Technology Marketing*, 4 (2/3), pp. 275–288.

Chapter 15
A Relational Communication Strategy for Successful Collaborative Innovation in Business-to-Business Markets

Bill Donaldson, Thomas O'Toole, and Mary Holden

Contents

15.1 Introduction

Research on understanding relationships within and between firms has grown as we attempt to increase our understanding of how business-to-business relationships actually work. We aim to contribute to this understanding of IORs by exploring the communication process, its features and mechanisms, in the context of successful

B. Donaldson (✉)
Aberdeen Business School, The Robert Gordon University Aberdeen, Garthdee Road, AB 10 7 QE Aberdeen, UK
e-mail: w.g.donaldson@rgu.ac.uk

T. O'Toole and M. Holden
WIT School of Business, Waterford Institute of Technology, Cork Road, Waterford, Ireland
e-mail: totoole@wit.ie, mtholden@wit.ie

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_15,

collaborative innovation in business-to-business relationships. When parties come together to innovate it clearly involves communication but this is almost taken for granted. Hence, it is not overtly detailed in the literature. This follows a pattern of extant work on relational communication which also underplays communication as a core variable in determining how parties interact in interorganisational settings. We address this imbalance and the chapter is structured by first understanding how communication provides the lubrication to the process of collaborative innovation, then we draw out the features and mechanisms of communication in successful collaborative innovation. We concentrate on communication in innovative relationships specifically where parties come together to add joint value to their products, services, business processes and models. The context is business-to-business where firms tend to be interdependent or embedded in rather complex interorganisational activities so examples and case studies are used as realistic examples of current practice. Interorganisational partnership is critical to joint decision-making and firms involved in collaborative innovation must integrate to seamlessly cooperate. They must also manage product development complexity through sharing of tacit information, high quality communication and interpersonal relationships. Relationships evolve over time and some of this is achieved through the internal dynamic of relationship innovation. This innovation is often seen as dominated by either party in the dyad. In this chapter we focus on a type of innovation – collaborative, joint or co-innovation.

15.2 The Communication Process in Collaborative Innovation

Collaborative innovation is a bi-party exchange where actors participate collectively to add mutual benefit. Early work in social exchange theory identified cohesiveness (anything that attracts people to take part in a group) and communication (frequency of interaction) as crucial determinants of collaboration (Homans 1958). We define collaborative innovation as the type of innovation generated in process, product, technology or business system created via potentializing interdependencies between companies at a dyad or network level (Håkansson and Eriksson 1993; Andersen and Drejer 2009). Business-to-business innovation can be dominated by a powerful party or emerge from the relationship that uses its mutual dependence and cooperates for joint advantage – a collaborative solution. These types of solutions are a natural evolution from the lead user method of new product development (von Hippel 1988) and are especially applicable in business-to-business markets where, for example, in effect, customers such as manufacturers are already highly involved with innovative suppliers (Stump et al. 2002; Johnsen 2009). In business markets buyers and suppliers are integrated in value chains. For example, Autoeuropa, a Volkswagen (VW) subsidiary, is a production plant in Portugal for VW models Sirocco, Eos, Sharma and Alhambra producing 180,000 vehicles per annum. VW have invested over €500 million on the plant building new infrastructures for suppliers and modernising production equipment and the group strategy is aimed at becoming an economic

and environmental leader in the global automotive industry (Volkswagen 2009). To achieve this they have pursued long term relationships with suppliers, based on mutual trust, embracing intensive exchange of know-how and skills. The suppliers work in the manufacturer's plant and have dense ties across the organisation and supply chain, and honed cross organisation problem solving capabilities (Takeishi 2001; Hillebrand and Biemans 2004). Volkswagen cannot maintain an intense relationship with all suppliers and have a tiered system. First tier suppliers are expected to assume responsibility for second and third tier suppliers. Naturally in such a scheme the role of the supplier in the network and the level of knowledge shared and communicated is dependent on their tier.

Collaborative innovation does not work for everyone but in the context of mutual interdependence is a natural outcome of the long term relationship (Van Echtelt et al. 2008; Athaide and Klink 2009). It does have the advantages of lowering transaction costs and risks that would be associated with involving outsiders in new projects. Additionally, collaborative innovation is a fluid problem-oriented mode which can adapt easier to the demands of the parties and does not require a highly structured new product development approach to function. Most costs and eventual benefits are readily understood by the parties and they are ready to work together immediately on any problem.

Collaborative innovation is messy and unstructured. It requires deep communication at all levels within the cooperating firms to work; communication acts as an essential coordinating mechanism. Communication is the process of sharing knowledge and of building up a shared understanding and expectation of the partnership. In collaborative relationships, communication processes and systems are already in place which facilitate a seamless knowledge exchange – little effort needs to be put into it to happen. One apt metaphor to describe communication in relationships is "the glue that holds organisations together". Communication has not always received the attention in marketing that it deserves. This was highlighted by Duncan and Moriarty (1998) who argued for communication to be the 4th P due to the growth and development of relationship marketing. This is even more obvious in business-to-business markets where firms are interdependent and information sharing is at the heart of the way exchange processes are managed.

Communication theory is built on the structure and flow of information and knowledge exchange between parties. A starting point for understanding is the basic model of communication which includes a source, a medium or channel, a receiver, and crucially, feedback and noise (interruption) (Krone et al. 1987). The components of relational communication strategy for successful collaborative innovation as outlined in Table 15.1 concern aspects of this model albeit applied to individuals and groups in organisations, between organisations, and in wider systems.

The power of communication in collaborative innovation is in the process but also in the dialogue between the partners. New knowledge is created at the interplay between explicit and tacit knowledge (Nonaka 1994). In relationships, explicit knowledge is readily accessible due to its codification but it is tacit knowledge that is created through interaction, dialogue, idea sharing, and jointness which is

Table 15.1 Components of relational communication strategy

Components	Sample application	Dimensions	To collaborative innovation relationships	Component type
Mechanistic	Mohr and Nevin (1990)	Frequency, direction, modality, content	High frequency, bidirectional, informality, indirect (discussion)	Feature
Behaviour	Mohr and Spekman (1994)	Quality, participation, information sharing	High quality, dense participation, open information sharing of tacit and explicit knowledge	Feature
Interpretive symbolic	Barnett (1998), Hatch (1993)	Communication culture and climate	Shared meaning base, open organisational and interorganisational communication climate	Feature
Information Richness	Daft and Lengel (1984), Barry and Crant (2000), Ganesan et al. (2005)	Range of media assessed by richness – face-to-face highest	Interpersonal, face-to-face, proximate	Mechanism
Topoi of Relational Communication	Burgoon and Hale (1984)	Range of interpersonal elements	Affiliate interpersonal relationships	Mechanism
Knowledge networks	Brown and Duguid (2001), Uzzi and Lancaster (2003), Hansen et al. (2005), Tagliaventi and Mattarelli (2006)	Formal and informal teams, on-line communities, information repositories, communities of practice	Loose teams, virtual communities, shared information repositories, and intergorganisational communities of practice	Mechanism

where the real power of communication in a collaborative innovation setting comes into play. Relationships, with deeply embedded routines and systems, have a major opportunity to use communication to create new knowledge that can be exploited by the parties.

From Table 15.1 the authors are proposing that for the successful management of collaborative innovation, a relational communication strategy encompasses:

A. Frequent and two-way communication
B. Indirectness and informal modes
C. High in quality – accurate, complete, adequate, timely, credible
D. Participative with the open sharing of tacit and explicit knowledge
E. Shared meaning base
F. Open organisational and interorganisational communication climate
G. Frequent face-to-face interactions
H. Affiliative interpersonal relationships
I. Loose interorganisational teams
J. Electronic virtual communities and open information repositories
K. Interorganisational communities of practice

A–F represent the features and H–K the mechanisms of a relational communication strategy in successful collaborative innovation. Each of these elements will be developed in the second half of the chapter.

Mechanistic and behaviour communication perspectives have been applied to relationships in a number of studies as shown in Table 15.1 (see, for literature review of extant research, Holden and O'Toole 2004a, b). The implication from the mechanistic perspective in a collaborative innovation space is that these relationships would involve highly frequent communication, be bi-directional and, given its problem solving nature, there would be a strong element of informality, and non-directedness or jointly formed solutions rather than imposed ones. In terms of behaviour, the quality of communication would be high with dense participation among a range of actors across both organisations. Open information sharing of tacit and explicit knowledge is a feature of collaborative relationships, including proprietary information, and is likely to be essential in collaborative innovation as it is the very basis of open innovation systems (Chesbrough and Appleyard 2007). The development of the open source software model has led to the adoption of resulting technologies as users have found superior performance from these over rival closed–developed solutions, for example, the Linux operating system (von Hippel 2005). The third component of a relational communication strategy referred to in Table 15.1 is interpretative symbolic. It is centred on social interaction and social context and develops over time a pattern of shared meaning from common events, behaviours and actions (Krone et al. 1987). The shared meaning base is accompanied by an open organisational and interorganisational communication climate – a system of communication which differentiates a particular set of collaborating parties. This system is a characteristic of the relationship that makes possible the open and rich tacit knowledge exchange at the heart of successful collaborative innovation.

The first component of our relational communication strategy in Table 15.1 that forms part of the mechanism of the strategy is information richness. Information rich media are proposed to be those that are interpersonal, face-to-face and proximate. Information rich media is readily applicable to collaborative innovation due to its need for deep interaction. This must be rich and purposeful to develop better solutions than those arrived at independently. The information rich mechanism for achieving this is interpersonal and face-to-face communication. These mechanisms of communication tend to reduce any potential for equivocality. Indeed, alternative approaches to developing innovation with third parties would have to specify, for example, in a new product alliance agreement, strict communication guidelines and protocols to avoid equivocality. The topoi of relational communication provide further specificity on the nature of interpersonal relationships needed in successful collaborative innovation, for example, mutual liking and affiliation are likely to be part of the social fabric of the relationship. These types of personal relationships between the core boundary spanners in the innovation context will keep the project going and facilitate risk taking behaviour in the partnership.

It is the authors' belief that maintaining strong ties across both organisations is an essential component of relational communication in collaborative innovation – knowledge networks. One essential aspect of a knowledge network in collaborative innovation is the team. In a relational setting it is self-governed and loose which allows maximum sharing of tacit knowledge without the typical boundaries prescribed to teams. The interfirm innovation literature has not evolved to include electronic virtual communities and open information repositories which could complement interpersonal mechanisms particularly where geographic boundaries impede physical meetings. The mechanisms often associated with a more social oriented approach to communication are boundary roles, as specified, and communities of practice. The establishment of a community of practice for collaborative innovation is a mechanism used more in a network of innovation rather than at the interorganisational level. However, the concept of communities of practice to inspire constant innovation might warrant more attention where likeminded people across both organisations are encouraged to develop practice communities that share all types of knowledge.

Table 15.1 presents a relational communication strategy for successful collaborative innovation. Obviously for it to work it must do so at individual, group and organisation levels. Although the literature is replete with reference to communication, it is often assumed rather than acknowledged explicitly in IORs perhaps because it is subsumed as part of the "atmosphere" in relationships and networks. Yet, due to the interfaces that exist in complex networks and because we are talking about individual human beings interacting, communication is essential to lubricate the process between seller and buyer at a human contact level and via technology. Innovation can be driven by changes in the external environment which requires effective communication between individuals in the same organisation, between team members and within the organisation more generally which, in turn, must be complemented with communication between individuals and teams in a partner organisation. In collaborative relationships, there is likely to be symmetry between

all these levels and if any change happens at one level it can be accommodated by the next or mitigated by it, if adverse. Communication in a relationship is multi-layered and multi-level and comes alive in the interactive processes between the parties.

15.2.1 Communication Between Individuals

In collaborative innovation, communication between individuals is likely to be fluid, open-ended and problem-oriented. The history of past cooperation will have created a communication climate and a set of embedded relationships which makes communication between individuals in the partnering organisations effortless. Communication of this type is not easy to replicate. In effect, it is not necessarily a feature of the competitive market situation faced by most companies. In this context, communication is an asset as it has a rare quality only sustainable where parties have a history of unique trading relationships. Indeed, the possible risks of information sharing between individuals across companies can be what most pre-occupies organisations. Will proprietary company information be revealed? Will advantage be taken? In a collaborative setting, these risks are set aside for mutual gain. In a business-to-business relationship, the locus of innovation is often a problem to be solved for the partner in which case the ownership of the innovation remains with the partner who brings the expertise. In terms of non-product/technology based innovation, the knowledge rests in people whom can bring it to other situations. One of the biggest risks is often the potential that people might leave.

15.2.2 Communication Between Teams

Given that new product development (NPD) in general requires inter-functional coordination, much focus has been placed on how this originates, develops and is managed. Numerous studies have examined the interface between research and development and marketing but, in interorganisational NPD, these interfaces can be more pronounced encapsulating complex relationships. The focus is not only on individuals but on teams. How teams emerge, work and produce desired outcomes is crucial. This has called into question the relevance of the stage-gate model and the assumption of a linear and sequential process to NPD. Instead, the reality is complex interaction within networks in dynamic and changing environments. To understand communication within and between teams requires investigating not only the beliefs and actions of individuals but the collective encompassing issues of status, power and socialisation processes amongst others. What makes collaborative innovation teams different is that they can eschew the need for formality and work quite independent of organisational control to get the job done. An individual's contribution depends on the task at hand and who is needed from both organisations.

If others are needed, they can be called in as the work dictates. This informality can lead to knowledge-rich solutions.

15.2.3 Communication Within and Between Organisations

While organisational learning has become a catch-all for the process of information acquisition, dissemination and application, involvement in NPD at the organisational level can take many forms varying by size (number of participants), formality, individual versus collective, radical versus incremental. Much of what an organisation can do in the collaborative innovation space is bounded by its internal communication climate. If it is not open then it cannot be so with another partner. Effective organisation and management of communication at individual, team and organisational levels is crucial to successful outcomes. The managerial challenge is to ensure the most appropriate structure to effect the required solution. To misquote Peter Drucker, the management theorist, the right organisational structure will not guarantee success but the wrong one will ensure failure. Task forces, matrix structures and venture groups have been advocated to avoid such failure. At an organisational level, managers have to balance loss of control with the autonomy needed to be collaborative. Rather than controlling the process, managers need to focus on the outcomes and freeing up process blockages. Organisational level signals should be directed at open communication and interaction with the partner. The emphasis on the social-oriented relationship in collaborative innovation is in the creation of the interdependent entity – a shared system of beliefs and purpose across collaborating organisations.

15.3 Features of Communication in Collaborative Innovation

15.3.1 Frequency, Bidirectionality, Informality and Indirect

The authors are proposing that for the successful management of collaborative innovation, a relational communication strategy encompasses frequent and two-way communication, indirectness and informal modes. These features mark out the intensive nature of communication between the collaborators.

Part of the features of relational communication in an IOR context is high frequency especially in a collaborative innovation project; obviously, information will travel in both directions – a core feature of close relationships; communication will not be procedural and rule bound but will be free flowing and also high in social content; indirectness will be favoured over power dictates and discussion and debate used to resolve problems. These stratagems will be reflected in all the levels previously mentioned – individual, team, and organisation. Enabling this type of

communication necessitates deep interorganisational trust and commitment. Often in buyer–supplier relationships where strategic sourcing is prevalent, you might expect intense communication in innovative activity but this may rarely be the case as the underlying cooperative base is not there. For example, powerful, large scale firms may control the exchange and much of the network. Even in cases where they don't, intense communication may not be part of a firm's strategy for knowledge creation.

Dominant firms play major roles in the UK oil and gas industry in the North Sea. In line with the network industry, the innovation process incorporates an enabling organisation, sub contractors or technology providers and a number of end user organisations. As in most industries, suppliers are divided into tiers, for example, suppliers of drilling equipment might be first tier and suppliers of drilling equipment technology such as closed circuit television might be second tier. The industry is characterised by complexity due to the nature of its operations and its natural, political and economic environment. In complex environments, one would expect communication to be intense but collaborative innovation is still rare even in a scenario where huge complex innovations are often inherent in the way firms operate. These innovations are largely prescribed and formalised by a powerful party which means that intense communication as described here is mitigated; the communication culture and climate at the organisational level does not support collaborative innovation. Collaborative innovation seems to only happen in pockets. Much of the technology developed in the industry is custom, therefore communication of information, knowledge transfer and integrated processes are complex. The enabler may start the process by seeking an innovative solution to a problem, a drilling problem for example, and invite tenders or a formal process for submission and evaluation of proposals, but it is the individuals from both the technology providers and the end user organisations that manage the relationship and are primarily involved in communication with the network. Communication is thus dependent on the enabler to provide the opportunities (the problem to be solved) but relies on a close relationship with the technology providers to apply and exploit the knowledge in cooperation with end users. By getting together via brainstorming, these individuals identified missing products or that which would be useful to have in order to improve their drilling and exploration performance. As it was put to us innovation is not about people in white coats developing things – it is much more complex – trying to get people together with varying perspectives from different disciplines in order to develop a cohesive team to deliver the product solution. The individuals from the cooperating organisations communicate with intense frequency and exchange of information is two-way but requires clearance for proprietary information. This mode of innovation is on the collaborative scale but not truly co-innovation because communication is more formally mediated by the dominant buyer than intense and self-directed. In collaborative innovation, partners know each other so well that the need for formality in documentation and systems is only necessary when there is a crisis but, even here, past experience will direct that solutions will be found through the relationship. It can be hard for outsiders to the relationship to understand the informality – boundaries are not placed on

communication and social relationships are encouraged. The risks inherent in the relationship are just not present or perceived. Returning to the oil and gas example, the enabling organisation values more formal communication and formal reports of progress although they are happy to be kept informed at other times via e-mail. They needed to know what was going on and be able to report on progress to more senior management who were not directly involved in the NPD activity. Part of this formality was due to the safety requirements in this context with proof of a formal paper trail should it be required. Thus both formal and informal communication was essential to progress.

The global nature of the oil and gas industry makes such formality an imperative in many situations but reduces the potential of informality to produce innovative ideas. Even through communication was frequent and bidirectional between the partners, the rules of engagement were set by the dominant partner and the individuals involved chosen by both parties and tightly time managed. Informal communication features are closely related to indirect methods of communication, that is, the use of influence and persuasion rather than power in a relationship. Trying to persuade a partner to try a solution or following and making suggestions about how processes could improve facilitates better performance in collaborative situations. The nature of our insight provided into the oil and gas industry would seem to suggest an under-utilisation of this feature of communication due to organisational-level restrictions and a greater reliance on formality and direct requests and recommendations with implied consequences of not doing same.

15.3.2 Quality and Dense Participation

For the successful management of collaborative innovation the authors are proposing that a relational communication strategy also encompasses one that is high in quality (accurate, complete, adequate, timely, credible) and participative.

There are many communication barriers that block quality information transmission across organisations. In a relational context, collaborative innovation is taking place between organisations without boundaries making it possible for high quality information to flow between the partners. Knowledge exchange that is accurate, complete, adequate, timely and credible is a major advantage to the speed and richness of the dialogue between organisations. The kind of information search and request difficulties and problems with information asymmetry are just not there. Running side by side with quality is participation which enhances the amount of tacit knowledge shared between the partners. Dense participation across the structural levels of both organisations is a feature of relational communication in collaborative innovation.

Our relational communication strategy proposals here can be implied from studies that have investigated hierarchical relationships in an organisational context. Results suggest that in many of these types of relationships, communication is one-way as the hierarchical structure restrains the upward flow of communication

and, if low levels of trust exist in these relationships, information is distorted and poor in quality (Jablin 1979; Stohl and Redding 1987). The exchange of information high in quality occurs when the relationship is characterised by a high level of trust. Dominance can cause withdrawal which can manifest itself in many ways such as infrequent, if any, communication, no feedback, the use of more formal channels, no participation in planning or forecasting, and limited information sharing – in other words, a transactional approach to exchange. Furthermore, because communication is the means by which power is exercised, dominance may result in a pursuit of self-interest over mutual interest, hence dominance can result in manipulation of communication and its media. This type of hierarchical communication is the antithesis of that needed for collaborative innovation.

Participation in a relational communication strategy is one which facilitates those who need to be. Density of participation across both organisations is likely to see much mutual interaction between firms, equivalent to strong relational ties. Strong ties between individuals enhance information stickiness from a knowledge network perspective (Bush and Tiwana 2005) and "unstick" information from an innovation perspective (von Hippel 1994), and are ideal for transferring complex knowledge (Hansen 1999). Mutual cooperation over time and joint problem solving means that a range of people have built up collaborative experience and can participate in any new product project. The ties that bind members in both organisations together are the result of frequent interaction on important issues and are at multiple levels across both organisations. This dense participation involving strongly tied actors from both organisations is a huge relational communication strategy resource for successful collaborative innovation.

15.3.3 Openness of Information Sharing of Tacit and Implicit Knowledge

From Table 15.1 the authors are proposing that for the successful management of collaborative innovation, a relational communication strategy involves, as part of its features, the open sharing of tacit and explicit knowledge. That is, sharing of information up to and including that which would not be shared with others (proprietary) and keeping each other informed of developments and trends; the sharing of ideas is unrestrained. In collaborative innovation, open sharing of information is what makes for superior new products. If information sharing is open, then it can be translated into knowledge in the partnership which would not be available where release and exchange of information is controlled.

Increased information sharing is now taken for granted in product development settings and open information sharing is viewed as a potential relational competence (Fliess and Becker 2006; Athaide and Klink 2009). Even in consumer goods companies with large internal research and development departments, managers have realised that they cannot meet their new product growth targets without

bringing in others to their new product development hub. This is done by releasing product information and encouraging sharing of information. Total openness of information sharing between parties in a business-to-business setting is reliant on trust. The risk of abuse is high. Many business-to-business relationships have a base of information sharing that could easily transfer to an innovation setting due to the integration of processes and systems. Service firms are starting to realize the benefit of service process collaborative innovation. For example, a leading UK law firm, with a major high street bank as a client, developed a bespoke IT system to serve their customers' customer. Dealing with law issues for the Bank's clients, the Law firm has a dedicated intranet to link their legal dealings that also keeps the Bank's Relationship Manager up-to-date with their client's affairs. Any deadlines that pass are flagged in red to alert not only the lawyer but also the Bank. They can then decide to inform the client or take whatever action they deem appropriate. Obviously, this is a risky situation given the nature of the tri-party relationships. By opening up internal structures or suppliers may approach the wrong people within the company for information. A compromise or balance is required between openness and the procedures needed to control specific processes (Pawar and Sharifi 2002).

To realise fully the potential of information sharing of tacit and explicit knowledge in collaborative innovation, an openness and willingness to share must exist between partners. This will only happen in a relationship characterised by high trust and reciprocity. It is in the mix of tacit and explicit knowledge share that the potential to create higher value added solutions emerge. This, combined with the knowledge base in two organisations, makes this feature of the relational communication strategy contribute to successful collaborative innovation.

15.3.4 Shared Meaning Base and Open Communication Climate

The final feature of our relational communication strategy for successful collaborative innovation proposed is a shared meaning base and open organisational and interorganisational communication climate.

The interpretative symbolic approach underlies this relational communication strategy feature, see, Table 15.1, and is an apt way of describing a communication system that is unique to the parties. It is centralised on social interaction and social context. The communication of information to another cannot occur without both individuals sharing a common meaning base, that is, a shared "symbol-referent system". Mutual understanding is formed through bonding with others via social interaction which leads to the creation of shared meanings and behaviour and is influenced and changed by an altering social context (Krone et al. 1987). Organisational culture develops from this and shapes how a particular company might interact with another. If its internal communication climate is not open, it is difficult to see how it can use an alternative strategy in its relationships, hence the choice of a collaborative partner is crucial. A culture and climate of communication is learned

and resistant to change, it is part of an organisation's identity. A strong history of shared meaning developed through individuals and systems over time predicates the type of communication climate now present in the relationship. Macneil's (1980) classic description of relational contracting norms presents one situation where, when parties have developed a unique close management structure, norms are akin to those of "mini-societies", or "mini-states". This is a powerful position for collaboration innovation to prosper. It is likely to produce solutions much richer than either party acting alone or as a dominant actor. Firms cede power to the relationship but create added joint value. Most organisations have different values and cultures so merging these for collaboration isn't easy. Communication is the driver of integration as it involves understanding of difference and a dialogue on what the partnership can deliver.

15.4 Mechanisms for Effective Communication in Collaborative Innovation

15.4.1 Interpersonal Modes of Communication and Affiliation

From Table 15.1 the authors are proposing that for the successful management of collaborative innovation, a relational communication strategy will have among its mechanisms frequent face-to-face interactions and affiliative interpersonal relationships.

Daft and Lengel (1984) developed a communication model utilising media richness as its framework. They suggested that face-to-face medium usage is the richest due to immediate feedback and ability to read the other person's expressions. It has been found to be important in new product development but, crucially, when combined with a strong relationship can differentiate success (Ganesan et al. 2005). The type of relationship needed is well described in Burgoon and Hale's topoi of affiliate interpersonal behaviours. The collaborating partner could be considered as a friend or as having a rare working relationship. In an IOR, boundary spanners perform key roles in the continued maintenance of affiliate interpersonal relationships.

Inter-functional integration within organisations and interorganisational integration between members within a network is critical to integrated decision making in innovation. Partners must integrate and cooperate to manage the complexity arising from an ever changing external environment. Traditionally, the salesperson/buyer performed this role, but this has long since proved inadequate to embrace the necessary skills to ensure successful communication and, ultimately, successful NPD. Part of the problem is the different culture and language spoken between engineers, accountants and marketers who have different backgrounds, knowledge and experience. Indeed engineers may prefer to speak with their counterparts in other organisations rather than functional colleagues in their own organisation. One

solution is the business development manager whose role is to coordinate company resources behind customer solutions and this requires new skills and abilities not found in the traditional role of the salesperson. This new breed requires an understanding that the boundary spanning exchange role involves human interaction and focal to human interaction is communication. Numerous authors (Biemans 1992: Markham and Griffin 1998; Walter and Gemunden 2000) refer to those individuals who are capable of marshalling support, overcoming obstacles and virtually pulling the development project to completion by their sheer will and energy, as product champions, mentors or relationship promoters. These individuals are characterised by energy and passion and will act as the driving force behind the collaboration (Walter and Gemunden 2000). Collaborative innovation requires champions in both organisations to push on and continue to have faith when all around them lose it. They become the arbitrators and architects of communication when all else fails. Lynch and O'Toole (2008), in a case study on collaborative innovation between a food manufacturer and its packaging partner, found the IOR tied together by the strong bonds of friendship and trust between two key boundary spanners – the engineering manager in the food manufacturer and the technical director in the packaging supplier. The case revolved around a problem with wastage caused by the sealing layer in the packaging – when subsequent innovations failed to solve the problem, it was the affiliative relationship between the boundary spanners that got it across the line and eventually produced a solution that was not only beneficial to both partners but also had other market place applications.

We are proposing that personal modes of communication as practiced by a business development manager or other boundary spanners and interaction are ideal mechanisms for collaborative innovation. Face-to-face communication works as the best medium for transmitting complex information and for problem solving in innovation. Interpersonal communication and face-to-face media are most associated with collaborative, people-centred forms of knowledge creation which uses interorganisational talent to its optimum. All other modes of communication are also relevant but it is a matter of emphasis. Interpersonal modes, especially, face-to-face will be prominent in collaborative innovation.

15.4.2 Loose Teams

The authors are proposing that for the successful management of collaborative innovation, part of the mechanisms of a relational communication strategy include loose interorganisational teams.

Communication in collaborative innovation is supported by looser structures; ones that are not over-regulated. In the type of open system we describe in this chapter, the people on both sides of the relationship are basically self-governed. The teams are made up of those that need to be there. They are not devoid of politics but

can resolve problems through the goodwill and interdependence characteristics of the relationship.

Teams that are formulated to solve new product development problems are common. The issues in getting such teams to cooperate together within an organisation and its units are well documented. Often previous ties and personal relationships can inhibit the flow of information in organisational settings. There are many people articulating the need for more open teams to mirror what is happening in, for example, the open source software development movement so as to capture ideas at the boundaries and to involve more people in the hope of getting richer solutions (Tapscott and Williams 2006). Given this background, the creation of teams to solve IORs' NPD projects might seem a daunting managerial task. The creation of fluid structures can only emerge where a relational communication strategy is pursued. In business-to-business relationships, partners can respond to a problem and solve it; in parallel a whole host of related solutions can emerge to provide further quality and cost savings. This mode of development only thrives where loose structures can be put in place, resources found, and the contacts across the organisation brought together to solve the problem. The opposite – more planned product, process, technology, or management improvements – will be targeted through review, but can form a similar structure for optimal solutions to develop and grow. Loose team approaches seem impossible to manage, but their beauty is their self-governance. They only last as long as they need to and dissolve again once the problem is solved. The process, even when conflictual, can deepen the relationship. The self-governing nature of these types of interorganisational teams puts no barrier in the way of information exchange and communication and, as such, is ideal for collaborative innovation – the best ideas will surface where people are given the freedom to act and engage creatively with others.

15.4.3 Electronic Virtual Communities and Open Information Repositories

We are proposing that for the successful management of collaborative innovation, another major mechanism of our relational communication strategy is electronic virtual communities and open information repositories.

Virtual communities link individuals, teams and organisations who share common interests using electronic media. As such, they form a community of interest rather than the more permanent community of practice described below. The use of electronic media to create knowledge sharing platforms for innovation or as a resource to draw from in the case of an information repository cannot be underestimated. Contractor and Monge (2002) found that, in organisations where information repositories existed, it increased the flow of information as people where able to draw on the expert or source of particular pieces of knowledge. The range of electronic tools for information exchange is extensive; as a communication

mechanism for collaborative innovation, its usage is for the creation and maintenance of dialogue across organisations.

Buyer–supplier relationships with high degrees of involvement in collaborative innovation are often proximate and will have people and other resources in each others' plants and premises. This interchange will be relatively fluid during project development. Direct face-to-face contact will be complemented by other forms of communication including traditional electronic forms of communication such as e-mail and mobile telephony message exchange, and using information generated in information systems controlled by either party for production, supply and logistics. It is not always possible to enjoy the face-to-face contact given the geographic separation of many businesses which is where virtual communities and information repositories can be used as a supplement to other mechanisms of communication.

The reduction in cost of Internet connection and the possibility of video conferencing across the Net enables a virtual face-to-face communication channel. Online communities are present in many markets and across many services and products. Their use in certain innovation settings is prevalent, for example, the open source software community is one practical exemplar of a virtual community of practice. In business-to-consumer markets, companies have tried to use the Web to engage customers more actively in new product development and demonstrate the impact of their inputs. The potential for business-to-business virtual communities of innovation is growing from the sharing of information through interorganisational information systems. Huge ranges of technical and process information is now shared on-line. This enables design and engineering problems to be discussed and options shared on-line. In a collaborative setting, virtual communities can be doing this on a continuous basis. Sharing technical and other information can also occur through an information repository. Information repositories are becoming more a feature of business-to-business exchanges having started as internal systems in complex service organisations, like consultancies, which had a need to share methodologies and previous projects with everyone inside their organisation. Shared information in this way can create a historical record of what was tried in the past and reflect on the lessons learned, thus strengthening the embedded problem solving capability between the partners.

15.4.4 Interorganisational Communities of Practice

The final mechanism of our relational communication strategy proposed by the authors to impact on successful collaborative innovation is interorganisational communities of practice.

A community of practice is a group of people who engage with each other over a sustained period of time to develop a skill or area of knowledge through collaboration, conversation, and exchange; indeed, Brown and Duguid (2001) have argued that tacit knowledge is often transferred through direct interaction within a community of practice environment.

Its members take stewardship for the learning of newcomers and of the development of the subject matter itself. In successful collaborative innovation, partners have built up an interorganisational community of practice which has shared resources, developed problem solving routines and has learned together. This community is linked to many others to which members are part of, thus widening out the network resources available to the partners.

In effect, communities of practice can connect organisations to the outside world. Without this connection, IORs can suffer from insularity and block out information and communication that is inconsistent with their views and, in this way, could actually stymie creativity (Burt 2004). One external community that organisational members are part of is their professional body which, by definition, can link knowledge workers on a global basis. Many knowledge workers are required to be members of a professional body which are in themselves communities of practice but of course the self sustained community of practice such as that among a group of research and development managers or engineers in a particular field is often much richer in terms of information exchange and knowledge creation. These networks are essential to new ideas but also may bring in outside knowledge to a collaborative innovation project. Communities of practice created by interfirm connections are more formalised in that they arise from a formal structure but are sustained on the same basis as regular communities of practice. An interfirm community of practice might be a group of engineers across different tiers in the supply chain and their counterparts in the buying organisation. These communities, in a collaborative system, bring hidden solutions and creativity which could not be accessed or planned through any other communication mechanism. On a dyadic level, interaction of this type is routinized in long evolved mutual cooperation between like minded individuals. Communities of practice as nodes in a wider network and those directly involved in a particular collaborative project are essential portals to connected worlds which bring a multiple of actors directly and indirectly to a problem situation. The attraction of collaborative innovation, albeit a rare form of innovation as implied in the definition of this chapter, is that it inherently avoids many of the risks associated with information asymmetries in such communities.

The authors and colleagues (Kelliher et al. 2009; Bugge et al. 2010; McGrath and O'Toole 2010) have been engaged in using their university to create knowledge networks which, in part, share a collaborative innovation objective across a range of businesses in tourism and small-to-medium sized enterprises (SMEs). Using the university as a hub for knowledge exchange, learning communities are developed into communities of practice which have been engaged to share ideas, solve business problems, create opportunities and promote innovation. On the innovation side, the main impact has been in service innovation in the tourism sector such as in joint marketing and bundled products and services, and in the SME arena, access to innovation resources through the networks created and to collaborative partners. Creating "live" communities of practice, and developing skills in knowledge creation and sharing in enterprises with a predominantly independent mindset, has added value to the participants and created sustained innovation after the

university-led knowledge exchange initiatives ended. The university is now an invited innovation partner by some of the past participants in its created communities. Communities of practice as mechanisms to foster innovation can work and can be nurtured.

15.5 Conclusion

The features and mechanisms of our relational communication strategy are often overlooked in collaborative innovation because they are taken for granted. The aim of this chapter was to match the work done on relational communication with collaborative innovation; it begins to answer the question as to what type of relational communication strategy is appropriate for successful collaborative innovation. It borrows from work done on communication in closely coupled, mutually-oriented relationships and applies it to innovation. Features and mechanisms for communication in collaborative innovation projects are sketched out in some detail in the chapter. Whilst these will need empirical testing, they follow from case work by the authors and case evidence from extant research literature. Managers should be aware of the potential effect communication can have on an innovation project. Successful collaborative innovation can only flourish if the communication culture and climate is open and shared between the partners. The features and mechanisms of a relational communication strategy in this chapter provide the toolkit to enable it to happen.

Bibliography

Andersen, P. H. & Drejer, I. (2009). Together we share? Competitive and collaborative supplier interests in product development. *Technovation*, *29*(10), 690–703.

Athaide, G. & Klink, R. R. (2009). Managing seller-buyer relationships during new product development. *Journal of Product Innovation Management*, *26*(5), 566–577.

Barnett, G. A. (1998). Communication and organizational culture, Chapter 6. In G. M. Goldhaber, & G. A. France (Eds.), *Handbook of Organizational Communication* (pp. 101–141). France: Lavoisier.

Barry, B. & Crant, J. M. (2000). Dyadic communication relationships in organizations: An attribution/expectancy approach. *Organization Science, 11*(6), 648–664.

Biemans, W. (1992). *Managing Innovation Within Network*. London: Routledge.

Brown, J. S. & Duguid, P. (2001). Knowledge and organization: A social-practice perspective. *Organization Science*, *12*(2), 198–213.

Bugge, K-E., O'Gorman, B., Hill, I., & Welter, F. (2010). Regional sustainability, innovation and welfare through an Adaptive Process Model. In J. Sarkis, J. J. Cordeiro, & D. Vazquez Brust (Eds.), *Facilitating Sustainable Innovation through Collaboration* (pp. 77–96). Netherlands: Springer.

Burgoon, J. K. & Hale, J. L. (1984). The fundamental topoi of relational communication. C*ommunication Monographs*, *51*, 193–214.

Burt, R. S. (2004). Structural holes and good ideas. *The American Journal of Sociology, 110*(2), 349–399.

Bush, A. A. & Tiwana, A. (2005). Designing sticky knowledge networks. *Communications of the ACM, 48*(5), 67–71.

Chesbrough, H. W. & Appleyard, M. M. (2007). Open innovation and strategy. *California Management Review*, *50*(1), 57–76.

Contractor, N. S. & Monge, P. R. (2002). Managing knowledge networks. *Management Communication* Quarterly, *16*(2), 249–258.

Daft, R. L. & Lengel, R. H. (1984). Information richness: A new approach to managerial behavior and organization design. In B. Staw, & L. L. Cummings (Eds.), *Research in Organizational Behaviour* (pp. 191–233). Greenwich: JAI.

Daft, R. L. & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, *32*(5), 554–571.

Duncan, T. & Moriarty, S. E. (1998). A communication-based marketing model for managing relationships. *Journal of Marketing*, *62*(2), 1–13.

Fliess, S. & Becker, U. (2006). Supplier integration – controlling of co-development processes. *Industrial Marketing Management*, *35*(1), 28–44.

Ganesan, S., Malter, A. J., & Rindfleisch, A. (2005). Does distance still matter? Geographic proximity and new product development. *Journal of Marketing*, *69*(4), 44–60.

Håkansson, H. & Eriksson, A. K. (1993). Getting innovations out of supplier networks. *Journal of Business-to-Business Marketing*, *1*(3), 3–34.

Hansen, M. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organizational subunits. *Administrative Science Quarterly, 44*(1), 83–111.

Hansen, M. T., Mors, M. L., & Løvås, B. (2005). Knowledge sharing in organizations: Multiple networks, multiple phases. *Academy of Management Journal*, *48*(5), 776–793.

Hatch, M. J. (1993). The dynamics of organizational culture. *Academy of Management Review*, *18*(4), 657–693.

Hillebrand, B. & Biemans, W. G. (2004). Links between internal and external cooperation in product development: An exploratory study. *Journal of Product Innovation Management*, *21*(2), 110–122.

Holden, M. T. & O'Toole, T. (2004a). A quantitative exploration of communication's role in determining the governance of manufacturer-retailer relationships. *Industrial Marketing Management*, *33*(6), 539–548.

Holden, M. T. & O'Toole, T. (2004b). Affirming communication's primary role in a manufacturer-retailer context. *Journal of Marketing Management*, *20*(9/10), 1047–1073.

Homans, G. C. (1958). Social behavior as exchange. *American Journal of Sociology*, *63*(6), 597–606.

Jablin, F. M. (1979). Superior-subordinate communication: The state of the art. *Psychological Bulletin*, *86*, 1201–1222.

Johnsen, T. E. (2009). Supplier involvement in new product development and innovation: Taking stock and looking to the future. *Journal of Purchasing & Supply Management*, *15*(3), 187–197.

Kelliher, F., Foley, A., & Frampton, A. M. (2009). Facilitating small firm learning networks in the Irish tourism sector. *Tourism & Hospitality Research*, *9*(1), 80–95.

Krone, K. J., Jablin, F. M., & Putnam, L. L. (1987). Communication theory and organizational communication: Multiple perspectives. In F. M. Jablin, L. L. Putnam, K. H. Roberts, & L. W. Porter (Eds.), *Handbook of Organizational Communication* (pp. 18–40). Newbury Park: Sage.

Lynch, P. & O'Toole, T. (2008). Managing relationships for innovation in the food industry. In J. A. Cunningham, & D. G. Harrington (Eds.), *Irish Management 2.0, New Managerial Priorities in a Changing Economy* (pp. 249–268). Dublin: Blackhall.

Macneil, I. (1980). *The New Social Contract*. New Haven: Yale.

Markham, S. K. & Griffin, A. (1998). The breakfast of champions: Associations between champions and product development environments, practices and performance. *Journal of Product Innovation Management*, *15*(5), 436–454.

McGrath, H. & O'Toole, T. (2010). The potential and challenge of the network realisation capability for SMEs in Ireland and Finland. *Journal of Business Market Management, 4*(1), 27–49.

Mohr, J. J. & Nevin, J. R. (1990). Communication strategies in marketing channels: A theoretical perspective. *Journal of Marketing*, *54*(4), 36–51.

Mohr, J. J. & Spekman, R. E. (1994). Characteristics of partnership success: partnership attributes, communication behavior, and conflict resolution techniques. *Strategic Management Journal*, *15*(2), 135–152.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, *5*(1), 14–37

Pawar, S. & Sharifi, S. (2002). Virtually co-located product design teams: Sharing teaming experiences after the event? *International Journal of Operations & Production Management*, *22*(5), 656–679.

Stohl, C. & Redding, W. C. (1987). Messages and message exchange processes. In F. M. Jablin, L. L. Putnam, K. H. Roberts, & L. W. Porter (Eds.), *Handbook of Organizational Communication* (pp. 451–502). Newbury Park: Sage.

Stump, R. L., Athaide, G. A., & Joshi, A. W. (2002). Managing seller-buyer new product development relationships for customized products: A contingency model based on transaction cost analysis and empirical test. *Journal of Product Innovation Management*, *19*(6), 439–454.

Tagliaventi, M. R. & Mattarelli, E. (2006). The role of networks of practice, value sharing, and operational proximity in knowledge flows between professional groups. *Human Relations*, *59*(3), 291–319.

Takeishi, A. (2001). Bridging inter- and intra-firm boundaries: Management of supplier involvement in automobile product development. *Management Journal, 22*(5), 403–433.

Tapscott, D. & Williams, A. D. (2006). *Wikinomics*. London: Atlantic Books.

Uzzi, B. & Lancaster, R. (2003). Relational embeddedness and learning: The case of bank loan managers and their clients. *Management Science*, *49*(4), 383–399.

van Echtelt, F. E. A., Wynstra, F., van Weele, A. J., & Duysters, G. (2008). Managing supplier involvement in new product development: A multiple-case study. *Journal of Product Innovation Management*, *25*(2), 180–201.

Volkswagen (2009) Group Strategy 2018. Retreived 22.10.2009 from http://www.volkswagenag.com/vwag/vwcorp/content/en/thegroup/strategy.html

von Hippel, E. (1988). *The Sources of Innovation*. New York: Oxford University Press.

von Hippel, E. (1994). "Sticky information" and the locus of problem solving: Implications for innovation. *Management Science, 40*(4), 429–439.

von Hippel, E. (2005). *Democratizing Innovation*. Cambridge, Massachusetts: MIT Press.

Walter, A. & Gemunden, H. G. (2000). Bridging the gap between suppliers and customers through relationship promoters: Theoretical considerations and empirical results. *The Journal of Business & Industrial Marketing*, *15*(2/3), 86–105.

Chapter 16
Strategic Planning for Communication of Innovation: Crowdsourcing as Social Capital

Sherry Devereaux Ferguson

Contents

16.1 Introduction

Mired in an economic recession of yet unknown parameters, organizations face an unpredictable future. In an environment where the old paradigms have failed, innovation acquires a high value and the technologies undergirding innovation become critical organizational resources. By the same reasoning, the users of Facebook, Twitter, Skype, blogs, wikis, Second Life, YouTube, Flickr, mobile technologies, LinkedIn, and other sharing platforms constitute the social capital of an information society (Bourdieu 1986; Coleman 1988; Frank et al. 2004). Yet many organizations (especially large firms and governments) fear the consequences of integrating these technologies and audiences into their operations. This chapter will argue that, in 2010, the technologies best capable of supporting an innovative economy are open source in nature; the most valuable organizational asset is social capital; and strategic planning for communication of innovation must reflect the character of audiences fashioned by social media.

S.D. Ferguson
Department of Communication, University of Ottawa, 554 King Edward Avenue, Ottawa, ON, Canada K1N 6N5
e-mail: sherry.ferguson@uottawa.ca

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_16,

Fostering and sharing creative insights through group interactions (i.e., open source approaches) have a long history in the social sciences in the form of activities such as brainstorming, synectics, and lateral thinking. In the same way, businesses have long relied on Delphi techniques for extracting knowledge from expert populations and nominal group techniques for pulling information from lower levels of the organization (Ferguson and Ferguson 1988). In the late 1980s, former General Electric President Jack Welch instituted "Work-Outs" (akin to New England town hall meetings) with employees, designed to elicit solutions to organizational problems (Krames 2002). Social media, however, operate in an entirely different dimension as regards quantity of contributions, the uncontrolled nature of the input, and the often anonymous and voluntary nature of the sources – the essence of a phenomenon called *crowdsourcing* (Hudson-Smith et al. 2009).

The term *crowdsourcing* (coined in 2006 by *Wired* magazine contributing editor Jeff Howe 2008) refers to open source methods of data creation where large groups of users generate content that is shared. In some cases, the organization makes a deliberate effort through an open call to outsource a task to a community or group (Ekins and Williams 2010; Tapscott and Williams 2006); in other cases, the content appears spontaneously in the form of videos, blogs, wikis, or other sharing platforms, with no centralized control. In the context of innovation, crowdsourcing (a mega trend according to experts) implies "opening the door to allow more people – your customers, your employees or the public at large – into your innovation process to help improve your products, services, Web site or marketing efforts with the idea that two heads – or 2,000 or 20,000 – are better than one" (Sullivan 2010). Some scholars (e.g., Hudson-Smith et al. 2009) distinguish between *crowdsourcing* (lack of centralized control) and *crowdcasting* (centralized control); most do not make this distinction.

This chapter takes a communication perspective by focusing on the question "What are the strategic considerations in using crowdsourcing as a tool in innovating organizations?" To respond to this question, I examine the growing use of social media by individuals and organizations, explore seven characteristics of audiences that should be taken into account in planning for communication of innovations, suggest theories that support a user orientation, and identify the perceived barriers to the use of crowdsourcing as a tool in innovating organizations.

16.2 Proliferation of Social Media, Open Source Organizations, and Audience-Based Approaches

16.2.1 Proliferation of Social Media

The Web 2.0 phenomenon, first named by Tim Reilly in 2005 (Everitt and Mills 2009) has occurred in a highly compressed period of time. Pew Internet reports that the number of users with a social networking profile has quadrupled over a 4 year

period (Patton 2009). BBC statistics (2010) suggest that 450,000 new blogs appear each day. By June 2007, YouTube was drawing about 10% of all Internet traffic (Huberman et al. 2009); the statistics would be significantly higher in 2010. The International Association of Business Communicators (IABC) reported in 2008 that 50% of their responding members employ video-sharing media such as YouTube (Williams and Williams). At last count, LinkedIn had more than 55 million members (Baker 2010). In November 2009, Facebook reported 300 million active users, MySpace 125 million members, and Twitter more than 27 million members (Patton 2009). About three million were active tweeters, a number that represented a 1,382% increase over the previous year (Rose 2009). Constantly in flux, these statistics change minute by minute in an upward direction.

The likelihood that social media will further extend their influence into all areas of our lives (business, interpersonal, health, and other) drives the present need to understand the potential and risks of the new technologies. To illustrate the rapidly growing academic and professional interest in the topic, 1,330 of the 1,503 articles referenced under *social media* and catalogued in the Arts and Humanities Index have appeared since 2009; 2,770 of the 3,955 articles referenced in the Social Sciences Index have appeared in the same 2-year period.[1] These articles cover a wide range of subjects and disciplines. Because of the rapidly gathering interest in social media and the time lag in publishing academic works, many of the most current figures and insights related to usage appear in trade publications.

16.2.2 From Learning to Open Source Organizations

When we talk about communication of innovations, we are not just talking about the distribution and conveying of information to publics – the approach taken in early innovation studies that portrayed "adopters" as passive recipients, who could choose to act or not act on the information. One of the most popular early models – the Innovation-Decision Process, for example – involves five steps: knowledge, persuasion, decision, implementation, and confirmation (Rogers 1995) – none of which require an active contribution to the direction of change. According to Haider and Kreps (2004), over 5,000 articles focusing on the distribution process had been published by the 40th anniversary of diffusion research.

By the late 1980s, however, alternative perspectives had also entered the innovation literature with talk of "boundaryless" and "learning" organizations – organizations with no clearly defined boundaries that engage in an ongoing quest for knowledge, value experimentation and improvisation, encourage critical thinking and risk-taking, tolerate mistakes, and value impermanence. According to Redding and Catalanello (1994), the above characteristics enable the organization

[1]Scholars Portal, accessed on May 23, 2010.

to innovate sufficiently fast to survive and prosper in a rapidly changing environment. The concept of the learning organization can be traced back to the double-loop learning advocated by Argyris and Schön (1974).

So the movement in the direction of open source practices such as crowdsourcing did not come from a conceptual vacuum. In fact, their main forerunner was open systems theory, which continues to influence scholarship across the spectrum of the social and physical sciences. Open innovation and open source approaches confirm the viability of the open systems model and the "boundaryless" organization, which is said to be characterized by speed, flexibility, and innovation. Although social media have further collapsed the boundaries between organizations and their publics and between content and technology, the trend originated years earlier.

In entering the discussion of communication of innovations, is useful to recognize that *innovation* as a term comes with different definitions in different disciplines and different contexts – sometimes implying products, at other times processes. Sometimes the term suggests recent developments; at other times, it implies new awareness of existing developments. In the same way, adoption of an innovation has a range of meanings, which can relate to individuals or organizations. In terms of corporate or business entities, the concept of adoption can imply full-scale adoption, contracting out the development of an innovation, or purchasing another company with the required innovative skills (Rye and Kimberly 2007). In other words, any discussion of communication of innovations can have a range of interpretations and implications.

16.2.3 Audience-Based Approaches to Planning for Innovations

Both academics and practitioners agree that strategic planning is necessary for the successful integration of new technologies into a corporate vision (Nambisan and Sawhney 2010; Barnes 2010; Sullivan 2010). They also agree communicators have a significant role to play in these strategic processes. The communicator looks for ways to support the corporate mission, mandate, and objectives through the framing of communication goals, messages, strategies, and tactics. The various parts of the strategic communication plan flow from the analysis of audience needs and expectations. In the context of this discussion, the term *audiences* will refer to employees, as well as external publics, as social capital resides in both groups. The term *social capital* refers to the value (economic or otherwise) that resides in social relationships and networks (Putnam 2002).

Following World War II, communication studies moved from an emphasis on the communicator as sender (e.g., Hovland et al. 1953) in the direction of communicator as builder of social relationships (e.g., Grunig 1992). The evolved communication models saw senders and receivers as constantly exchanging roles, with audience research becoming a dedicated area of study for many scholars. The

Aristotelian model, which depicted communication flow as one-way and linear, fell into disuse. The new models saw audiences as culturally diverse, active, and individualistic in their responses. The limited effects and two flow models of opinion leadership, which stressed human agency, replaced the hypodermic needle model, which saw audiences as passive and highly susceptible to persuasion (Lazarsfeld et al. 1968). Talk of *the public* yielded to discussion of *publics*. Uses and gratifications theory (Katz et al. 1974; McQuail 1983) attributed even higher levels of initiative to audiences. This theory argues that audiences actively select media that meet their need for information, entertainment, social interaction, and recognition, among others. The development of social media has further changed and elevated the status of audiences. Thus, this third section of the chapter seeks to identify how social media have influenced the character of twenty-first century audiences and established their status as significant sources of social capital in an information society. More specifically, I will examine seven trends with the potential to impact upon strategic communication planning for innovation.

First, the dominant characteristic of all social media is their potential for – and encouragement of – audience participation. An audience member climbs onstage at a Bourbon Street establishment to become a part of the entertainment. Contestants on *American Idol* and *Dancing with the Stars* plead for audience votes that will enable them to continue in the competition. CNN and Deutsche Well invite and publish feedback on online news articles generated by staff members. Artists gain acclaim on the basis of number of YouTube views. Court TV shows and crime stopper infomercials invite questions and feedback from viewers. Citizen journalists and I-reporters publish photographs of tsunamis, tornados, and volcano eruptions; and British Petroleum (BP) asks audiences to submit solutions to the massive oil spill off the Gulf Coast. In short, the boundaries between senders and receivers of messages and content and technology have becoming increasingly blurred as audiences demand an active, participative role in the communication process. In the late 1970s, my husband and I co-authored an article titled "Analogue Man: Engagement without Commitment" (Ferguson and Ferguson 1978). This article described television as an analogue medium that involved one-way linear transmission of information to a largely passive audience. If I were to write on the same subject today, the title would be "Digital (Wo)Man: Engagement *with* Commitment."

Recognizing the new user-generated and reflexive technoculture (Han 2010), *Time* magazine named "You" the "Person of the Year" in 2006. Citing Lev Grossman, author of the article accompanying the *Time* cover, Han explains that "the Internet that has allowed "You" to win the recognition . . . does not resemble the Internet of the 1990s dot-com boom nor the ARPANET developed by the U.S. Department of Defence 20 years before that" (pp. 200–201). In other words, Web 2.0 is a radical innovation in itself, leaving disruptive change in its wake but creating an environment for "radical inclusion" (Han 2010, p. 201). This inclusiveness achieves the status of imperative when one considers the loss of corporate memory and expertise that accompanies the ongoing exodus of employees

to other organizations. A dominant characteristic of today's workforce is its transience, which leaves a footprint that may be better known to long-term consultants, customers, and other outsiders than to impermanent employees and managers.[2]

Second, social media have encouraged audiences to become active seekers of information. An orthopedic patient arrives at the surgeon's office, armed with information on the latest procedure for resurfacing the hip joint.[3] Potential buyers turn to online reviews in researching the latest innovations in hybrid cars. Interested individuals go to *Britannica Online* to learn more about recent developments in DNA research. The increasing fragmentation and difficulty of using mass media to reach twenty-first century audiences is a well-established finding in communication research. In fact, Webster (2006) notes that "audience fragmentation is more advanced than is generally recognized" (p. 1). For that reason, the potential in open source policies that allow audiences to seek out the organization should not be ignored.

This trend toward empowered information seekers extends into the business domain, where consumers research and critique the latest business products and services (Antikainen and Väätäjä 2010) and where new age capital resides in people, not in material goods:

> An inherent tension that plagues knowledge utilisation research is the fuzzy, informal and context-dependent nature of much of the knowledge associated with organizational innovations. This knowledge . . . is not easily transferable because it is often embodied as know-how or practical wisdom in the person or organization that has it (a phenomenon known as "stickiness") (von Hippel 1991, cited in Greenhalgh, et al. 2005, p. 426).

Third, social media have encouraged a critical mindset in audiences. Users have come to expect a feedback option with every communication. So the possibility to provide critiques of people, organizations, and ideas appears across the spectrum – in online journalism, Twitter, blogs, TV news and entertainment features, and print media. Whereas the top-down flow of information, dominating the years preceding the development of satellite TV, nurtured a mindset that did not encourage criticism of authority figures in organizations or government, the current flow of information in every direction (upward, sideways, and downward) encourages people to express their points of view and to challenge authority. Even a cursory look at feedback links confirms the critical and cynical nature of much of this feedback (Rice 2010). As a consequence, many organizations have instituted a policy of pulling

[2]With the death of the paternalistic model in the 1970s, the massive layoffs due to the economy in the 1980s, and the vacating of many upper level positions as baby boomers leave the workforce en masse, many employees have shifted their perspectives and their loyalties to accommodate the new realities. And with the loss of each person, the experience, expertise, and corporate memory walks out the door. Ideas deemed "innovative" to the new generation of employees may have a long (and sometimes dismal) history in the organization; however, no one knows that the ideas were ever tried and ultimately discarded.

[3]See authors such as Lo and Parham 2010, and Hesse et al. 2005, for a discussion of this trend in health communication.

objectionable comments from the dialogue. Some kinds of software allow users to bring unacceptable responses to the attention of the host organization. The struggle of countries such as China to maintain control over social media has led to even stronger policies and practices, such as the demand to censor access points on foreign search engines. As a consequence, Google recently withdrew services from that country. As illustrated above, the censorship may be initiated at the point of the user, the host organization, or even a national entity.

Fourth, social media draw audiences who seek attention and recognition. As one blogger noted, "There's not a lot I won't put on there" because "I love to be the center of attention" (Miller and Shepherd, n.d.). Some studies have demonstrated that audiences stop using sites that fail to acknowledge their presence (Huberman et al. 2009). For that reason, organizations offer a variety of monetary and non-monetary rewards to motivate users to participate in open innovation communities. Common non-monetary techniques include allotting points for valued contributions, listing top innovators on the websites, acknowledging the most active members, and introducing active community members (Antikainen and Väätäjä 2010). People are often willing to forego financial gain to obtain notice (Huberman et al. 2009).

Fifth, social media encourage audiences to disclose freely, and audiences expect similar levels of openness and transparency in others. High levels of personal disclosure on Facebook, blogs, and websites such as Postsecret.com have created a generation of consumers who expect the same high levels of disclosure from others, including celebrities, politicians, and corporate leaders (Miller and Shepherd, n.d.). In the last several years, a number of American and Canadian politicians and generals have resigned from public office after having affairs exposed in the national media and widely discussed on social media. Facing demands for accountability, Tiger Woods held two press conferences in the spring 2010 to apologize for his extramarital affairs to family, supporters, and a largely anonymous public; and Sandra Bullock's former husband Jesse James went on national television to acknowledge his affair with stripper "Bombshell Magee."

The new level of interconnectedness, offered by social media, has nurtured a culture of voyeurism and incursions into the lives of others. More importantly for organizations, however, the connections do not stop with the personal. Publics expect corporate entities and their leaders to share knowledge and information, including the negative, and to conduct business in the most transparent fashion. In other words, they demand reciprocity: we will share with you, but you must also share with us. As Crescenzo (2010) observed, "Corporate communication – that whitewashed, sterilized, sanitized form of communicating that so many organizations rely on – doesn't really work in the SM space" (p. 11). Like many other ideas, the recognition of the importance of transparency in communication is not a novel concept. Cleveland wrote an article in 1985 titled "The Twilight of Hierarchy: Speculations on the Global Information Society," in which he discussed the leakiness of information and its impact on hierarchy. In 1988, Ferguson and Ferguson

discussed the futility of talking about organizational boundaries and introduced the simultaneous access model as a replacement for the top-down communication model; and in 2001, former GE President Jack Welch observed:

> *Hierarchy is dead. The organization of the future will be virtually layerless and increasingly boundaryless, a series of information networks in which more electrons and fewer people will manage processes. Information will become transparent. No leader will be able to hoard the facts that once made the corner office so powerful.* (Welch 2001, p. 433)

Sixth, social media have created audiences who expect responses in real time. Instant conversations and instant updates typify interactions on social media. Whereas consumers used to be satisfied with a letter received 3 or 4 weeks after an inquiry, they now expect a response within 24 h of receipt of an email. No place or time is sacred space, and meeting the needs of contemporary audiences means accepting their terms of engagement. Yet few organizations are equipped to handle the demands:

> As traditional business intelligence systems and technology intersect with new systems such as Facebook, Twitter, and Google Wave, a conflict arises between traditional information retrieval and discovery of new information available via newsfeeds, blog articles, short text messages from Twitter users, and user-generated videos posted to sites such as YouTube and Vimeo. Most business intelligence systems are not well-equipped to handle real-time information. The future of real time lies in creating applications that require no searching (Arnold 2009, p. 40).

For governments and organizations that require multiple levels of approval for responses or revelation of information, the problem is serious – and still further aggravated in countries like Canada with requirements for bilingual communications. In speaking of organizational uses of ICTs, Sørnes et al. note: "Given the apparent significance of time in structuring organizational reality, future research should examine more thoroughly the temporal elements that affect members' sensemaking, their communication with one another" (p. 137).

Seventh, social media require a mix of language competencies in audiences, as well as those who seek to communicate to them. Transliteracy is "the ability to read, write and interact across a range of platforms, tools and media from signing and orality through handwriting, print, TV, radio and film, to digital social networks" (Thomas et al. 2007). Twitter demands, for example, that users restrict their messages to 140 words; in response, microbloggers employ a vocabulary of acronyms, abbreviations, and icons to offer brief and to-the-point information to their audiences (DeFebbo et al. 2009). The website blog, on the other hand, encourages a different form of literacy, more akin to the traditional essay or diary. On Instant Messenger, the conversations proceed through the use of multiple and often discontinuous threads. The Social Media Release (SMR), a new public relations tool, provides content to bloggers and other social media users, who may or may not publish or transmit the information to their personal network of friends and acquaintances (Steyn et al. 2010). Even if bloggers choose to share the SMR, they may repackage it or add comments or links to other sources (Bradley 2008).

16.3 Connecting Audiences, Social Media, and Innovation

The proliferation of social media in the new century has fueled the need for a new paradigm to guide innovation studies – one that sees audiences as participative, active, critical, open, attention-seeking and self-aware, time-sensitive, and translit-erate. Some of the theories and concepts relevant to an audience- or user-orientation include open innovation, symbiosis, social constructionism (also social constructiv-ism), sense-making, and reflexive modernity. Others (already mentioned) include open systems theory, uses and gratifications, and social influence models such as opinion leadership. The latter may have new applications in a Web 2.0 world. For example, a recent survey targeted active bloggers "who regularly commented on technology products and services in a B2B environment, news and lifestyles; whose opinions were regarded as influential in those fields; and who were targeted as prominent commentators by PR firms and departments" (Steyn et al. 2010). While the dominant use of such information would seem to be diffusion of information, the bloggers could potentially have useful insights to contribute to the organization. The extent to which these opinion leaders are engaged as contributors may also influence their commitment to diffuse the innovations.

Christensen (1997) described the reasons that "great firms" fail when faced with the disruptive technologies. Unlike sustaining technologies, which involve incre-mental improvement of established technologies, disruptive innovations typically call for new ways of thinking about products, services, and markets. In these circumstances, large firms rarely cope well, as illustrated by the case of social media:

> The socially transformative innovations in information technology such as email, the World-wide Web, Google, e-commerce, Linux, and eBay have emerged not from the traditional powerhouses of IT innovation such as IBM, Intel, Bell Labs, or Microsoft, but from users of their technologies – business innovators, user groups, and communities of practice outside of the original centers of innovation (Bers 2005, p. 3).

Accepting that knowledge no longer resides in a few large organizations, Chesbrough (2003) introduced the term *open innovation*, which stresses the impor-tance of going outside the boundaries of the organization to harvest and – and in some cases – develop or out-license innovative ideas and intellectual property. Open innovation theory assumes that knowledge no longer resides in a few large organizations. According to Christensen and Overdorf (2000), viable options for improving the coping potential of larger firms include creating new structures within the corporation, birthing an independent organization that comes from the parent, or acquiring a new company whose processes and values mesh with the demands of the new task. Symbiotic models build on the open innovation concept (Yang and Shyu 2009; Castiaux 2007).

Social constructionist and social constructivist theories also offer user-oriented ways of thinking about social media and innovation (Berger and Luckmann 1966; Bers 2005). In the spirit of postmodernism, social constructionists argue that media technologies have created the reality in which contemporary society moves; however,

these scholars do not distinguish between developers and users of the technologies. As in the case of the Linux open source movement, the users are also the developers of the technology, and no one person or organization holds the rights to Linux. In this sense, individuals and groups participate in the creation of their perceived social realities. Social constructionists such as Bers (2005) argue that recombining and identifying new social ends for existing products and services should be the emphasis of open-source innovation research. Even if not applied to every organization, this approach would seem to fit well with large companies that experience difficulty in coping with disruptive innovations. A psychologically-based variation of *social constructionism*, *social constructivism* asserts that we create our own social reality through interaction with the media.

In the same way as social constructivism, sense-making models (Weick et al. 2005; Dervin 1992) are concerned with how we reduce uncertainty and make sense out of our experiences. Moved into the organizational sphere, sense-making models incorporate concepts related to attribution of meaning in shared and collaborative contexts. Theories of reflexive modernity propose that, over time, people become more self-aware and reflective. The focus on "YOU" in modern society would seem to validate the presence of reflexivity in contemporary society, along with its relevance for organizations that interact with publics.

Cook (2008) proposed a communication model with applications specific to social media. He said that social media perform four functions of relevance to organizations: communication, cooperation, collaboration, and connection. Some argue the need to hire a social media administrator to coordinate these functions (Bradley 2008).

All of the above models and theories share a focus on audiences – their needs, expectations, and potential to contribute to the collective intelligence through crowdsourcing. In that sense, they have a contribution to make to strategic thinking about the communication of innovations.

16.4 Barriers to the Adoption of Open Source Policies in Organizations

Despite the growing interest in open source theories within the halls of academia, research suggests that few organizations have clear (if any) policies for dealing with social media. A 2007 survey (Zerfass, Sandhu, and Young), involving 1,087 PR practitioners in 22 European countries, found that only one out of every three PR professionals have any involvement with innovation in their companies; and only one in five communication managers considers innovation to be a strategic issue for communicators. *Communication World* reported that only one-third of communicators said their organizations use social media to support two-way communication (Williams and Williams 2008). A Melcrum poll found almost half of 159 communication practitioners admitted to being unclear about the

business case for using social media; the same percentage said they had not yet built a case. However, the 31% who had built a business case used innovation and idea exchange as a justification (Hathi 2010).

Unclear policies also typify the operations of web personnel. A survey by the *Columbia Journalism Review* found that many web editors had no idea of the mission of their websites (Navasky and Lerner 2010). A September 2009 survey by Computerworld found 41% of 120 IT professionals admitted their organizations lack a social media policy (Brandel 2009), as well as the capability to manage user-generated content (Nűscheler and Cochrane 2009).

Barnes (2010) surveyed members of Inc. 500 and Fortune 500 companies to identify the extent to which they had incorporated the new technologies into their operations. The results showed that the Fortune 500 lagged behind the Inc. 500 in podcasting (21% vs. 37%) and (35% vs. 52%). A large number of organizations forbid their employees from using social media (Ranger 2009; Kennedy 2009; Bradley 2008), a situation that will surely need to change with the entry of the millennial generation to the workforce.

Multiple reasons explain the reticence of companies (particularly larger firms) to buy into social media. Many feel threatened by considerations related to security and intellectual property, reputation management, threats to authority, legal concerns, compensation, productivity, merit of information and return on investment, the adequacy of tools for managing open-source contributions, and implementation and integration of the tools into the daily operations of the organization. (See Ranger 2009, for a survey of the literature in this area and for the results of a survey that elicited opinions of Canadian employees and managers on this topic.) These reasons explain – but do not justify – the limited use of social media by innovating organizations.

16.5 Conclusion

Strategic planning for communication of innovations must build on existing knowledge of social media, audiences, and communication and innovation theories. Key words in any formula for success will be *trust*, *respect*, *transparency*, *openness*, *sharing*, *recognition*, and *timeliness*. Little doubt remains that practices such as crowdsourcing will characterize the operations of organizations in the coming years, and those that do not adjust quickly will join the ranks of endangered species.

Bibliography

Antikainen, M. J., & Väätäjä, H. K. (2010). Rewarding in open innovation communities – How to motivate members? *International Journal of Entrepreneurship and Innovation Management, 11*, 440–456.

Argyris, C. & Schön, D. (1974). *Theory in practice: Increasing professional effectiveness*. San Francisco, CA: Jossey-Bass.
Arnold, S. E. (2009). Real-time search: where retrieval and discovery collide. *Online, 33*, 40–41.
Baker, G. (2010). It's networking, but not as you knew it. *NZ Business, 24*, 40–41.
Barnes, N. G. (2010). Tweeting and blogging to the top. *Marketing Research, 22*, 8–13.
Berger, P. L., & Luckmann, T. (1966). *The social construction of reality: A treatise in the sociology of knowledge*. Garden City, NY: Anchor Books.
Bers, J. A. (2005). Contributions of social constructionism to a theory of accelerated radical innovation. Retrieved from http://ari- institute.com/_pdfs/publications/.
Bourdieu, P. (1986). The forms of capital. In J.G. Richardson (Ed.), *Handbook of theory and research for the sociology of education*. New York, NY: Greenwood Press.
Bradley, P. (2008). A selection of social media search engines. *Ariadne, no.57*, 40. Retrieved May 15, 2010 from http://www.ariadne.ac.uk/issue57/search-engines/.
Brandel, M. (2009). Baited and duped on Facebook: how smart companies are protecting employees from scammers and creating usage policies that work. *Computerworld, 43*, 28–33.
Burt, R. S. (1999). The social capital of opinion leaders. *Annals of the American Academy of Political and Social Science, 566*, 37–54.
Carr, J. (2009). Following tweets and sharing reads. *Information Today, 26*, 16.
Castiaux, A. (2007). Radical innovation in established organizations: being a knowledge predator. *Journal of Engineering and Technology Management, 24*, 36–52.
Chesbrough, H. (2003). *Open innovation: The new imperative for creating and profiting from technology*. Boston, MA: Harvard Business School Press.
Christensen, C. M. (1997). *The innovator's dilemma: When new technologies cause great firms to fail*. Cambridge, MA: Harvard Business School Press.
Christensen, C. M., & Overdorf, M. (2000). Meeting the challenge of disruptive change. *Harvard Business Review, 78*, 66–76.
Cleveland, H. (1985). The twilight of hierarchy: speculations on the global information society symposium presentation. *Public Administration Review, 45*, 185–195.
Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, *94*, 95–120.
Cook, N. (2008). *Enterprise 2.0: How social software will change the future of work*. Burlington, VT: Gower Publishing Inc.
Crescenzo, S. (2010). Are you a "social media evangelist" or a communicator? *Communication World, 27*, 10–11.
DeFebbo, D. M., Mihlrad, L., & Strong, M. A. (2009). Microblogging for medical libraries and librarians. *Journal of Electronic Resources in Medical Libraries, 6*, 211–223.
Dervin, B. (1992). From the mind's eye of the user: the sense-making qualitative-quantitative methodology. In J. Glazier & R. Powell (Eds.), *Qualitative research in information management* (pp. 61–84). Englewood, CO: Libraries Unlimited.
Ekins, S., & Williams, A. J. (2010). Reaching out to collaborators: crowdsourcing for pharmaceutical research. *Pharmaceutical Research*, *27*, 393–395.
Everitt, D., & Mills, S. (2009). Cultural anxiety 2.0. *Media, Culture & Society, 31*, 749–768.
Ferguson, S., & Ferguson, S. D. (1978). Analogue man-engagement without commitment. *Canadian Journal of Communication*, 6, 12–18.
Ferguson, S. D., & Ferguson, S. (1988). *Organizational communication* (2nd ed.). New Brunswick, NJ: Transaction Publishers.
Frank, K. A., Zhao, Y., & Borman, K. (2004). Social capital and the diffusion of innovations within organizations: the case of computer technology in schools. *Sociology of Education, 77*, 148–171.
Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., Kyriakidou, O., & Peacock, R. (2005). Storylines of research in diffusion of innovation: a meta-narrative approach to systematic review. *Social Science & Medicine, 61*, 417–430.
Grunig, J. E. (Ed.). (1992). *Excellence in public relations and communication management*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Haider, M., & Kreps, G. L. (2004). Forty years of diffusion of innovations: utility and value in public health. *Journal of Health Communication, 9*, 3–11.
Han, S. (2010). Theorizing new media: reflexivity, knowledge, and the Web 2.0. *Sociological Inquiry, 80*, 200–213.
Hathi, S. (2010). Communicators remain unclear on business case for social media. *Strategic Communication Management*, *14*, 9–10.
Hesse, B. W., Nelson, D. E., Kreps, G. L., Croyle, R. T., Arora, N. K., Rimer, B. K., & Viswanath, K. (2005). Trust and sources of health information: the impact of the internet and its implications for health care providers, findings from the first health information national trends survey. *Archives of Internal Medicine, 165*, 2618–2624.
Hovland, C. I., Janis, I. L., & Kelley, H. H. (1953). *Communication and persuasion*. New Haven, CT: Yale University Press.
Howe, J. (2008). *Crowdsourcing: Why the power of the crowd is driving the future of business*. New York, NY: Crown Business.
Huberman, B. A., Romero, D. M., & Wu, F. (2009). Crowdsourcing, attention and productivity. *Journal of Information Science, 35*, 758–765.
Hudson-Smith, A., Batty, M., Crooks, A., & Milton, R. (2009). Mapping for the masses: accessing Web 2.0 through crowdsourcing. *Social Science Computer Review, 27*, 524–538.
Katz, E., Blumler, J., & Gurevitch, M. (1974). Utilization of mass communication by the individual. In J. G. Blumler & E. Katz (Eds.), *The uses of mass communications: Current perspectives on gratifications research*. Beverly Hills, CA: Sage.
Katz, E., & Lazarsfeld, P.F. (1955). *Personal influence*: *The part played by people in the flow of mass communication*. Glencoe, IL: Free.
Kennedy, S. D. (2009). Social net working. *Information Today, 26*, 15–16.
Krames, J. A. (2002). *The Jack Welch lexicon of leadership*. New York, NY: McGraw-Hill.
Lazarsfeld, P., Berelson, B., & Gaudet, H. (1968). *The people's choice*. New York: Columbia University Press.
Lindley, D. (2009). Managing data. *Communications of the ACM, 52*, 11–13.
Lo, B., & Parham, L. (2010). The impact of Web 2.0 on the doctor-patient relationship. *Journal of Law, Medicine & Ethics, 38*, 17–26.
McCreary, B. (2009). Web collaboration – how it is impacting business. *American Journal of Business, 24*, 7–9.
McQuail, D. (1983). *Mass communication theory*. London: Sage.
Miller, C. R., & Shepherd, D. (n.d.). Blogging as social action: a genre analysis of the webblog. *Into the blogosphere*, online publication of the University of Minnesota. Retrieved from http://blog.lib.umn.edu/blogosphere/blogging_as_social_action.html.
Moon, M. (2009). The new phase of enterprise communications: when content management meets social media – An interview with David Nűscheler and Kevin Cochrane of Day. *Journal of Digital Asset Management, 5*, 298–314.
Nambisan, S., & Sawhney, S. (2010). *The global brain*. Upper Saddle River, NJ: Wharton School Publishing.
Navasky, V., & Lerner, E. (2010). Tangled web. *Columbia Journalism Review, 48*, 45–50.
Nüscheler, D., & Cochrane, K. (2009). The new phase of enterprise communications: When content management meets social media—an interview with David Nüscheler and Kevin Cochrane of Day. *Journal of Digital Asset Management, 5*, 298–314. doi:10.1057/dam.2009.24
Patton, C. (2009). The social networking express. *Professional Safety, 54*, 5.
Putnam, R. D. (Ed.). (2002). *Democracies in flux: The evolution of social capital*. New York, NY: Oxford University Press.
Ranger, J. (2009). *Exploring the potential of social media as organizational communication tools*. Unpublished M.A. thesis, University of Ottawa.
Redding, J. C., & Catalanello, R. F. (1994). *Strategic readiness*. San Francisco, CA: Jossey-Bass.
Rice, D. (2010). Managing your reputation in a viral world. *SDM, 40*, 93–94.
Rogers, E. (1995). *Diffusion of innovations* (4th ed.). New York, NY: Free.

Rose, B. (2009). Much chatter about Twitter. *American Bar Association Journal, 95*, 25–26.
Rye, C. B., & Kimberly, J. R. (2007). The adoption of innovations by provider organizations in health care. *Medical Care Research and Review, 64*, 235–278.
Sørnes, J. -O., Stephens, K. K., Browning, L. D., & Sætre, A. S. (2005). A reflexive model of ICT practices in organizations. *Informing Science Journal*, *8*, 123–142.
Steyn, P., Salehi-Sangari, E., Pitt, L., Parent, M., & Berthon, P. (2010). The social media release as a public relations tool: intentions to use among B2B bloggers. *Public Relations Review*, *36*, 87–89.
Sullivan, E. A. (2010). A group effort: More companies are turning to the wisdom of the crowd to find ways to innovate. *Marketing News, 44*, 23–30.
Tapscott, D., & Williams, A. J. (2006). *Wikinomics: How mass collaboration changes everything*. New York, NY.
Thomas, S., Joseph, C., Laccetti, J., Mason, B., Mills, S., Perril, S., & Pullinger, K. (2007). Transliteracy: crossing divides. *First Monday, 12*. Retrieved May 25, 2010 from http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/2060/1908.
Webster, J. G. (2006). Beneath the veneer of fragmentation: television audience polarization in a multichannel world. *Journal of Communication*, *55*, 366–382.
Weick, K. (1995). *Sensemaking in organizations*. Thousand Oaks, CA: Sage.
Williams, R., & Williams, T. (July-August 2008). Adopting social media: Are we leaders, managers, or followers? *Communication World*, 34–38.
von Hippel, E. (1994). "Sticky information" and the locus for problem-solving: implications for innovation. *Management Science*, *40*, 429–439.
Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization Science, 16*, 409–421.
Welch, J. (2001). *Jack: Straight from the gut*. New York: NY: Warner Books.
Yang, C., & Shyu, J. Z. (2009). A symbiosis dynamic analysis for collaborative R&D in open innovation. *International Journal of Computational Science and Engineering, 5*, 74–84.
Zerfass, A, Sandhu, S., & Young, P. (2007). Euroblog perspectives on social software in communication management: results and implications. Leipzig/Luzern/Sunderland. Retrieved from www.euroblog2007.org/euroblog2007–results.pdf.

Chapter 17
Achieving Market Leadership for Innovation Through Communication

Eric Viardot

Contents

17.1 Introduction

A long catalogue could be filled with the list of firms that introduced an innovation with a superior technology but failed to establish it on the markets. In the lone field of PCs, one may think of Apple, IBM, and Next, who have lost a battle against the so-called Wintel alliance. Similarly, Excite or AltaVista lost to Google as the leading search engine while Palm was defeated by Research in Motion for the first position in the Wireless Mobile Device business. More recently, Amazon has taken over Sony for the leadership position in the e-reader (or e-book device) market.

It is difficult to sell innovations successfully because they are fraught with uncertainties (Klein and Tornatzky 1982), especially at the launching phase. It is never easy to anticipate the market potential of an innovation as many inventions proceed to solve a specific problem but often turn out to have unexpected uses in unexpected conditions. Consider the case of the laser, another major innovation of the twentieth century, which range of uses has expanded in so many directions since its invention. Lasers are used for precision cutting in the textile, metallurgy, and

E. Viardot
EADA – Escuela de Alta Dirección y Administración, C/Aragó, 204, 8011 Barcelona, Spain
e-mail: eviardot@eada.edu

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_17,

composite materials industries as well as in various surgical procedures. They produce high-quality sound in compact disc players, high-quality text and drawings through laser printers, as well as amazing speed in telephone transmissions when they are associated with optical fibers.

Furthermore, very often, the impact of an innovation relies on complementary inventions, which contribute to a full system solution that will add to its performance and, consequently, its demand (Chesbrough and Teece 1996). For instance, Edison's system of incandescent lighting required the simultaneous development of lamps, generators, sockets, and wiring. In the majority of cases the value to a customer of an innovation is a function of the availability of complementary solutions, like software applications for personal computers and now smartphones, or the coverage of the telephone network for a cellular handset.

Another source of uncertainty is that development time for these complementary innovations can fluctuate very significantly. For example, after the dynamo was invented in the early 1880s, electrolytic techniques were created contiguously, giving birth to a prosperous electrochemical industry; but it took more than half a century to see the arrival of the electric motor. Similarly, the transistor and, later, the integrated circuit were introduced into computers years behind their invention to transform the computer industry. Ultimately, the integrated circuit itself became a computer with the advent of the microprocessor in 1970. In the same way, the telephone has existed for more than a 100 years, but only recently has its performance been improved by facsimile transmission, voice mail, conference calls, data transfer, and online services, for example.

However some companies have achieved significant market success with very innovative goods or services. Some of them have even managed to achieve a "winner-takes-all" position. (Frick and Torres 2002) for a given innovative product category; with a market share so important that they are leaving only crumbles for the rest of the players.

Table 17.1 illustrates the dominance of a handful of companies in various innovative product categories. Very often the name of the company is associated with its major successful innovation, even though the company may have diversified in other businesses later. For example, Google is closely related to web search engine as Microsoft is with PC software or Nokia with mobile phones.

Interestingly, it is not always the "most innovative" technology or a "state of the art" innovation which manages to achieve market success. In fact, an analysis of the various case studies shows that all those winning companies rely less on technology than on their willingness to communicate with all the market players and to open the business in order to expand opportunities for other participants.

The proportion of large innovative firms that rely heavily on external support for innovation has increased dramatically in the last few years (Roberts 2001). Various studies have shown the value generating effects of integrating a broad range of external parties which are bringing a large range of resources, skills, as well as technical and commercial competences in the innovation process (Love and Roper 1999; Tether and Tajar 2008). Those participants include:

Table 17.1 Dominant companies in various innovative product categories

Industry	Market share of the dominant players (%)	Names of the dominant players
Operating systems	89	Microsoft
Browser	75	Microsoft
Search engine	54	Google
Personal computer	54	HP, Dell, Acer, Lenovo
Mainframe	90	IBM
Optical disks	50	Sony
Cell phones	72	Nokia, Motorola, Samsung
Smart phones OS	65	Symbian
GPS systems	66	Garmin, TomTom
Digital map	99	Navteq, TeleAtlas
PC microprocessors	93	Intel, AMD
Networks systems (routers)	90	Cisco Systems, Juniper
Custom chips	70	TSMC, UMC
Database software	84	Oracle, IBM, Microsoft
ERP software	41	SAP, Oracle
Mobile service satellite	50	Inmarsat
Satellite launcher	55	Astrium

Source: Annual reports, press release, Reuters, Blooberg, MedAd news, IDC, Gartner group

- The suppliers
- The main customers also called the lead-customers or heavy user
- The competitors
- The universities
- The private research institutes
- The government research organizations
- The "complementors" that provide the product and services around the technology
- The consultants, acting as carriers of the innovation or facilitators to the markets

Other works have underlined that companies relying on heterogeneous external parties have better innovation performance than endocentric companies (Miotti and Sachwald 2003; Nieto and Santamaría 2007). To do so, they communicate massively with all their external partners in order to accelerate the understanding and the adoption of an innovation as well as the development of new usage and applications around it.

In this chapter, we are going to analyze the various methods of communications they are using to beat the uncertainties associated with innovation. The first way is to adopt a "push" communication strategy towards the market players: they share the innovative technology with all the participants by offering compatibility and/or open access. The second approach is to implement a "pull" communication strategy to attract new partners by creating and managing a supportive network in order to promote the innovation in the market. The third way is a combination of the two previous modes where the "push" and "pull" communications are mixed. The fourth technique is to actively publicize the innovation through an aggressive branding. Finally, the fifth avenue is to communicate with the world by going global in order to reach the maximum volume of users of the innovation.

17.2 The "Push" Communication Approach: Compatibility and Open Architecture

As the development of complementary innovations is so often crucial for the market success of an original innovation, one way to accelerate it is to push the innovative technology towards all the participants by making it easily available and compatible so that all those complementary solutions will work well together (Farrell and Saloner 1985).

For instance, in the personal computer industry, compatibility is required to ensure that computers, software, modems, printers, and other peripherals interface easily. Similarly, in the cellular telecommunications market, compatibility demands a common set of technological standards for the design of cellular base stations, digital switches, and handsets to ensure maximum geographical coverage for users. The larger the coverage, the greater the value for customers and the bigger the future demand, leading more customers and other market players to invest in the expansion of the network (Mc Gee et al. 2002).

For instance in the 1990s because there was only one compatible technology, the GSM (Global System for Mobile Communications), backed by more than 900 telecom vendors and operators while there were four different and non compatible technologies in the US. The value for the cellular phone users clearly was much bigger in Europe than in the US and the cellular phone caught up more quickly in Europe than in the US. At the same time, Nokia was able to surf on this mobile phone innovation wave and manage to build a strong market share, in Europe and to run over Motorola.

The ultimate way to be compatible is to make the product architecture widely available for free, so that it can benefit from the value co-creation (sometimes also called user generated content) by the complementors, the customers and any other third party. This has made the success of "open-source" software such as Linux, Apache or Mozilla for instance.

However, open-source is not the ultimate solution as there is always a risk of fragmentation, also known as "forking" in the software industry. Fragmentation occurs when a single software project is split between various development teams which are making increasingly different versions of the original. The most famous example is the multiple versions of the original Unix computer operating system which was developed in the 1970s by AT&T's Bell Labs but is now sold in many different and often incompatible versions, including HP/UX, AIX (IBM), Berkeley BSD, SINIX (Siemens), Solaris (Sun), Inx (Silicon Graphics), etc. Consequently an application developed originally for the Unix market could run only on one of the versions and required a substantial adaptation to run on another version. Such an absence of compatibility has ultimately limited the value of Unix as a market standard for PCs and servers.

One key lesson from this case is that opening the innovation process does not guarantee the full compatibility of an innovation over time. It requires an aggressive stand from a company to make sure that this will happen and will last in order to make the innovation widely available to external parties who will adopt it and fine-tune it.

17.3 The "Pull" Communication Approach: Create and Stimulate a Supportive Network

In order to turn up increasing returns on the adoption rate of an innovation by the market, some companies are pushing it aggressively by the forming of a business net to work together to ensure the success of an innovative product or service. This system generates a positive feedback loop which nurtures an increasing value for an innovation: the addition of more participants to a group creates an incentive for others to join in; thus it provides the necessary momentum and critical installed base to make an innovation successful enough to become a *de facto* standard and wipe out other competitive solutions.

Creating a supportive network can be achieved through distribution and licensing agreement or through partnership and alliance. A prominent example is what Matsushita did in 1975 with the VCR when it licensed its VHS technology to other consumer electronic enterprises including Hitachi, Sharp, Mitsubishi, and Philips NV, and formed an original equipment manufacturer (OEM) agreement with GE, RCA, and Zenith. In doing so, Matsushita put together a big network of firms eager to push the same technological solution to the end-user, while Matsushita continued to compete against these companies in the final market place under the JVC brand name. Consequently, Matsushita managed to win over its main competitor, Sony, whose product was based on a different technology called Betamax and which refused to open its technology to any other players in the market.

Again when Sony started to work on a new optical disk technology for data storage, the company decided not to work alone but to make an alliance to promote its new technology. In 2002, it spearheaded the creation of the "Blu-ray Disc Founder group" with eight other leading electronic companies: Matsushita, Pioneer, Philips, Thomson, LG Electronics, Hitachi, Sharp, and Samsung in order to develop and license this technology. The association renamed "Blu-Ray association" expanded swiftly to more than 250 members coming from consumer electronics, computer hardware, and motion picture production. Six years later, Blu-ray became the *de facto* standard of this category of product when its major competitor the HD-DVD technology by Toshiba exited the market.

In the computer industry Wintel (the alliance of Intel and Microsoft), SAP, or IBM have made and forged an entire ecosystem around their solutions, namely Windows, R/3, and Notes, with application developers, system integrators, trainers, and hardware companies working together to provide solutions to end users. SAP, the leader in ERP software for business-to business applications, has more than 1,500 partners all over the world-which the company describes as the SAP Ecosystem-working with and around its software solutions.

Those companies are dealing mostly with business customers. But in consumers markets, the same route has been adopted by Apple. One reason behind the success of its iPhone, named "Invention of the Year" in 2007 by the Time Magazine, stands in the number of third party applications which have been encouraged by Apple. They are distributed through the "App Store", and developers get a 70% share of the

Table 17.2 Google partnerships since its foundation

Year	Company/organization	Type of relation	Official goal
2001	Yahoo!	Partnership	Become Yahoo's default search provider
	Universo Online (UOL)	Partnership	Search service (for the Brazilian leading online service provider)
2002	AOL	Partnership	Offer Google search and sponsored links to 34 million customers
2004	Libraries of Harvard, Stanford, University of Michigan, Oxford, and New York Public Library	Partnership	Digital scanning
2005	NASA Ames Research Center	Partnerships	Research projects involving large-scale data management, nanotechnology, distributed computing, and the entrepreneurial space industry
	Sun Microsystem	Partnership	Share and distribute each other's technologies
	Time Warner's AOL	Partnership	Enhance each other's video search services
	Websites	Service: "Adsense for Mobile"	Provides the ability to monetize mobile websites through the targeted placement of mobile text ads
2006	News Corp.'s Fox Interactive Media	Agreement US$900 million	Provide search and advertising on the social networking site, myspace
	eBay	Partnership	Advertising partnership
	Adobe	Distribution agreement	Toolbar distribution
	Intuit	Strategic alliance	Offer a variety of Google services to Intuit small business customers
	Dell	Partnership	Install search software on Dell computers
2007	China Mobile	Partnership	Provide CM users with Google mobile search
	Samsung	Collaboration	Put Google products and services on selected Samsung phones
	Salesforce.com	Partnership	Combini on-demand CRM applications with AdWords
	The University of Texas at Austin library and the Princeton University library	Partnership	Library Project: digitize and make available approximately 15 million volumes on line before 2015
	Google, HTC, Intel, Motorola, Qualcomm, Samsung, LG, T-Mobile, Nvidia, Wind River Systems, TI, etc	Open Handset Alliance	Develop an open platform for mobile services called Android.

(*continued*)

Table 17.2 (continued)

Year	Company/organization	Type of relation	Official goal
	NORAD	Sponsorship and partnership	Use of Google Earth to track Santa Claus in 3-D and on YouTube
	IBM	Partnership	Supercomputing initiative so that students can learn to work at Internet scale on computing challenges
2008	Publishers	Partnership	Digitize millions of magazine articles and make them available on Google Book Search

Source: Adapted from Google.com

price of their application. In March 2010, in the US only there were 180,845 applications and 32,183 active publishers listed on the app-store-metrics website.

Another illuminating example is the case of Google. Notwithstanding its numerous acquisitions, Google has also been teaming constantly with various public and private organizations in order to consolidate its leadership position in the search engine industry. Through a mix of distribution agreements, partnerships, and alliances (see Table 17.2), Google aims to make its search engine widely available for all categories of applications.

There are some limits to the pull communication approach when the network of external parties is getting too big and too complex. Recent studies (Laursen and Salter 2006) have shown that too many contributors to a network generate Diminishing returns to innovation performance and adoption. Because of the growing complexity and quantity of interactions, there would be an inverted U-shape between the number of alliances and the rate of new product development (Rothaermel and Deeds 2006).

17.4 Combining the Pull and Push Communication Strategy

A very limited number of proprietary technological innovations have managed to make it big on the market in the last decade, except maybe in industries which rely heavily on patent protection. Successful innovative companies make sure that their innovation is technically compatible with other complementary solutions and fits with existing standards in order to pull new supporters. But in some cases they have to create those standards through a "push" communication and lobbying strategy which stimulates the emergence of networks of market players who are backing the innovation.

Nokia and Google have embraced this approach. In June 2008, Nokia took total control of Symbian, a UK based mobile phone operating system manufacturer with the goal of making its solution the new basis of a fully open mobile software

platform. Symbian was already the leader in mobile operating software with a platform of 200 million users, 10 years of development, and the support of tens of shipping vendors as well as operators. Under Nokia's new ownership, Symbian was relabeled the Symbian Foundation and the company was turned into a nonprofit organization opened to all organizations and independent developers.

The new foundation was backed by a significant number of smart phones manufacturers and telecommunication operators such as Sony Ericsson, Motorola and NTT DoCoMo, AT&T, LG Electronics, Samsung Electronics, STMicroelectronics, Texas Instruments and Vodafone. With this move, Symbian which had already a leading market share of about 60% of the world's smartphone turned the proprietary mobile operating systems from Apple, Research in Motion and Microsoft in the minority.

The Symbian Foundation is battling with the Open Handset Alliance, another open-source business alliance created by Google to back its Android mobile operating system based on Linux. It includes more than 45 members and advocates for the advancing of open standards for mobile devices. Nokia and Google are now going head-to-head to impose their innovative solution to the market but they took two different paths to convince the market participants: parties: while Nokia started with a push approach and then extended to a pull communication strategy, Google went the other way around, by building up a large network and then pushing for the technology through open standards.

17.5 Developing a Dominant Brand Name

Successful innovative companies have also understood that another communication avenue to rally the maximum of external parties around an innovation is to develop a strong and famous brand image (Corkindale and Belder 2009). One major issue associated with the uncertainties of innovation is that innovation tends to worry many customers or external parties (Boyd and Mason 1999). Some are intimidated by the task of learning how to use the innovation, some are risk averse to any novelty, and others are afraid that the innovation will become obsolete quickly; all are always postponing their decision to take it on. What is true for consumers is also true for organizations. Many managers fret about innovations and try to assess the balance on the risk/return relationship of such investment more than considering the sheer novelty of an innovation.

A brand is a name, a set of words, a sign, a symbol, a design, or a combination that identifies a seller's goods or services (Keller 1993). Consequently, a well-known and familiar brand helps to reassure individuals or industrial buyers when they consider the purchase of an innovative solution which represents always a leap into the unknown. In that case, one of the main criteria that determine a customer's choice is confidence in a company and its products (Temporal and Lee 2000).

A strong brand facilitates the identification of the innovation while attaching a quality image and a personality that establish a bond with the customers and

facilitate their loyalty (Urde 1999). For instance, Google is perceived as a clean, friendly but credible path to accessing the tremendous wealth of the Internet. Nokia's personality evokes empathy for the consumer and his needs, like a trusted friend. Cisco's image is associated with being a visionary and an expert in Internet telecommunication as well as a partner with its clients. And the Apple brand personality is about lifestyle, imagination, innovation, passion, and aspirations. It suggests also power-to-the-people through innovation thanks to simplicity and the removal of complexity from people's lives (http://www.marketingminds, 2010).

In general, dominant brands which come first in customers' minds enjoy greater market and financial success than their competitors (Burke and Schoeffler 1980). This is also true for innovative products. In the ranking of the first 25 major brands according to their market value in 2009, 12 are closely associated with innovative product or industries, as illustrated in Table 17.3. Indeed, the most valuable brand is Google, a brand for a service which was launched in 1998. This brand is topping traditional brands like Coke or MacDonald which have been there for decades.

Table 17.3 Ranking of the top most valuable marketing brands in 2009

Ranking	Name	Value ($M)[a]	Industry
1	**Google**	100,039	**Internet Search**
2	**Microsoft**	76,249	**Software**
3	Coca-Cola	67,625	Soft drink
4	**IBM**	66,622	**Information technologies**
5	McDonald	66,576	Fast food
6	**Apple**	63,118	**Electronics**
7	**China Mobile**	61,288	**Mobile phone operator**
8	**General Electric**	59,798	**Technology and services**
9	**Vodafone**	53,727	**Mobile phone operator**
10	Marlboro	49,460	Cigarettes
11	Wal-Mart	41,063	Retail
12	ICBC	38,066	Banking
13	**Nokia**	35,163	**Mobile devices**
14	Toyota	29,907	Automotive
15	UPS	27,842	Package Delivery
16	**Blackberry**	27,478	**Mobile devices**
17	**HP**	26,745	**Information technologies**
18	BMW	23,948	Automotive
19	SAP	23,615	Enterprise software
20	Disney	23,110	Media and entertainment
21	Tesco	22,938	Retail
22	Gillette	22,919	Razors
23	**Intel**	22,861	**Microprocessors**
24	China Construction bank	22,811	Banking
25	**Oracle**	21,438	**Enterprise software**

Source: Milward Brown, Brand Z top most valuable marketing brands report, http://www.millwardbrown.com/brandz

[a]Brand value represents the fractions of intangible corporate earnings of a company which is attributable to the brand multiplied by an earning multiple, depending on the brand market valuation and the brand growth

This preeminent position of innovation driven brands does not come by accident. One may argue that their value reflects their market success. Actually part of their hit performance has been achieved through a very forceful branding strategy which they have started very early in their corporate life.

For sure, some of the companies listed in the ranking above are now spending huge amounts of money to promote their brand. In 2009, Microsoft spent US$ 1.4 billion (2.40% of its total revenues) in advertising while Dell invested US 811 million (1.30%); the advertising budget of Apple represented US$ 501 million (1.37%), and the one for BlackBerry was US$ 337 million (3.60%).

But the building of a strong brand image for an innovation does not always require big amounts of money. Some highly successful company have managed to achieve recognition through creativity and publicity like Google, which has achieved this position mostly through word-of-mouth and quality. E-bay, Amazon, or Yahoo have also got top of mind recognition on a low advertising budget. Those web based firms have been able to generate "buzz" among "influencers" instead of relying solely on traditional advertising. The excitement and passion they have generated has translated into sales afterwards. In that matter, they just follow the previous generation of successful innovators such as Intel, Microsoft, Intel, Compaq, Cisco, and others; those firms were first talked about in the pages of the Wall Street Journal, the Financial Times, Business Week, Forbes and Fortune magazines. Only once their brand image was made, then they spend money in advertising to maintain their image and notoriety.

When promoting an innovation, the use of branding is not exclusive to private companies. It has been used very effectively by some alliances to promote an innovation in order to make it a standard. Consider the case of Bluetooth, a short-range networking protocol for connecting different types of digital devices (mobile phone, computer, GPS, etc) or accessing the Internet by wireless signals within a 35-ft or 10-m range.

In 1998, five companies founded the Bluetooth Special Interest Group (SIG), Ericsson, IBM Corporation, Intel Corporation, Nokia and Toshiba Corporation. Its goal was to promote the development of the new protocol as the standard solution for wireless connections. Very early the decision was made to develop a strong brand so as to communicate with the end – consumers in order to accelerate its recognition and to step up its adoption by other industrial companies.

A name and a logo were chosen which were trademarked by the Bluetooth SIG. The word "Bluetooth" was taken from the tenth century Danish King Harald Bluetooth who had been influential in uniting Scandinavian Europe during an era when the region was torn apart by wars and feuding clans. The founders of the Bluetooth SIG felt the name was fitting because on the one hand Bluetooth technology was first developed in Scandinavia, and on the other hand Bluetooth technology is able to unite differing industries such as the cell phone, computing, and automotive markets.

From the beginning, Bluetooth has been actively promoted by members of the SIG among the end users. Since 2004, SIG has conducted an independent study on consumer awareness, attitude and usage of Bluetooth wireless technology in the

Table 17.4 Associate members in the SIG group and Bluetooth brand awareness

	2004	2005	2006	2007	2009
Number of associate members	3,400	5,500	9,000	10,000	13,000
Percentage of brand recognition	60	73	81	85	85

Source: Bluetooth.com

United States, United Kingdom, Germany, Japan and Taiwan. The average brand awareness level has raised from 60% in 2004, to 85% in 2009, a very high level of recognition.

Such a high level of recognition has pushed many companies to adopt Bluetooth as the standard wireless connection (see Table 17.4). This move was made easier as Bluetooth is a full compatible solution and with the backing of the SIG to create a supportive network. Today, the Bluetooth SIG has more than 10,000 member companies in the telecommunications, computing, automotive, music, apparel, industrial automation and network industries.

17.6 Communicating with the World by Going Global

Another way to ensure the market acceptance of an innovative product is to open it up to the world market as innovation is becoming increasingly global from the supply perspective and from the demand side. This is a direct consequence of the explosion of the Internet, the rise of globalized financial markets, the spiralling foreign direct investment by multinational companies, and the emergence of China and India.

Companies increasingly go abroad to interact with their most demanding customers, get the most competent or cheapest suppliers, and seek ideas or knowledge with leading research environments which are getting more geographically dispersed and seek new markets for their technologies. Consequently, the proportion of corporate R&D centre performed outside domestic countries is increasing rapidly (Herstad et al. 2008). Still, the most important motive for globalization is the customization of innovations to suit market conditions, especially when the lead users or main suppliers are located abroad.

Consequently, going global becomes a natural way to ensure the commercial triumph of an innovation. It comes as an extension of the push communication strategy in order to promote innovations towards all the external market participants as increasing returns follow the firms that penetrate one large geographical market after another.

Innovation driven companies serving business customers were the first to embrace globalization as organizations all over the world have more or less the same needs and expectations. Consequently, opening up globally an innovation was relatively easy and not too costly. For instance, in the software industry, the swift growth of the German SAP resulted from the increasing acceptance of its ERP (enterprise Resource Planning) software in various part of the western world: in 1980, SAP had only 50 customers, all Germans companies; in 1996, it had 9,000

customers worldwide, and in 2009, it has more than 75,000 customers in over 120 countries, representing 140,000 installations of SAP software with more than 2,400 certified partners. Today, SAP makes more than 80% of its turnover outside the German market.

But globalization has also proven to be effective to push innovative solutions towards consumers markets. For example, Nokia's globalization strategy has provided a major push to ratchet up the adoption rate of mobile phones in the world. In the 1980s Nokia was selling to the Finnish market only; it became the market leader in Europe in the early 1990s. Then, it went truly global and achieved market leadership in 1998 as its sales had expanded dramatically. In 1990, Nokia shipped around 1 million units in 1990, over 77 million units in 1999, and 420 million units in 2009, about one out of every three cell phones in the world. During this decade Nokia has shipped 2.5 billion mobile phones and is currently used by 1.25 billion people, i.e. one person out of five on the planet (Ahonen 2010).

Table 17.5 shows how some innovation driven companies have managed to grow their leadership by promoting their solution outside of their native markets. Interestingly, Yahoo has a smaller degree of internationalization compared to some of its rivals, such as Google and Microsoft. This is probably one of the reasons, among others, why Yahoo has not been able to maintain the leadership position it had acquired at the end of the 1990s in the search engine business. And in 2008, Apple decided to accelerate the internationalization of its iPhone to make it a real success in the smartphone market. The iPhone had got a significant market share in the US (20% in June 2008 against 44% for the BlackBerry) but was still small on a worldwide level (5.3% in June 2008 against 53% for Nokia and 11.4% for the

Table 17.5 Global reach of some leading innovation driven firms

Company	Percentage of annual revenues made outside the country of origin
Nokia	97
Vodafone	87
SAP	80
Sony	80
IBM	75
HP	70
Intel	70
Microsoft	60
Dell	54
Google	52
E-Bay	50
Cisco	50
EMC	48
Apple	40
Blackberry	37[a]
Yahoo	25

Source: annual reports and press releases compiled by the author
[a]Outside of North America

BlackBerry). The strategy paid off as Apple doubled its market share in 2009 but was facing new competition from Google's Android and HTC.

17.7 Conclusion

We have underlined the importance of communication as a way to improve the adoption of an innovation by the markets and we have identified four different communication manners used by successful innovation driven firms in order to beat the uncertainties associated with an innovation. In conclusion, an interesting question is to consider the combination and the timing of those actions. The more logical approach seems to go sequentially.

The first step starts with a pull communication strategy based on the design of a compatible architecture, which may be fully opened initially or at a later time. Then the firm can activate a push communication strategy by nurturing and stimulating a network of external market participants, such as suppliers, customers, competitors, research institutes, and complementors which are attracted by the compatibility of the technology to implement their own ideas and develop their own complementary solutions. This makes the innovation even more attractive to other potential customers and creates a positive feedback loop which paves the way to an increased acceptance of the innovation.

Next, the company can translate the number of complementors and partners in the brand value of its product and promote it actively to the end-users market. This will boost the appeal of the innovation to new external participants which will be drawn by the perspective of a bigger market. Finally, armed with a strong product, a solid network of partners and a robust brand image, the company may decide to use those assets and reach for the global market in order to make its innovation a worldwide standard.

Such a sequential path has been followed by companies such as Intel or Microsoft for instance and has proven to be very effective. But there are some variations to this model. Some organizations have started by offering directly an open architecture-like the Apache Foundation with the web server Apache. Other companies have actively promoted their brand even before having a strong network of partners, such as Tom-Tom did in the GPS systems business in Europe. Alternatively, several companies have built a strong brand and a solid network of complementors but have not opened their architecture, such as Apple with its iPhone. Other firms have shaped an impressive group of associates but without a strong brand name, like the Taiwanese HTC in the cellular phone handset.

Ultimately, some companies have not gone sequentially but have done all those actions in parallel in order to create some kind of a "big bang" and to rally the market to a new innovation. This has been the strategy of Sony for its Blue-ray optical discs and it has shown to be very effective. Such a road is clearly for companies which have large financial pockets and which are not faint-hearted as it can be very costly if it fails.

Bibliography

Ahonen T. (2010). communities-dominate.blogs.com/brands/2010/01/what-to-call-the-past-decade-has-to-be-the-nokia-decade-heres-why.html.

Boyd T. C. and Mason C. H. (1999). The link between attractiveness of "Extrabrand" attributes and the adoption of innovations. *Journal of the Academy of Marketing Science*, 27(3), 306–319.

Burke W. L. and Schoeffler S. (1980). Brand Awareness as a Tool for Profitability. *The Strategic Planning Institute*. Boston, MA: Cahners.

Chesbrough W. and Teece D. J. (1996).When is virtual virtuous. *Harvard Business Review*, 74(1), 65–73.

Corkindale D. and Belder M. (2009). Corporate brand reputation and the adoption of innovations. *Journal of Product and Brand Management*, 18(4), 242–250.

Eisenhardt K. M. and Schoonhoven C. B. (1996). Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial firms. *Organization Science*, 7(2), 136–154.

Farrell J. and Saloner G. (1985). Standardization, compatibility, and innovation. *RAND Journal of Economics*, 16(1), 70–83.

Frick K. A. and Torres A. (2002). Learning from high-tech deals. *The McKinsey Quarterly*, (1), 112–124.

Herstad S., Bloch C., Ebersberger B., and de Veld E. V. (2008). *Open innovation and globalisation: Theory, evidence and implications*, Visionera.net.

Keller L. K. (1993). Conceptualizing, measuring and managing customer-based brand equity. *Journal of Marketing*, 57(1), 1–22.

Klein K. J. and Tornatzky L. G. (1982). Innovation Characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transmission Engineering Management*, 29(11), 28–45.

Laursen K. and Salter A. (2006). Open for innovation: the role of openness in explaining innovation performance among U.K. manufacturing firms. *Strategic Management Journal*, 27(2), 131–150.

Love J. H. and Roper S. (1999). The determinants of innovation: R & D, technology transfer and networking effects. *Review of Industrial Organization*, 15(1), 43–64.

Mc Gee J., Sammut B., and Tanyut A. (2002). Network industries in the new economy. *European Business Journal*, 14(3), 116–133. Marketingminds.com.au/branding/apple_branding_strategy.html.

Miotti L. and Sachwald F. (2003). Co-operative R&D: Why and with whom? An integrated framework of analysis. *Research Policy*, 32(8), 1481–1499.

Nieto M. J. and Santamaría L. (2007). The importance of diverse collaborative networks for the novelty of product innovation. *Technovation*, 27(6–7), 367–377.

Roberts E. B. (2001). Benchmarking global strategic management of technology. *Research-Technology Management*, 44(2), 25–36.

Rothaermel F. T. and Deeds D. L. (2006). Alliance type, alliance experience, and alliance management capability in high-technology venture. *Journal of Business Venturing*, 21(4), 429–460.

Temporal P. and Lee K. C. (2000). *Hi-Tech Hi-Touch Branding: Creating Brand Power in the Age of Technology*. Wiley: New York.

Tether B. and Tajar A. (2008). Beyond industry–university links: Sourcing knowledge for innovation from consultants, private research organisations and the public science-base. *Research Policy*, 37(6–7), 1079–1095.

Urde M. (1999). Brand orientation: a mindset for building brands into strategic resources. *Journal of Marketing Management*, 15(1–3), 117–133.

Chapter 18
Innovation Communication as a Cross-Functional Dynamic Capability: Strategies for Organizations and Networks

Nicole Pfeffermann

Contents

18.1 Dynamic Capabilities in the Innovation Economy

Information and knowledge are two contributors to innovation and change. The ubiquitous availability of information and rapid sharing of knowledge require that the enterprise has the ability to re-invent and adapt continuously to environmental dynamism, for instance, in launching innovations or communicating with vendors and customers as co-creators in value creation processes (Davenport et al. 2006). Therefore, the organizational capability *to innovate* (innovative capability) is one essential factor for an enterprise in the innovation economy. However, the perspective of value creation through innovation has shifted from the closed to the Open Innovation view (e.g. Chesbrough 2003; Herzog 2008) and "successful companies will be those that transform information into value-creating knowledge, and [. . .] use this knowledge to innovate and capture additional profit" (Davenport et al. 2006: 17).

Author's Note: This book chapter represents ideas from the Ph.D. thesis work by Nicole Pfeffermann and thus is based on the publication (pending process).

N. Pfeffermann
Systems Management, International Logistics, School of Engineering and Science, Jacobs University Bremen, Campus Ring 1, 28759 Bremen, Germany
e-mail: Nicole.Pfeffermann@googlemail.com

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_18,

The construct Open Innovation can be understood as ". . . the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation [. . .]" (Chesbrough 2006: 1). Innovation is defined as ideas, concepts, prototypes, practices, objects, programs/initiatives, models, design, issues, etc. that are perceived as new by stakeholders (based on Rogers 2003). In the open economy multiple inventions have to be combined for market success (e.g. Teece 2007; Somaya and Teece 2007).

As a consequence, strategic management concentrates on capabilities and innovation to gain sustainable value-capturing and competitive advantages (e.g. Davenport et al. 2006; Grant 2008). From the dynamic capability approach perspective (Teece et al. 1997), dynamic capabilities influence a corporation's value creation by the impact on the valuable resource base of a corporation which in turn represents a source of competitive advantage (Ambrosini and Bowman 2009).

> "*A dynamic capability* is the capacity of an organization to purposefully create, extend, or modify its resource base" (Helfat et al. 2007: 4).

Besides innovation, dynamic capabilities are essential factors in the innovation economy to *address environmental dynamism* (Teece et al. 1997) such as new stakeholder demands or new markets. Due to knowledge-empowered customers and advanced information and communication technologies (ICT) various new business models and market entry strategies have emerged for launching new products and added-value services (Davenport et al. 2006). As a result, enterprises manage a broad spectrum of innovations in new market structures beyond product nowadays and process innovations (e.g. managerial innovations, marketing innovations, co-created targeting innovations) based on internal and external information sources and knowledge (e.g. Davenport et al. 2006; Lichenthaler and Lichtenthaler 2009; Waarts et al. 2002). In this context the question has to be posed of how communication of innovations can be understood in the innovation economy.

18.2 A Modern View of Innovation Communication From a Strategic Management Perspective

18.2.1 Communication of Innovations Throughout the Open Innovation Process

Communication of innovations is of expanding interest to business and science (e.g. Mohr et al. 2009; Zerfaß and Ernst 2008; Zerfaß and Möslein 2009); this is true nowadays in particular due to the increasing demand for innovation, the breadth of enterprises' innovation portfolios, the ubiquitous availability of information, knowledge-empowered stakeholders and new business models in new and different markets.

Three main streams of research can be identified in the field *communication of innovations*:

1. Marketing of innovations in marketing research
2. Innovation communication in marketing diffusion research
3. Innovation communication in corporate communication research linked to innovation management research

First, research in marketing, consumer behaviour and psychology encompasses scientific investigations regarding the antecedents and consequences in marketing of innovations. Marketing is an essential part in the innovation process (Crosby and Johnson 2006). Communication can inform consumers about the advantages and characteristics of an innovation by using mass media and individual communication throughout the adoption process (Hofbauer et al. 2009). Theoretical findings and managerial implications provide essential information concerning strategies and mechanisms to introduce innovations successfully. Marketing of innovation includes both the commercialization of radical innovations, technologies and services (e.g. Mohr et al. 2009; Sandberg 2008; Sowter 2000) and strategic innovation marketing (e.g. Talke 2005; Trommsdorff and Steinhoff 2007). Various useful definitions are provided in the literature, for instance, "innovation marketing encompasses all market-oriented activities of innovation management – that is, all strategic and operative decisions for marketing new products" (Steinhoff and Trommsdorff 2011).

Second, "diffusion research seeks to understand the spread of innovations by modeling their entire life cycle from the perspective of communications and consumer interactions" (Peres et al. 2010: 91). Several innovation diffusion models have been introduced mainly in the marketing diffusion literature (e.g. Mahajan et al. 2000; Peres et al. 2010) related to specific industries, adopter groups or steps in the adoption process (e.g. Arndt 1967; Hesse 1987; Mahajan et al. 1990, 1995; Pae and Lehmann 2003; Rohlfs 2001). Currently research interest has shifted in its focus, for instance, from the forecasting focus to the managerial diagnostic focus in order to provide answers in marketing management (Peres et al. 2010). Regarding communication, three social influence factors are mentioned to be drivers in innovation diffusion (1) word-of-mouth communication (e.g. Martilla 1971; Mazzarol 2011), (2) network externalities (e.g. Rohlfs 2001; Tomochi et al. 2005), and (3) social signals (e.g. Van den Bulte and Stremersch 2004; Berger and Heath 2008). These social influence factors, referred to as *interdependencies among consumers,* "affect various market players with or without their explicit knowledge" (Peres et al. 2010: 91) and thus have to be considered in marketing of innovations. Future research in this field requires the consideration of online communities, web services and complex types of product-services categories in innovation diffusion (Peres et al. 2010).

Third, researchers have focused on innovation communication and its impact on the innovation process from idea to launch as a part of corporate communication (e.g. Fink 2009; Zerfaß 2009). Three communication fields are used in this process (1) internal communication; (2) external communication; and (3) *public relations* (innovation journalism: Nordfors 2009). Moreover, *innovation communication* is mentioned as a

new term (Zerfaß et al. 2004), and Zerfaß (2009) defines innovation communication as a systematic initiation of communication processes with internal and external stakeholders to support technical, economical and social novelties through (a) the interest-led construction, revision, and destruction of socially depend conceptional patterns and communication resources, and (b) by stimulating (or, though the stimulation of) content-related catalysts for the development, as well as through professional promotion, of novelties. The object of communication is primarily the innovation itself, but in many cases it is also the organization behind the innovation. The communication management shall plan, monitor and evaluate innovation communication based on the defined understanding of innovation communication (Zerfaß 2009: 42 translated in English; for past definitions of innovation communication see also Zerfaß et al. 2004; Mast and Zerfaß 2005; Mast et al. 2006).

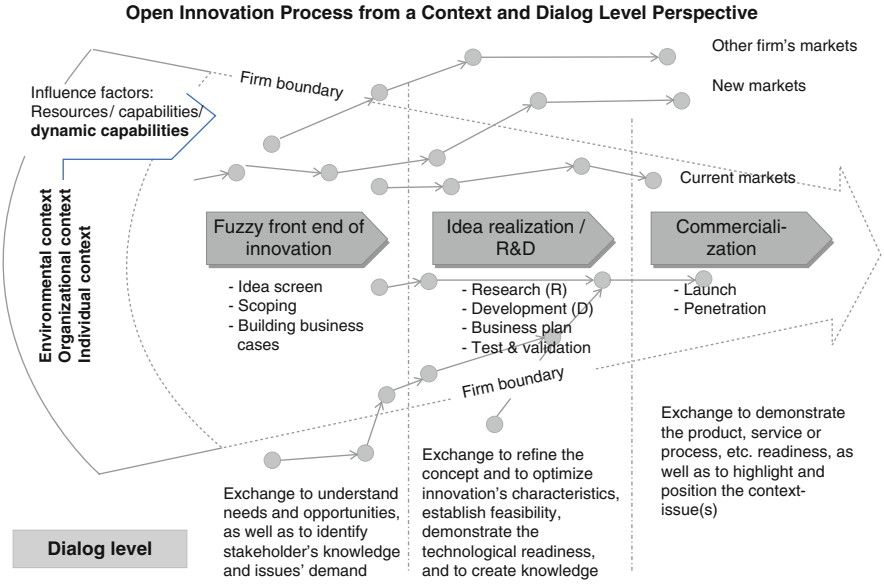
The first and second research streams primarily focus on market-related activities, first, to attract consumer's attention and, second, to facilitate an innovation's adoption process by driven social influences; including all involved market players or actors in innovation management from a strategic and operational view. On the other hand, the third research area conceives communicating innovations from idea to launch as a constitutive element in innovation management (Zerfaß 2009) and as a part of corporate communication management (Zerfaß et al. 2004).

Based on the current approach in innovation management, the following diagram (Fig. 18.1) shows an Open Innovation process and the dialog level with several dialog situations between an organization and its stakeholders throughout an Open Innovation process (based on Daschkovska et al. 2010). However, in the long-run enterprises have to manage several Open Innovation processes at the same time and over a period of time. Thus, they have to coordinate various communication processes, tools and activities related to different innovations to address knowledge-empowered stakeholders at their own markets, other firm's markets and new markets. Therefore, it is assumed that over a period of time the coordination and integration of innovation communication in organizational communication can result in a modern view from a strategic management perspective.

18.2.2 Innovation Communication as a Dynamic Capability

A literature review shows some examples for investigations in the field of organizational communication competence and marketing capability, as shown in Table in Appendix. However, the table indicates that research in *innovation communication as an organizational capability or dynamic capability* is still deficient.

The characteristics of the innovation economy lead to a broad spectrum of innovations in a rapidly changing environment and, on the other hand, to the necessity of focusing on dynamic capabilities to improve the valuable resource base of an enterprise in order to gain sustainable competitive advantages under new circumstances. In this context and based on the literature review in Sect. 18.2.1, innovation communication might be able to intentionally:



adapted from Brem, 2008; Daschkovska et al., 2010; Dwivedi & Butcher, 2008; Herzog, 2008

Fig. 18.1 Communication of innovations throughout the Open Innovation process

1. Create ideas and re-configure innovations and the whole innovation portfolio, as an enterprise's valuable resource, from idea to launch due to several systematic planned, future-oriented dialog situations between an organization and its stakeholders throughout Open Innovation processes (see Sect. 18.2.1; Daschkovska et al. 2010)
2. Re-shape collaborative innovation networks through communication, *as a resource base in the innovation economy to invent and introduce successfully innovations* (Prandelli et al. 2008)
3. Create or extend the innovation reputation asset of a company because *communication can influence positively corporate reputation on the organizational communication level* (van Riel and Fombrun 2008)
4. Re-shape markets (for marketing see Golfetto and Rinallo 2008), incl. new business models, as an enterprise's resource, because communication of innovations can create new valuable issues on communication markets through the strategically oriented communication tools *issues management and agenda setting* (e.g. Cornelissen 2008; Goodman and Hirsch 2010; Ingenhoff and Röttger 2008)
5. Activate new knowledge schemata and extend knowledge schemata of internal stakeholders, i.e. re-fresh the human resource of an enterprise regarding future-oriented imagination (mental application) and mindsets (e.g. Rogers 2003; Jones and Tollin 2008; and for schemata theory see also Bruhn 2009; Koolman 2006; Miller 2005) and
6. Extend other related organizational capabilities such as knowledge management, as well as innovation management *to seize opportunities in the entrepreneurial view* (Teece 2007)

Thus, innovation communication can fulfill the specific requirements of being understood as a dynamic capability because innovation communication can reconfigure, create and extend the valuable resource base of an enterprise. For instance, the changing organizational processes might have an impact on the enterprise's innovative capability leading to the understanding that the dynamic capability *innovation communication* is a higher level dynamic capability that can operate on *zero level capabilities* (operating and managerial resources) and *first level capabilities* (e. g. innovative capability) (see also Ambrosini and Bowman 2009). Further, internal factors and environmental factors are enablers for the successful deployment of dynamic capabilities (e.g. Teece et al. 1997; Schreyögg and Kliesch-Eberl 2007). For instance, as contingency factors different system structures can affect the dynamic capability *innovation communication*.

Nowadays one factor is the increase of worldwide communication networks within own international corporations, as well as with corporation's stakeholders such as suppliers, communication agencies, consulting services, customers, government agencies and other external constituencies (e.g. Ayoko et al. 2004; Babcock and Babcock 2001). Hence, corporations need to develop cross-functional capabilities such as new product development capability (Grant 2008). In this context, innovation communication might represent a cross-functional dynamic capability because the processes of innovation communication needs to relate many internal departments (idea management, R&D, marketing, corporate communication, patent management, and controlling) and external constituencies in worldwide cross-functional communication networks. For instance, the Open Innovation project "ParcelRobot" required several communication activities in the innovation network (Rohde et al. 2011).

In research empirical data of dynamic capabilities appears relatively seldom, which may be the cause of poorly specified dynamic capabilities (e.g. Ambrosini and Bowman 2009; Pablo et al. 2007). Due to this fact of seldom empirical studies caused by poorly specified dynamic capabilities, this book chapter aims at presenting first a conceptual definition and a classification system for the dynamic capability *innovation communication*, based on a literature review, as a fundamental basis on which future research might build on, for instance, with empirical research studies.

18.2.3 Definition of Innovation Communication as a Dynamic Capability

"Organizational communication is a theoretical based, comprehensive approach to studying the sending and receiving of messages in a complex systemic environment" (Zaremba 2006: 34). More precisely, it is the study of why and how managers communicate to meet their responsibilities, which employee communication skill sets are needed and how to improve them, as well as "why and how organizations need to interact with their internal and external audiences" (Zaremba 2006: 34). Thus, communication is a process in which messages are sent by a sender

to receiver(s) through channels and its receiver(s) decode/s information using individual's senses and give/s feedback (e.g. Argenti 2009; Zaremba 2003) in a "constant mutual influence of communication participants" (Miller 2005: 6; see also Bittner 1985; Burgoon and Ruffner 1978; DeVito 1997). In this transactional conceptualization of communication related to complex systemic environments, an ". . . organization as an entity [. . .] must link internal departments and be linked to its environment" (Zaremba 2006: 60). Based on the literature background and firmly anchored in systems theory in organizational communication (e.g. Conrad and Poole 2004; Papa et al. 2008; Zaremba 2006), a useful *conceptual definition* (Pozzi 2001) of innovation communication is the following:

Innovation communication, as one of a company's cross-functional dynamic capabilities, is defined as transactional procedures of transmitting information between an organization and its stakeholders in terms of:

1. Introducing ideas, concepts, prototypes, practices, objects, programs/initiatives, models, design, issues, etc., or a combination of them, referred to as an innovation cluster, that are perceived as new by a stakeholder
2. Generating and highlighting context-issue(s) for the innovation or the innovation cluster
3. Presenting the organizational innovative capability and
4. Considering the interrelated, time-related and open transaction used to increase an enterprise's value by building up new stakeholder schemata (knowledge domains), modifying existing ones, intensifying the organization's innovation reputation, and improving the management of strategic assets such as information, innovation, and reputation (based on Pfeffermann et al. 2008)

This definition is also useful for innovation networks in the Open Innovation view, i.e. the dynamic innovation communication capability encompasses transactional procedures of transmitting information between many organizations in collaborative arrangements (collaborative networks) and their stakeholders, which leads to a higher complexity of the network's dynamic capability *innovation communication* in open systems. From a strategic management perspective, collaborative arrangements, such as research consortium, cross-border joint ventures, market information sharing agreements, co-development contracts, are commonly used to provide flexibility and motivation in an entrepreneurial perspective of risk-taking, innovation and change (de Wit and Meyer 2005).

Regarding the management of innovation communication as a modern communication field in organizational communication,

The management of innovation communication represents all strategic, tactical and operational activities to plan, coordinate, execute, monitor and evaluate transactional procedures of information transmission in an organizational process-related and information-related view considering

1. Three types of external markets (resource markets, communication markets, and sales markets)
2. Internal management incl. resources, capabilities and structures and
3. Interrelated network structures

Linked to the theoretical discussion of uniqueness of dynamic capabilities, the provided conceptual definition of innovation communication is the abstract description and the provided management definition of innovation communication including its strategies and tools (see also Sect. 18.3) and represents the dynamic capability *in practice*, i.e. the performative aspects, which tends to "display subtle but important differences between firms" (Ambrosini and Bowman 2009: 44; Feldman and Pentland 2003).

Besides internal communication, finance communication, and marketing/branding communication, the communication field *innovation communication* can be integrated into organizational communication. Consequently, this cross-functional communication field also tends to facilitate stakeholder relationship management (public relations, community relations, media relations, shareholder relations, employee relations, customer/consumer relations or basically stakeholder communication), to enable establishing innovative brands (corporate brands, product brands and network brands) and to strengthen corporate reputation; mainly related to the communication objects *innovations, context-issue(s) of innovations*, and *innovative capability on a company or innovation network level*.

All words in the conceptual definition of innovation communication have a specific meaning and the following figure (Fig. 18.2) illustrates these words/dimensions, which can be derived from the conceptual definition *innovation communication* and understood as the constitutive elements of the dynamic innovation communication capability. These eight dimensions are all involved in innovation communication; however they vary in its intensity depending on the functional management view. Furthermore, the elements of innovation communication are interrelated and influence each other.

1. *Information transmission:* This dimension addresses the ability to plan, coordinate, execute, monitor and evaluate transactional procedures of information transmissions related to the following three communication objects:
   (a) The organization's innovation/s and/or innovation cluster/s
   (b) The context-issue(s) of the organization's innovation/s and/or innovation cluster/s and
   (c) The innovative capability of a company or network

First, innovation is defined as ideas, concepts, prototypes, practices, objects, programs/initiatives, models, design, issues, etc. that are perceived as new by stakeholders (based on Rogers 2003). Information management and transactional procedures of information transmission regarding innovation/s and/or innovation cluster/s of an organization's innovation portfolio have to be coordinated constantly for communication purposes, in particular in the Open Innovation economy with globally spread resources and sources incl. multiple inventions for market success (e.g. Teece 2007; Somaya and Teece 2007). Thus, a broad range of innovation types and information resources have to be analyzed and planned because the type of innovation can influence both information transmission and knowledge creation. For instance, continuous and discontinuous innovations might produce dissimilar effects on consumer adoption (Moreau et al. 2001).

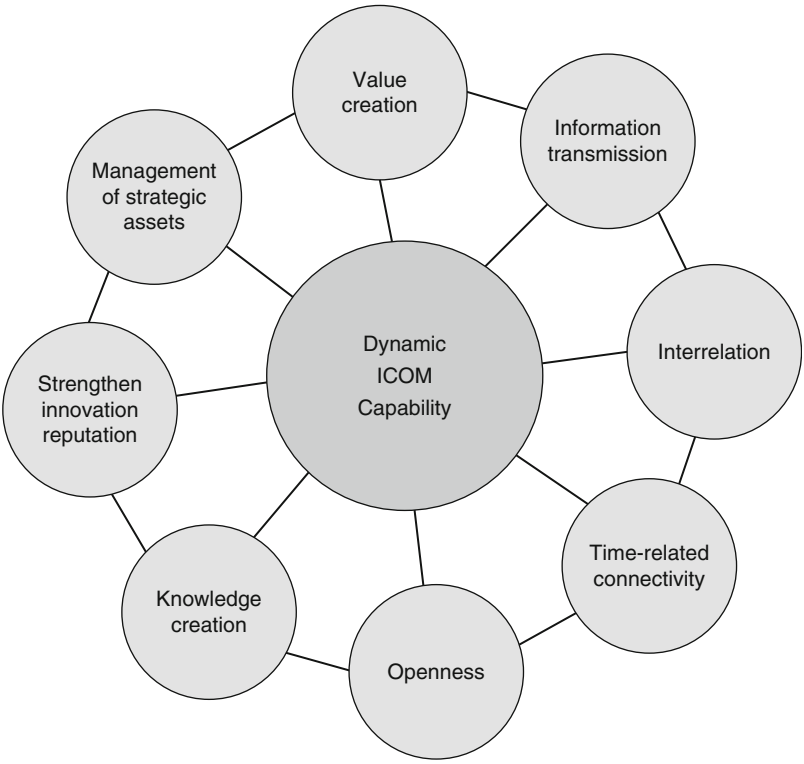


Fig. 18.2 Elements of the dynamic capability *innovation communication* based on the conceptual definition
Source: author

Second, information management and information transmission concerning context-issue(s) of an innovation or innovation cluster have to be coordinated constantly for communication purposes. The term *context-issue* represents a frame of an innovation or innovation cluster that can integrate the innovation or innovation cluster into a topic of concern and activate or modify an individual's schema for a better understanding of certain aspects of the innovation or innovation cluster based on framing theory and concepts related to innovation communication (e.g. Dahinden 2006; Huck 2009; Pfeffermann et al. 2008; Scheufele 1999, 2003), as well as schema theory (e.g. Bartlett 1932; Brewer and Nakamura 1984; Rumelhart and Ortony 1977; Rumelhart and Norman 1988; Waldmann 1990) in communication context (e.g. Bruhn 2009; Esch 2006; Kroeber-Riel 1993). A schema is understood as "a large unit of organized information used for representing concepts, situations, events, and actions in memory" (Galotti 2003: 232; Rumelhart and Ortony 1977; Rumelhart and Norman 1988) and individuals "constantly assessing and evaluating the fit between their current situation and a number of relevant schema and sub-schemata" (Galotti 2003: 233). Thus, schemata can support to interpret current information and facilitate decision-making, such as in case of innovation

adoption. Framing can be understood as a method in innovation communication to provide a "frame of reference" (Huck 2009; Pfeffermann et al. 2008; for framing see Orlikowski and Gash 1994; Putman and Fairhurst 2004). From a management view, all specific innovation-related frames can be managed by using the strategic tool *framing* and specific innovation-related topics can be coordinated in *issues management* to systematically and purposefully create stakeholder's knowledge domains. Both tools have to be closely linked to the innovation or innovation cluster throughout an innovation process and managed on a strategic innovation communication level linked to other frames in corporate communication.

Third, information management and information transmission relating to an enterprise's or innovation network's capacity to be innovative have to be coordinated constantly for communication purposes. Innovative capability can be defined as "the comprehensive set of characteristics of an organization that facilitate and support innovation strategies", in which innovative strategies "... can be characterized in terms of timing of market entry, technological leadership or followership, scope of innovativeness and rate of innovativeness" (Burgelman et al. 2009: 9). For instance, information related to the innovative capability has to be monitored in order to coordinate information transmission in innovation communication.

2. *Interrelation:* This element of the dynamic innovation communication capability embraces the subordinate concept of interrelation, which means the ability to plan, coordinate, execute, monitor and evaluate several interrelated managerial tasks, communication processes, communication tools, and communication activities of innovation communication on four different levels:
   (a) The interrelation among tasks, processes, tools, and activities of innovation communication taking place at the same time and over a period of time for a company and/or its collaborative networks
   (b) The interrelation among tasks, processes, tools, and activities of innovation communication and innovation management processes, tools, and activities taking place at the same time and over a period of time for a company and/or its collaborative networks
   (c) The interrelation among tasks, processes, tools, and activities of innovation communication and other managerial tasks, communication processes, communication tools, and communication activities in organizational communication (primarily in corporate communication and marketing) taking place at the same time and over a period of time for a company and/or its collaborative networks
   (d) The interrelation among communication processes, communication tools, and communication activities of innovation communication considering three types of markets and its interdependencies – resource markets, sales markets, and communication markets

First, companies can primarily have different types of innovations at the same time and over time (e.g. Burgelman et al. 2009; Drejer 2002; Schilling 2008). Regarding the three introduced communication objects of innovation communication, the interrelations of communication processes, communication tools, and communication

activities have to be coordinated at the same time and over a period of time. Besides the coordination of the communication processes, tools, and activities on a strategic and operational level, this also includes the *cooperation between people and other resources* (McGee et al. 2005). As a result, coordination and cooperation should lead to a consistent appearance of an enterprise at the same time and over a period of time based on the concept of integrated communication (e.g. Bruhn 2003, 2005, 2008, 2009; Bruhn and Ahlers 2011).

Second, communication processes, communication tools, and communication activities of innovation communication have to be simultaneously adapted to several innovation processes pertaining to innovation management processes, tool and activities. For instance, the definition of standards for processes and policies with proposed communication tools and activities for several dialog situations in Open Innovation projects can facilitate the interrelations between innovation communication and innovation management.

Third, corporate communication consists of several fields of communication which include processes, tools, and activities (e.g. internal communication, public relations, investor relations, government relations, marketing communication) (van Riel and Fombrun 2008), as well as marketing of innovations processes, tools, and activities (e.g. Trommsdorff and Steinhoff 2007). Therefore, processes, tools, and activities of innovation communication and processes, tools, and activities of other fields in corporate communication and marketing have to be linked to each other. All activities have to be interrelated and integrated in a communication concept at the same time and over a period of time, in accordance with the integrated view of communication (e.g. Bruhn 2003, 2005, 2008, 2009).

Fourth, the subordinate concept of interrelation concentrates on the interrelation among innovation communication and three types of markets to consider the supply and demand at work in the essential markets of an enterprise or collaborative network: *resource markets*, *sales markets* and *communication markets*.

3. *Time-related connectivity:* This dimension encompasses the ability to plan, coordinate, execute, monitor and evaluate time-related information considering the subordinate concept of time-related connectivity. The time-related connectivity represents the ability to link and unit past-related, present-related and future-related information of the three communication objects. For instance, this subordinate concept of time-related connectivity can facilitate knowledge creation and the construct *mental application* in innovation-decision making. According to the diffusion theory, knowledge supports an individual's decision-making process by reducing uncertainty about the advantage or disadvantage of an innovation (Rogers 2003). The time-related connectivity may support the decision-making process regarding the innovation's *compatibility*, meaning that the innovation is consistent with existing values and past experiences (e.g. Kima and Nam 2004; Moreau et al. 2001). Rogers (2003) additionally mentions the importance of an individual's mental application to an innovation in the persuasion phase of the innovation–decision process. Before making a decision, an individual mentally applies an innovation to

his or her present or future situation (Rogers 2003). For instance, an innovation communication tool for this element could be the method *storytelling* (e.g. Denning 2005; Fog et al. 2005; Frenzel et al. 2006; Simmons 2007) and the method *scenario planning* (e.g. Lindgren and Bandhold 2009; Ringland 2006).

Storytelling supports an individual's imagination and creates trust by telling authentic stories about an innovation or innovation cluster from the idea to the finished product. The results of the German empirical study *INNOVATE 2004* support this reasoning given that "... by telling an amusing story about its origin, its adoption in a company or its concrete meaning for the individual consultant illustrates well an innovation to the audience" (Mast et al. 2005: 11). Moreover, stories can create new opportunities and highlight the context (Frenzel et al. 2006) of an innovation or innovation cluster. As scenario planning is concerned, individuals and also organizations need a feedback system to learn from the past but also to gather information about the future. Uncovering and exploring future (business) environments, including potential risks and opportunities, is useful in preparing for many possible future situations (Lindgren and Bandhold 2009), for instance, innovation adoption possibilities or opportunities in new market structures.

4. *Openness:* As a third subordinate concept of innovation communication, open communication includes the ability to plan, coordinate, execute, monitor and evaluate communication processes, tools and activities in the open communication view. Based on the Open Innovation construct and openness in systemic environments, open communication encompasses the following seven functions of innovation communication:
   (a) Upholding constant communication with known and unknown stakeholders (based on Open Innovation; e.g. Davenport et al. 2006)
   (b) Using network communication (Zerfaß 2007)
   (c) Exploiting knowledge from inside and outside a company or collaborative network (Teece 2007)
   (d) Applying issues management to prevent crises and injury to reputation (e.g. Cornelissen 2008; Grensing-Pophal 2006)
   (e) Making best use of internal and external communication situations/networks such as exchanging information and know-how (e.g. Ayoko et al. 2004; Babcock and Babcock 2001; Zander and Kogut 1995)
   (f) Acting in accordance with moral legitimacy (e.g. Zerfaß 2007) and
   (g) Using value communication (Pfannenberg and Zerfaß 2005; Pfeffermann 2011) such as the method storytelling (Frenzel et al. 2006)
5. *Knowledge creation:* This dimension refers to the *learning by revising existing knowledge and building new schemata* (Miller 2005). A schema, interrelated with other schemata, will be activated and developed if, for instance, stakeholders have made their first experiences with a new product or received information about it that they perceive as a new situation. New information or experiences change and develop existing knowledge domains into a complex schemata system (e.g. Bruhn 2009; Miller 2005). Therefore, the element

knowledge creation implies the ability to plan, coordinate, execute, monitor and evaluate communication processes, tools and activities of innovation communication to build up knowledge domains and extend complex knowledge schemata of stakeholder groups. Generally, knowledge application supports new product development (Song et al. 2005) and also an innovation's adoption process (Rogers 2003). In fact, knowledge acts as a resource that can be re-shaped by innovation communication and opportunities can be seized to invent and build up knowledge management. Innovation communication can strengthen existing knowledge and build up new knowledge, which can have a positive impact on innovation diffusion.

6. *Strengthen innovation reputation:* A company's reputation for being innovative (innovation reputation), which is understood as the stakeholders' collective positive judgements of a company's innovativeness over time (based on Barnett et al. 2006), is addressed in this dimension by the ability to plan, coordinate, execute, monitor and evaluate communication processes, tools and activities of innovation communication to strengthen innovation reputation. The interrelation between innovation communication and innovation reputation leads to the construct of credibility. For instance, consumers do not only pay attention to messages, but also to the credibility of the source of the message. Higher credibility leads to higher acceptance of a new product (Maathuis et al. 2004). Moreover, the definition of corporate reputation consists of both (1) the stakeholder relationship perspective in the creation of trustful stakeholder relationships (the enterprise's behavior towards stakeholders in the past, present and expected future) and (2) the information transmission perspective (the degree of informative transparency). Information transmission is crucial for enhancing trust/credibility and stakeholder satisfaction and, hence, corporate reputation (de la Fuente Sabate and de Quevedo Puente 2003). As far as innovation communication is concerned, information transmission of the three communication objects plays a central role in establishing trust and stakeholder satisfaction, which leads to a strengthened innovation reputation.
7. *Management of strategic assets:* This dimension implies the planning, coordination, execution, monitoring, and evaluation of managing strategic assets related to innovation communication. A company coordinates and implements its strategic assets in concert with other specific resources and capabilities, which leads to the inherent value of strategic assets (McGee et al. 2005). In fact, innovation communication has to manage other specific resources and capabilities including other strategic assets of a company. Such strategic assets might include the resource "management techniques" that might consist of information management, innovation management as well as reputation management. Other strategic assets might be the innovative capability or marketing capability. Resources and capabilities are the asset base of a company, as described in Sect. 18.2.2; these are taken into account by innovation communication. The management of strategic assets acts as a resource and is concomitantly an outcome of innovation communication because the management of strategic assets can be re-shaped and extended through innovation communication, which

might lead to value creation in terms of an organization's competitive advantage (interrelation of dynamic capability and competitive advantage: Ambrosini and Bowman 2009; Protogerou et al. 2008).

8. *Value creation:* Constituting one of a company's dynamic capabilities, the cross-functional dynamic innovation communication capability is unique to an enterprise or a collaborative network. In the context of the conceptual definition, this dimension *value creation* focuses on value creation, value capturing and a sustained competitive advantage resulting from the fact that innovation communication can re-configure, re-shape, re-fresh, create and extend the valuable resource base of an enterprise and seize opportunities in the entrepreneurial view. Moreover, the impact of innovation communication on a company's value, referred to as return on investment of innovation communication, can be distinguished as having direct and indirect effects. The direct effects might result because innovation communication can build up knowledge and manage strategic assets. The indirect impact on a company's value could result from the influence innovation communication exerts on a company's reputation for innovation which, in turn, enhances that company's value.

18.2.4 Classification System of Innovation Communication

The following classification system can be deduced based on the conceptual definition and literature review. Table 18.1 shows seven types of innovation communication with its explanation in the organizational and network context level and from a functional management perspective. The three subordinate concepts are taken into account for all types of innovation communication and vary in their scope and rate of interrelation, time-related connectivity and openness in the open communication view.

18.3 Innovation Communication Strategies for Organizations and Innovation Networks

From a strategic functional view, corporate communication is closely linked to corporate strategy (Cornelissen 2008). In order to be successful, a company's communication strategy depends on how it is associated to company's corporate strategy and, on the other hand, "... requires that communication practitioners are involved in decision-making regarding the corporate strategy" (Cornelissen 2008: 99). For instance, communication practitioners bring a stakeholder perspective into the strategic management process and also support communicating the strategic decision to stakeholders (e.g. Belasen 2008; Cornelissen 2008). In

Table 18.1 Illustration of the classification system of innovation communication

A classification system/taxonomy of types of innovation communication	
From a functional management perspective	
Type	Explanation
Innovation communication for types of organizations	This class of innovation communication focuses on various types of organizations (e.g. startups, SMEs, cluster initiatives, global players)
Innovation communication for types of innovations	This class of innovation communication concentrates on types of innovation to consider specific characteristics of innovations in an enterprise's or collaborative network's innovation portfolio (e.g. radical innovation, product modification, multiple inventions, innovation cluster, marketing innovations)
Innovation communication for types of context-issues of innovations and innovation cluster	This class of innovation communication considers (1) different types of context-issues and (2) the status quo of different context-issues in the issues life cycle
Innovation communication for the degree of organizational innovative capability	This class of innovation communication takes into account the degree of innovative capability and evaluation of the innovativeness of an enterprise or collaborative network
Innovation communication for the type of knowledge creation	This class of innovation communication focuses on the type of knowledge creation: (1) activation or (2) modifying of knowledge domains, subdivided into the primarily and supplementary knowledge domains and types of knowledge, subdivided into information and know-how
Innovation communication for components of innovation reputation	This class of innovation communication considers the linkage to innovation reputation in terms of two components (1) behavioral perspective (creating trust in stakeholder relationships) and (2) the informative perspective (the degree of information transparency)
Innovation communication for strategic assets management	This class of innovation communication focuses on the management of strategic assets in terms of (1) scope and type of strategic assets, (2) management concepts, and (3) coordination and implementation processes

Source: author
Note: Based on the conceptual definition of innovation communication and literature review

fact, organizational communication is both a tactical and an operational activity, but is also strategic. Several authors have described patterns and key factors for strategy and strategic corporate communication/public relations (e.g. Argenti

2009; Austin and Pinkleton 2006; Conrad and Poole 2004; Cornelissen 2004, 2008; Smith 2009).

One commonly used managerial process of corporate strategy starts with defining the corporate mission and objectives, then conducts an external and internal analysis, makes the strategic choice, and finally implements the strategy (Barney 2007). Starting from the corporate strategy choice, including vision, mission, values, and objectives, corporate functional strategies for several functional units of a corporation can be derived from the corporate strategy, such as marketing strategy and human resource strategy. Thus, strategic corporate communication is integrated to achieve corporate goals. In this context, strategy represents the fundamental basis for managing communication activities inside and outside the organization (Belasen 2008). Strategy is therefore linked to corporate communication. The "sequential set of analyses and choices" serves as a basis for strategy formulation (Barney 2007: 6), as illustrated in Fig. 18.3. The grey-marked steps show the strategic functional view of innovation communication in the strategic management process. The strategic choice for the innovation communication strategy is deduced from the framework of the corporate communication strategy and only the goal choice for innovation communication is based on an external and internal analysis to consider market requirements and the internal resource base. After the specific goals of innovation communication are defined, strategic tools can be chosen and the strategy implemented (Fig. 18.3).

Regarding the strategic management process, innovation communication is an integral part of organizational communication and thus on a strategic level different innovation communication strategies can be defined. The planning process, which includes the formulation of a strategy of innovation communication, is orientated to the sequential steps of a strategic management process and thus strategy is derived from the corporate communication strategy to achieve a fit. It is assumed that the process can also be adapted to innovation networks from a collaborative network perspective.

Three main value-creation strategies of innovation communication can be derived from the conceptual definition and be adapted in a corporate communication context:

- Knowledge value strategy:
  Aims at systematically and constantly increasing stakeholder's knowledge to seize new opportunities through a broader knowledge base of an organization or collaborative network, as well as positively affecting the adoption/diffusion of innovations, which might lead to value creation, value capturing and sustain competitive advantage in the long-run (firm performance)
- Profile and positioning value strategy:
  Aims at systematically and constantly strengthening stakeholders' image and innovation reputation and positioning an organization or collaborative network as an innovator, which might lead to value creation, value capturing and sustain competitive advantage in the long-run (firm performance)

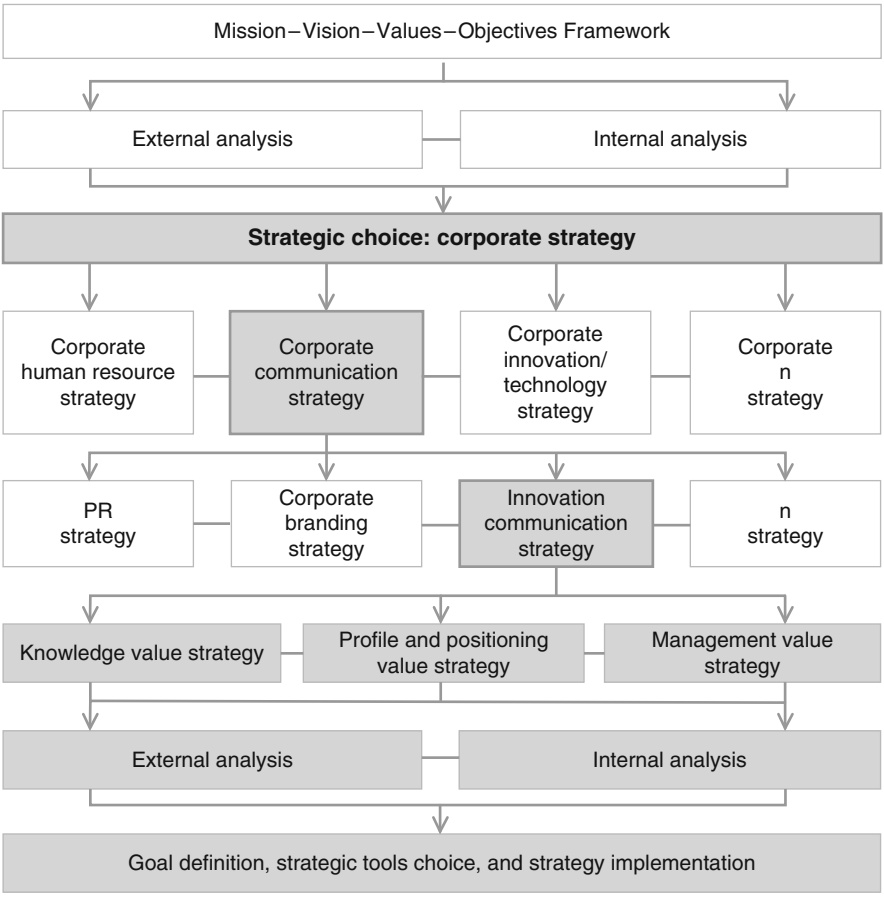


Fig. 18.3 Linkage between corporate strategy, corporate communication strategy, and innovation communication strategy in a managerial process view

- Management value strategy:
  Aims at systematically and constantly managing a corporation's strategic assets related to innovation communication, which might lead to value creation, value capturing and sustain competitive advantage in the long-run (firm performance)

As far as external analysis is concerned, the critical risks and opportunities of innovation communication in markets and relating to stakeholder groups have to be considered. Among others, one possible result of the external analysis could be that a competitor has positioned a similar context-issue in a specific communication market (communication market analysis). Another finding could show that the budget and the capacity to communicate innovations seem to be less contradictive than commonly presented by the resource markets (resource market analysis).

From an internal analysis perspective, it is crucial for a company to identify its own resources and capabilities for the dynamic capability *innovation communication*, such as information sources and innovation portfolio. Important are, on the one hand, physical resources (e.g. IT infra structure) as well as human and organizational resources and capabilities on the other (e.g. new product development teams, corporate culture, reputation, constituencies, time) (e.g. Argenti 2007; Grant 2008).

After the external and internal analysis is concluded, the strategy formulation requires a more adjusted formulation in the strategic choice process and a delineation of goals and concrete objectives (e.g. Smith 2009). Based on the conceptual definition and goal definition in corporate communication/public relations, the following goals for innovation communication in organizational communication can be deduced exemplifying the goal definition phase for an enterprise or collaborative network:

1. *Relationship/Knowledge management goals:*
   - Initiate dialog situations with stakeholders to systematically build up both knowledge schemata to support decision-making in innovation adoption and an organization's profound knowledge base for future-oriented inventions or the creation of multiple inventions
   - Enhance innovation partnership relationships and specific innovation project relationships in Open Innovation projects
   - Promote employee-driven and public dialog platforms to re-shape collaborative innovation networks and innovation portfolios
2. *Reputation management goals:*
   - Refresh the innovation reputation asset continuously
   - Strengthen the positive image as an innovator within an industry
   - Create trust for the innovative capability of an enterprise or collaborative network in changing environments
3. *Task management goals:*
   - Manage tangible and intangible assets related to innovation communication to establish an infrastructure for innovation communication and communication networks related to innovations
   - Create an entrepreneurial climate to support idea creation and seizing opportunities
   - Enable the acquisition of information (internal and external communication situation for producing ideas and knowledge) as a basis for creating innovative tools for innovation communication

The formulation of concrete objectives and key indicators can facilitate the implementation phase, which is concerned with the orchestration of strategic innovation communication tools, tactical plans, and operational activities according to the basic dimensions of the dynamic innovation communication capability.

After defining strategies and formulating goals, various strategic planning tools can be applied to plan and coordinate innovation communication on a strategic functional level, for example (see also Pfeffermann 2011):

- *Scenario planning* (e.g. Hill and Jones 2008; Lindgren and Bandhold 2009; Ringland 2006): Planning future scenarios for possible innovation adoptions and the impact on environments (e.g. PESTEL logic). For instance, "product design study 2015" demonstrates the development and future possibilities of a high-tech system (see innovation project "ParcelRobot": Rohde et al. 2011).
- *Framing* (e.g. Dahinden 2006; Huck 2009; Pfeffermann et al. 2008): Support for understanding new aspects of an innovation. Framing needs a strategic concept in order to integrate all frames of an organization related to the organization, brands or innovation/innovation cluster. A selected example is the project "ParcelRobot", where the frame *robotics logistics* was exerted to positively impact the market launch of the high-tech system (Rohde et al. 2011).
- *Storytelling* (e.g. Denning 2005; Fog et al. 2005; Frenzel et al. 2006; Simmons 2007): The method storytelling can be used to create trust and facilitate an individual's imagination. Several storyboards have to be coordinated in a strategic concept of innovation communication in order to be successful and to consider synergy effects and interdependencies among stories.
- *Market research* (e.g. Trommsdorff and Steinhoff 2007): Market research encompasses both information source and output to affect markets at the same time because the research findings can provide an opportunity for exchanges related to innovations or they can be used for setting an innovation's agenda. For instance, an online survey can highlight main findings related to the innovation (see RoboScan'07: Rohde et al. 2011).
- *Concept and portfolio mapping including issues management* (e.g. Cornelissen 2008; Goodman and Hirsch 2010; Kane and Trochim 2007): In strategic planning both methods can be used to visualize issues and innovations in terms of, for instance, an issue-importance-matrix or concept mappings.
- *Sensory communication* (e.g. Brumfield et al. 2008; Krishna 2010; Pfeffermann 2011; Rempel and Esch 2009; Scents in Arts 2010): Commonly used in marketing, scent-based communication is of increasing interest, as is also shown in current publications in this field. Sensory communication addresses multiple senses to positively influence an individual's emotional and cognitive information processing also at the action-taking level. However, organizations need to develop a strategic concept to address stakeholders through sensory communication for innovations.

The four main levels show the perspective on designing an integrated management concept of innovation communication. A process-related view focuses on the design, implementation and evaluation of standard and ad-hoc processes of communication activities according to different strategic planning tools. Resources and capabilities are essential to manage innovation communication in the resource- and capabilities-related views. The information-related view encompasses information management such as internal information processes to conduct scenario planning. The dialog-related view concentrates on relationships and how tools and activities can be coordinated to initiate proactive dialog situations with stakeholders or adopter groups.

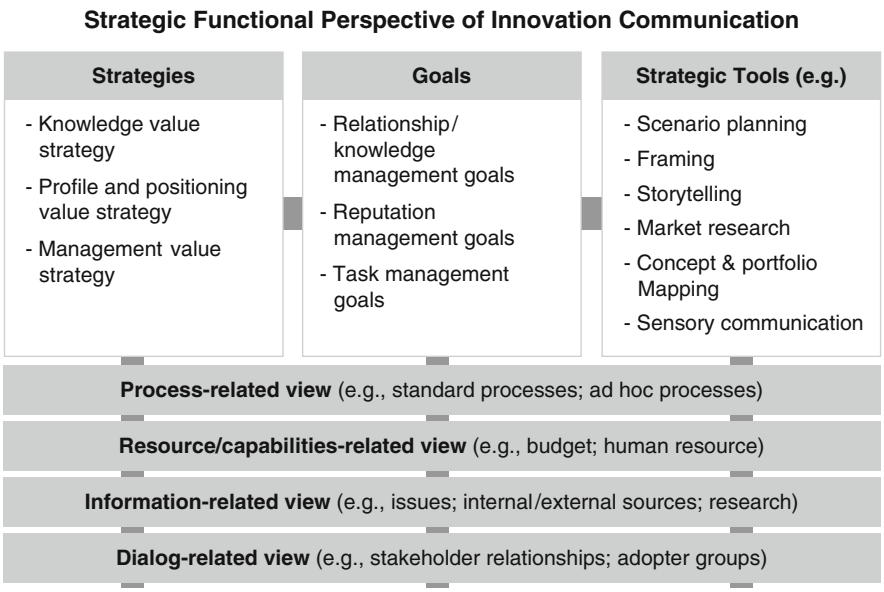


Fig. 18.4 Overview of the strategic functional level of innovation communication
Source: author

As a summary, Fig. 18.4 provides an overview of strategies, goals, and exemplified strategic tools of innovation communication for organizations and innovation networks viewed from four levels.

18.4 Conclusion and Outlook

The Open Innovation economy with its rapidly changing environments presents various new challenges for innovation and change, including, for instance, multiple inventions and resources and capabilities spread over global, inter-cultural and cross-functional networks. New approaches and managerial concepts are required. In this context, one field of interest is the influence factor *communication of innovations and the question of how communication of innovations can be understood in the innovation economy*. This book chapter emphasizes that innovation communication can be understood as a dynamic capability from a strategic management perspective. Innovation communication tends to fulfill specific requirements of being understood as a dynamic capability because innovation communication can re-configure, re-shape, re-fresh, create and extend the valuable resource base of an enterprise and thereby seize new opportunities to gain competitive advantages in the long-run. From a functional management perspective, innovation communication represents a communication field in organizational communication and can act as a catalyst innovation communication in

managing strategic assets on an enterprise or collaborative network level. Its functions include knowledge creation to positively influence innovation diffusion, as well as strengthening innovation reputation. As constitutive elements of innovation communication, eight dimensions were described to define the cross-functional dynamic capability *innovation communication* in more detail: information transmission; interrelation; connectivity; open communication; knowledge creation; strengthening of innovation reputation; management of strategic assets; and value creation. Furthermore, this book chapter presented a classification system based on the conceptual definition and three main strategies and types of goals for innovation communication were provided.

To conclude, this book chapter contributes to the debate in strategic management research of how specific dynamic capabilities should be defined, exemplified by the description of the dynamic innovation communication capability. Moreover, the concept of innovation communication may represent a tool of "unbounded" thinking in strategy formulation because innovation communication can support idea generation and information exchange in different phases in a strategic management process. Thus, this book chapter may provide a basis for the future research agenda in strategic management research (see McGee et al. 2005).

Future research might build on the conceptual definition to analyze the dynamic innovation communication capability in more detail, for instance, with empirical research studies focusing on multiple case studies. A contingency approach may provide an opportunity to understand the environmental factors and system structures that can have an impact on the dynamic innovation communication capability (for dynamic capability: see Ambrosini and Bowman 2009). For instance, scholars can investigate industry patterns and changing environments for innovation networks, as well as communication networks and interdependencies that can affect the dynamic innovation communication capability. Moreover, different Open Innovation projects incl. entrepreneur projects should be observed so that qualitative and quantitative data can be analyzed, using the triangulative approach (mixed method), to reveal new aspects in this field of interest from multi-disciplinary perspectives. From a content-related view, research can be directed at new approaches to integrate innovation communication in organizational communication and to develop an integrated management concept of innovation communication on a process-oriented, information-oriented, resources-oriented, dialog-oriented or network-oriented level (see Fig. 18.4).

Finally, the research field *communication of innovations* can be broadened to investigate innovation communication from a strategic management perspective, for instance, with three main research issues:

- For the organizational/network perspective (sender):
  How can which an institution or a collaborative network design, integrate and apply the dynamic innovation communication capability for transactional procedures of information transmission related to their innovation portfolio and degree of innovative capability; and thus how can the dynamic innovation communication capability be established, developed and evaluated?

- From the transactional procedure perspective (transaction):
  How can an institution or a collaborative network use which type of information and channel at which time or period of time to communicate innovations, innovation clusters, context-issue(s) or the innovative capability pertaining to the elements of the dynamic innovation communication capability?
- From the stakeholder perspective (recipient)
  How do stakeholders or adopter groups perceive the dynamic innovation communication capability of institutions or collaborative networks and how can the transactional procedures of information transmission related to the type of innovation portfolio and degree of innovative capability be influenced?

Bibliography

Akdeniz, M.B., Gonzalez-Padron, T., & Calantone, R.J. (2010). An integrated marketing capability benchmarking approach to dealer performance through parametric and nonparametric analyses. *Industrial Marketing Management*, 39(1): 150–160.

Ambrosini, V. & Bowman, V. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, 11(1): 29.

Argenti, P.A. (2007). *Corporate Communication*. (4th ed.). New York: Mc-Graw Hill.

Argenti, P.A. (2009). *Strategic Corporate Communication. A Global Approach for Doing Business in the New India*. New York: McGraw-Hill.

Arndt, J. (1967). Role of product-related conversations in the diffusion of a new product. *Journal of Marketing Research*, 4(August): 291–294.

Austin, E.W. & Pinkleton, B.E. (2006). *Strategic Public Relations Management* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Ayoko, O., Härtel, C., Fisher, G., & Fujimoto, Y. (2004). Communication Competence in Cross-Cultural Business Interactions. In D. Tourish, & O. Hargie (Eds.), *Key Issues in Organizational Communication* (pp. 157–171). New York: Routledge.

Äyväri, A. & Möller, K. (1999). Marketing Capability of Small Firms Operating in Networks. *Helsinki: Helsingin Kauppakorkeakoulu. Working papers/Helsinki School of Economics and Business Administration*: W; 227; ISBN: 951-791-407-5.

Babcock, R.D. & Babcock, B.D. (2001). Language-based communication zones in international business communication. *The Journal of Business Communication*, 38(4): 372–441.

Barnett, M., Jermier, J., & Lafferty, B. (2006). Corporate reputation: The definitional landscape. *Corporate Reputation Review*, 9(1): 26–38.

Barney, J.B. (2007). *Gaining and Sustaining Competitive Advantage*. (3rd ed.). New Jersey: Pearson Prentice Hall.

Bartlett, F.C. (1932). *Remembering. A Study in Experimental and Social Psychology*. Cambridge, UK: Cambridge University Press.

Belasen, A.T. (2008). *The Theory and Practice of Corporate Communication. A Competing Values Perspective*. Thousand Oaks, CA: Sage.

Berger, J. & Heath, C. (2008). Who drives divergence? Identity signaling, outgroup dissimilarity, and the abandonment of cultural tastes. *Journal of Personality and Social Psychology*, 95(3): 593–607.

Bittner, J.R. (1985). *Fundamentals of Communication*. Englewood Cliffs: Prentice-Hall.

Brem, A. (2008). *The Boundaries of Innovation and Entrepreneurship: Conceptual Background and Essays on Selected Theoretical and Empirical Aspects*. Wiesbaden: Gabler.

Brewer, W.F. & Nakamura, G.V. (1984). The Nature and Functions of Schemas. In R.S. Wyer Jr., & Srull, T.K. (Eds.), *Handbook of social cognition* (Vol. 1; pp. 119–160). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bruhn, M. (2003). *Integrierte Unternehmens- und Markenkommunikation* (3rd ed.). Stuttgart: Schäffer-Poeschel.

Bruhn, M. (2005). *Unternehmens- und Marketingkommunikation. Handbuch für ein integriertes Kommunikationsmanagement*. München: Vahlen.

Bruhn, M. (2008). Planning Integrated Marketing Communications. In H. Sievert, & D. Bell (Eds.), *Communication and Leadership in the 21st Century* (pp. 13–34). Gütersloh, Germany: Verlag Bertelsmann Stiftung.

Bruhn, M. (2009*). Integrierte Unternehmens- und Markenkommunikation: Strategische Planung und operative Umsetzung*. (5th ed.). Stuttgart, Germany: Schäffer-Poeschel.

Bruhn, M. & Ahlers, G.M. (2011). Integrated Communication in the Innovation Process. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 10). Berlin, Germany: Springer.

Brumfield, C.R., Goldney, J., & Gunning, S. (2008). *Whiff. The Revolution of Scent Communication in the Information Age*. New York: Quimby.

Bruni, D.S. & Verona, G. (2009). Dynamic marketing capabilities in science-based firms: An exploratory investigation of the pharmaceutical industry. *British Journal of Management*, 20: 101–117.

Burgelman, R.A., Christensen, C.M., & Wheelwright, S.C. (2009). *Strategic Management of Technology and Innovation*. Boston: McGraw-Hill.

Burgoon, M. & Ruffner, M. (1978). *Human Communication. A Revision of Approaching Speech/ Communication*. New York: Holt, Rinehart & Winston.

Chang, W., Park, J.E., & Chaiy, S. (2010). How does CRM technology transform into organizational performance? A mediating role of marketing capability. *Journal of Business Research*, 63: 849–855.

Chesbrough, H.W. (2003). The era of open innovation. *MIT Sloan Management Review*, 44(3): 35–41.

Chesbrough, H.W. (2006). Open Innovation: A New Paradigm for Understanding IndustrialInnovation. In H.W. Chesbrough, J. West, & W. Vanhaverbeke (Eds.), *Open Innovation: Researching a New Paradigm* (pp. 1–14). Oxford: Oxford University Press.

Conrad, C. & Poole, M.S. (2004). *Strategic Organizational Communication in a Global Economy*. (6th ed.). Belmont, CA: Wadsworth.

Cornelissen, J.P. (2004). *Corporate Communication – Theory and Practice*. London: Sage.

Cornelissen, J. (2008). *Corporate Communication: A Guide to Theory and Practice*. Los Angeles: Sage.

Crosby, L.A., & Johnson, S.L. (2006). Customer-centric innovation. *Marketing Management*, 15 (2): 12–13.

Dahinden, U. (2006). *Framing. Eine integrative Theorie der Massenkommunikation*. Konstanz, Germany: UVK Verlagsgesellschaft mbH.

Daschkovska, K., Pfeffermann, N., Meyer-Larsen, N., & Hülsmann, M. (2010). Adoption Framework for Innovations in Logistic Transport Chains. In W. Kersten, T. Blecker, & C. Lüthje (Eds.), *Pioneering Solutions in Supply Chain Management. A Comprehensive Insight into Current Management Approaches* (pp. 347–364). Berlin: Erich Schmidt Verlag.

Davenport, T.H., Leibold, M., & Voelpel, S. (Eds.) (2006). *Strategic Management in the Innovation Economy. Strategy Approaches and Tools for Dynamic Innovation Capabilities*. Erlangen: Publics Publishing and Wiley-VCH.

Day, G. (1994). The capabilities of market-driven organizations. *Journal of Marketing*, 58(4): 37–52.

de la Fuente Sabate, J.M. & de Quevedo Puente, E. (2003). The concept and measurement of corporate reputation: An application to spanish financial intermediaries. *Corporate Reputation Review*, 5(4): 280–301.

de Wit, B. & Meyer, R. (2005). *Strategy Synthesis: Resolving Strategy Paradoxes to Create Competitive Advantage*. (2nd ed.) London: Thomson Learning.

Denning, S. (2005). *The Leader's Guide to Storytelling: Mastering the Art and Discipline of Business Narrative*. San Francisco, CA: Wiley.

deVito, J.A. (1997). *Human Communication; The Basic Course*. New York: Longman.

Drejer, A. (2002). Situations for innovation management: towards a contingency model. *European Journal of Innovation Management*, 5(1): 4–17.

Dutta, S., Narasimhan, O., & Rajiv, S. (1999). Success in high technology markets: Is marketing capability critical? *Marketing Science Institute* (*Working Paper Report No. 99-119*), 1–44.

Dwivedi, A. & Butcher, T. (2008). *Supply Chain Management and Knowledge Management – Integrating Critical Perspectives in Theory and Practice*. Hampshire: Palgrave Macmillan.

Esch, F.-R. (2006). *Wirkung integrierter Kommunikation. Ein verhaltenswissenschaftlicher Ansatz für Werbung*. (4th ed.) Gabler, Germany: Wiesbaden.

Feldman, M.S. & Pentland, B.T. (2003). Reconceptualizing organizational routines as a source of flexibility and change. *Administration Science Quarterly*, 48(1): 95–118.

Fink, S. (2009). Strategische Kommunikation für Technologie und Innovationen – Konzeption und Umsetzung. In A. Zerfaß & K.M. Möslein (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation* (pp. 209–226). Wiesbaden, Germany: Gabler.

Fog, K., Budtz, C., Munch, P., & Blanchette, S. (2005). *Storytelling: Branding in Practice*. Berlin: Springer.

Frenzel, K., Müller, M., & Sottong, H. (2006). *Storytelling. Das Praxisbuch*. Wien: Carl Hanser Verlag.

Galotti, K. (2003). *Cognitive Psychology In and Out of the Laboratory*. Belmont, CA: Thomson Wadsworth.

Golfetto, F. & Rinallo, D. (2008). Reshaping Markets Through Collective Marketing Strategies: Lesson from the Textile Industry. In K. Tollin & A. Carù (Eds.), *Strategic Market Creation. A New Perspective on Marketing and Innovation Management*. Hoboken, NJ: Wiley.

Goodman, M.B. & Hirsch, P.B. (2010). *Corporate Communication. Strategic Adaption for Global Practice*. New York: Peter Lang.

Grant, R.M. (2008). *Contemporary Strategy Analysis* (6th ed.). Oxford: Blackwell.

Grensing-Pophal, L. (2006). *The Essentials of Corporate Communications and Public Relations* (Compiler: Harvard Business School Press/Society for Human Resource Management). Boston, MA: Harvard Business School Press.

Helfat, C.E., Finkelstein, C., Mitchell, W., Peteraf, M.A., Singh, H., Teece, D.J., & Winter, S.G. (2007). *Dynamic Capabilities: Understanding Strategic Change in Organizations*. Malden, MA: Blackwell.

Herzog, P. (2008). *Open and Closed Innovation: Different Cultures for Different Strategies*. Wiesbaden: Gabler.

Hesse, H.-W. (1987). *Kommunikation und Diffusion von Produktinnovationen im Konsumgüterbereich : Prognose d. Erstkäufe bei kauffördernder und kaufhemmender Kommunikation mit Diffusionsmodellen*. Berlin, Germany: Duncker & Humblot.

Hill, C.W.L. & Jones, G.R. (2008). *Strategic Management Theory: An Integrated Approach*. Boston: Houghton Miffin.

Hofbauer, G., Körner, R., Nikolaus, U., & Poost, A. (2009). *Marketing von Innovationen. Strategien und Mechanismen zur Durchsetzung von Innovationen*. Stuttgart, Germany: Kohlhammer.

Huck, S. (2009). Innovationskommunikation in den Arenen der Medien. Campaigning, Framing und Storytelling. In A. Zerfaß & K.M. Möslein (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement. Strategien im Zeitalter der Open Innovation*. Wiesbaden, Germany: Gabler.

Ingenhoff, D. & Röttger, U. (2008). Issues Management. Ein zentrales Verfahren der Unternehmenskommunikation. In M. Meckel, & Schmid, B.F. (Eds.), *Unternehmenskommunikation : Kommunikationsmanagement aus Sicht der Unternehmensführung* (pp. 323–354). Wiesbaden, Germany: Gabler Verlag.

Jablin, F.M. & Sias, P.M. (2004). Communication Competence. In F.M. Jablin & L.L. Putman (Eds.) *The New Handbook of Organizational Communication: Advances in Theory, Research, and Methods* (pp. 818–864). Thousand Oaks, CA: Sage.

Jones, R. & Tollin, K. (2008). Marketing's Role for Firms' Renewal and Innovation Capability. In K. Tollin & A. Carù (Eds.), *Strategic Market Creation. A New Perspective on Marketing and Innovation Management*. Hoboken, NJ: Wiley.

Kane, M. & Trochim, W.M.K. (2007). *Concept Mapping for Planning and Evaluation*. Thousand Oaks: Sage.

Kima, S.-H. & Nam, S. (2004). Across the threshold: Role of performance and compatibility in innovative new products' market penetration. *Industrial Marketing Management*, 33: 689–699.

Koolman, K. (2006). *Markenerfolg mit Marketinginnovationen*. Saarbrücken, Germany: VDM Verlag Dr. Müller.

Krishna, A. (2010). (Ed.). *Sensory Marketing: Research on the Sensuality of Products*. New York: Routledge.

Kroeber-Riel, W. (1993). *Bildkommunikation : Imagerystrategien für die Werbung*. München, Germany: Vahlen.

Lichenthaler, U. & Lichtenthaler, E. (2009). A capability-based framework for open innovation: complementing absorptive capacity. *Journal of Management Studies*, 46(8): 1315–1338.

Lindgren, M. & Bandhold, H. (2009). *Scenario Planning. The Link Between Future and Strategy* (2nd ed.). Basingstoke: Palgrave Macmillan.

Maathuis, O., Rodenburg, J., & Sikkel, D. (2004). Credibility, emotion or reason? *Corporate Reputation Review*, 6(4): 333–345.

Mahajan, V., Muller, E., & Bass, F.M. (1990). New product diffusion models in marketing: A review and directions for research. *Journal of Marketing*, 54: 1–26.

Mahajan, V., Muller, E., & Bass, F.M. (1995). Diffusion of new products: Empirical generalizations and managerial uses. *Marketing Science*, 14(3): 79–88.

Mahajan, V., Muller, E., & Wind, Y. (2000). New-Product Diffusion Models: From Theory to Practice. In V. Mahajan, E. Muller, & Y. Wind (Eds.) *New-Product Diffusion Models* (pp. 3–27). Düsseldorf: Springer.

Martilla, J.A. (1971). Word-of-mouth communication in the industrial adoption process. *Journal of Marketing Research*, 8(2): 173–178.

Mast, C. & Zerfaß, A. (2005). *Neue Ideen erfolgreich durchsetzen. Das Handbuch der Innovationskommunikation*. Frankfurt am Main, Germany: F.A.Z.-Institut für Management-, Markt- und Medieninformation.

Mast, C., Huck, S., & Zerfass, A. (2005). Innovation communication. Outline of the concept and empirical findings from Germany. *Innovation Journalism*, 2(7): 1–14.

Mast, C., Huck, S., & Zerfaß, A. (2006). *Innovationskommunikation in dynamischen Märkten. Empirische Ergebnisse und Fallstudien*. Berlin, Germany: Lit Verlag.

Mazzarol, T. (2011). The Role of Word of Mouth in the Diffusion of Innovation. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 9). Berlin, Germany: Springer.

McGee, J., Thomas, H., & Wilson, D. (2005). *Strategy: Analysis and Practice*. New York: McGraw Hill.

Miller, K. (2005). *Communication Theories: Perspectives, Processes, and Contexts*. (2nd ed.). New York: McGraw-Hill.

Mohr, J., Sengupta, S., & Slater, S. (2009). *Marketing of High-Technology Products and Innovations*. (3rd ed.). New Jersey: Pearson.

Möller, K. & Anttila, M. (1987). Marketing capability – A key success factor in small business? *Journal of Marketing Management*, 3(2): 185–203.

Moreau, C.P., Lehmann, D.R., & Markman, A.B. (2001). Entrenched knowledge structures and consumer response to new products. *Journal of Marketing Research*, 38(2), 14–29.

Morgan, N.A., Zou, S., Vorhies, D.W., & Katsikeas, C.S. (2003). Experiential and informational knowledge, architectural marketing capabilities, and the adaptive performance of export ventures: A cross-national study. *Decision Sciences*, 34(2): 287–321.

Morgan, N.A., Slotegraaf, R.J., & Vorhies, D.W. (2009a). Linking marketing capabilities with profit growth. *International Journal of Research in Marketing*, 26(4): 284–293.

Morgan, N.A., Vorhies, D.W., & Mason, C.H. (2009b). Market orientation, marketing capabilities, and firm performance. *Strategic Management Journal*, 30(8): 909–920.

Nath, P., Nachiappan, S., & Ramanathan, R. (2010). The impact of marketing capability, operations capability and diversification strategy on performance: A resource-based view. *Industrial Marketing Management*, 39(2): 317–329.

Nordfors, D. (2009). Innovation Journalism, Attention Work and the Innovation Economy A Review of the Innovation Journalism Initiative 2003–2009. *Innovation Journalism*, 6(May 1): 1–46.

Orlikowski, W.J. & Gash, D.C. (1994). Technological frames – making sense of information technology in organizations. *ACM Transactions on Information Systems*, 12(2): 174–207.

Pablo, A., Reay, T., Dewald, J.R., & Casebeer, A.L. (2007). Identifying, enabling and managing dynamic capabilities in the public sector. *Journal of Management Studies*, 44: 687–708.

Pae, J.H., & Lehmann, D.R. (2003). Multigeneration innovation diffusion: The impact of intergeneration time. *Journal of the Academy of Marketing Science*, 31(1): 36–45.

Papa, M.J., Daniels, T.D., & Spiker, B.K. (2008). *Organizational Communication. Perspective and Trends*. Thousand Oaks, CA: Sage.

Peres, R., Muller, E., & Mahajan, V. (2010). Innovation diffusion and new product growth models: A critical review and research directions. *International Journal of Research in Marketing*, 63: 849–855.

Pfannenberg, J. & Zerfaß, A. (2005). (Eds.) *Wertschöpfung durch Kommunikation*. Frankfurt am Main: Frankfurter Allgemeine Buch.

Pfeffermann, N. (2011). The Scent of Innovation – Towards an Integrated Management Concept for Visual and Scent Communication of Innovation. In M. Hülsmann & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 12). Berlin, Germany: Springer.

Pfeffermann, N., Hülsmann, M., & Scholz-Reiter, B. (2008). Framing Innovations to Grasp Stakeholders' Attention: A Dynamic Capability-Based Conception of Innovation Communication. *Research Report 2007/08 International Graduate School for Dynamics in Logistics*, Vol. 01, 2008, pp. 40–44.

Pozzi, M. (2001). The Terminological Definition: Conflicts Between Theory. In F. Mayer (Ed.), *Language for Special Purposes: Perspectives for the New Millennium, Linguistics and Cognitive Aspects, Knowledge Representation and Computational Linguistics, Terminology, Lexikography, and Didactics* (Vol. 1, pp. 272–281). Tübingen: Narr.

Prandelli, E., Sawhney, M., & Verona, G. (2008). *Collaborating with Customers to Innovate. Conceiving and Marketing Products in the Networking Age*. Northampton, MA: Edward Elgar.

Protogerou, A., Caloghirou, Y., & Lioukas, S. (2008). Dynamic capabilities and their indirect impact on firm performance. Conference Paper on *Entrepreneurship and Innovation – Organizations, Institutions, Systems, and Regions. Copenhagen, CBS*, June 17–20, 2008. Available at: http://www2.druid.dk/conferences/viewpaper.php?id=3718&cf=29 [date: 30-01-2010].

Putman, L.L. & Fairhurst, G.T. (2004). Discourse Analysis in Organizations. Issues and Concerns. In F.M. Jablin, & L.L. Putman (Eds.) *The New Handbook of Organizational Communication: Advances in Theory, Research, and Methods* (pp. 78–136). Thousand Oaks, CA: Sage.

Rempel, J.E. & Esch, F.-R. (2009). Olfaktorische Reize in der Kommunikation. In M. Bruhn, F.-R. Esch, & T. Langer (Eds.), *Handbuch Kommunikation: Grundlagen, innovative Ansätze, praktische Umsetzungen* (pp. 285–315). Wiesbaden: Gabler Verlag.

Ringland, D. (2006). *Scenario Planning, Managing for the Future* (2nd ed.). Chichester: Wiley.

Rogers, E.M. (2003). *Diffusion of Innovations*. (5th ed.). New York: Free.

Rohde, M., Pfeffermann, N., Echelmeyer, W., & Rasch, C. (2011). The High-Tech Innovation 'ParcelRobot' – Patent Strategy and Communication Tools. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 25). Berlin, Germany: Springer.

Rohlfs, J.H. (2001). *Bandwagon Effects in High-Technology Industries*. Cambridge, MA: MIT Press.

Rumelhart, D.E. & Norman, D.A. (1988). Representation in Memory. In R.C. Atkinson (ed.) *Stevens' Handbook of Experimental Psychology: Vol. 2 Learning and Cognition* (2nd ed., pp. 511–587). New York: Wiley.

Rumelhart, D.E. & Ortony, A. (1977). The Representation of Knowledge in Memory. In R.C. Anderson, R.J. Spiro, & W.E. Montague (Eds.), *Schooling and the Acquisition of Knowledge* (pp. 99–135). Hillsdale, NJ: Erlbaum.

Sandberg, B. (2008). *Managing and Marketing Radical Innovations*. London: Routledge.

Scheufele, D.A. (1999). Framing as a theory of media effects. *Journal of Communication*, 49(1): 103–122.

Scheufele, B. (2003). *Frames, Framing, Framing-Effekte. Theoretische und methodische Grundlegung des Framing-Ansatzes sowie empirische Befunde zur Nachrichtenproduktion*. Wiesbaden: Westdeutscher Verlag.

Schilling, M.A. (2008). *Strategic Management of Technological Innovation* (2nd ed.). New York: McGraw Hill.

Schreyögg, G. & Kliesch-Eberl, M. (2007). How dynamic can organizational capabilities be? Towards a dual-process model of capability dynamization. *Strategic Management Journal*, 28: 913–933.

Scents in Arts (2010). Available at http://www.scents-in-arts.com [date: 01-08-2010].

Simmons, A. (2007).*Whoever Tells the Best Story Wins: How to Use Your Own Stories to Communicate with Power and Impact*. New York: Amacon.

Slotegraaf, R.J. & Dickson, P.R. (2004). The paradox of a marketing planning capability. *Journal of the Academy of Marketing Science*, 32(4): 371–385.

Smith, R.D. (2009). *Strategic Planning for Public Relations* (3rd ed.). New York: Taylor & Francis.

Somaya, D. & Teece, D.J. (2007). Patents, Licensing and Entrepreneurship: Effecting Innovation in Multi-Invention Context. In E. Sheshinski, R.J. Strom, & W.J. Baumol (eds.), *Entrepreneurship, Innovation, and the Growth Mechanism of the Free-Market Enterprise*. Princeton, NJ: Princeton University Press.

Song, M., van der Bij, H., & Weggeman, M. (2005). Determinants of the level of knowledge application: a knowledge-based and information-processing perspective. *Journal of Product Innovation Management*, 22(5): 430–444.

Song, M., Nason, R.W., & Benedetto, A.D. (2008). Distinctive marketing and information technology capabilities and strategic types: A cross national investigation. *Journal of International Marketing*, 16(1): 4−38.

Sowter, C.V. (2000). *Marketing High Technology Services*. Aldershot: Gower.

Steinhoff, F. & Trommsdorff, V. (2011). Innovation Marketing – An Introduction. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 8). Berlin, Germany: Springer.

Steinmann, H. & Schreyögg, G. (2005). *Management: Grundlagen der Unternehmensführung: Konzepte – Funktionen – Fallstudien* (6th ed.). Wiesbaden, Germany: Gabler.

Talke, K. (2005). *Einführung von Innovationen. Marktorientierte strategische und operative Aktivitäten als kritische Erfolgsfaktoren*. Wiesbaden, Germany: Deut. Univ.-Verlag.

Teece, D.J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13): 1319–1350.

Teece, D.J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7): 509–533.

Tomochi, M., Murata, H., & Kono, M. (2005). A consumer-based model of competitive diffusion: The multiplicative effects of global and local network externalities. *Journal of Evolutionary Economics*, 15: 273–295.

Trommsdorff, V. & Steinhoff, F. (2007). *Innovations Marketing*. München: Franz Vahlen.
Tuominen, M. (1997). Marketing Capability and Market Orientation in Strategy *Interface. Helsingin kauppakorkeakoulun julkaisuja B-1*, Helsinki.
van den Bulte, C. & Stremersch, S. (2004). Social contagion and income heterogeneity in new product diffusion: A meta-analytic test. *Marketing Science*, 23(4): 530–544.
van Riel, C. & Fombrun, C. (2008). *Essentials of Corporate Communication. Implementing Practices for Effective Reputation Management*. New York: Taylor & Francis.
Vorhies, D.W. (1998). An investigation of the factors leading to the development of marketing capabilities and organizational effectiveness. *Journal of Strategic Marketing*, 6: 3–23.
Vorhies, D.W. & Morgan, N.A. (2003). A configuration theory assessment of marketing organization fit with business strategy and its relationship with marketing performance. *Journal of Marketing*, 67(1): 100–115.
Vorhies, D.W. & Morgan, N.A. (2005). Benchmarking marketing capabilities for sustainable competitive advantage. *Journal of Marketing*, 96(1): 80–94.
Vorhies, D.W., Morgan, R.E., & Autry, C.W. (2009). Product-market strategy and the marketing capabilities of the firm: impact on market effectiveness and cash flow performance. *Strategic Management Journal*, 30(12): 1310–1334.
Waarts, E., van Everdingena, Y.M., & van Hillegersberg, J. (2002). The dynamics of factors affecting the adoption of innovations. *Journal of Product Innovation Management*, 19: 412–423.
Waldmann, M.R. (1990). *Schema und Gedächnis: das Zusammenwirken von Raum- und Ereignisschema beim Gedächnis für Alltagssituationen*. Heidelberg, Germany: Roland Asanger Verlag.
Weber, R. & Crocker, J. (1983). Cognitive processes in the revision of stereotypic beliefs. *Journal of Personality and Social Psychology*, 45(5): 961–977.
Weerawardena, J. (2003). The role of marketing capability in innovation-based competitive strategy. *Journal of Strategic Marketing*, 11: 15–35.
Wellmon, T. (1988). Conceptualizing organizational communication competence: A rules-based perspective. *Management Communication Quarterly*, May 1: 515–534.
Zander, U. & Kogut, B. (1995). Knowledge and the speed of the transfer and imitation of organizational capabilities: An empirical test. *Organization Science*, 6(1): 76–92.
Zaremba, A.J. (2003). *Organizational Communication: Foundations for Business & Management*. Mason, Ohio: Thomson/South-Western.
Zaremba, A.J. (2006). *Organizational Communication: Foundations for Business & Collaboration*. Mason, Ohio : Thomson/South-Western.
Zerfaß, A. (2007). Unternehmenskommunikation und Kommunikationsmanagement: Grundlagen, Wertschöpfung, Integration. In M. Piwinger, & Zerfaß A. (eds.), *Handbuch der Unternehmenskommunikation* (pp. 21–70).Wiesbaden, Germany: Gabler Verlag.
Zerfaß, A. (2009). Kommunikation als konstitutives Element im Innovationsmanagement – Soziologische und kommunikationswissenschaftliche Grundlagen der Open Innovation. In A. Zerfaß & K.M. Möslein (Eds.), *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation* (pp. 23–56). Wiesbaden, Germany: Gabler.
Zerfaß, A. & Ernst, N. (2008). *Kommunikation als Erfolgsfaktor im Innovationsmanagement. Ergebnisse einer Studie in deutschen Zukunftstechnologie-Branchen*. Leipzig: Universität Leipzig.
Zerfaß, A. & Möslein, K.M. (2009). *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation*. Wiesbaden, Germany: Gabler.
Zerfaß, A., Sandhu, S., & Huck, S. (2004). Innovationskommunikation – Strategisches Handlungsfeld für Corporate Communications. In G. Bentele, M. Piwinger, & G. Schönborn (Eds.), *Kommunikationsmanagement. Strategien, Wissen, Lösungen* (August 2006; 1.24, pp. 1–30) München: Luchterhand.
Zou, S., Fang, E., & Zhao, S. (2003). The effect of export marketing capabilities on export performance: An investigation of Chinese exporters. *Journal of International Marketing*, 11(4): 32–55.

Appendix: Illustration of Definitions of Organizational Communication Competence and Marketing Capability (sorted in chronological and then alphabetical order and is not to be understood as a complete review)

Type	Definition	Source
Marketing capabilities	"The marketing capabilities include product development, the process to develop and manage product and service offerings; pricing, the strategy to extract the optimal revenue from firm's sales; channel management, the course of action to establish and maintain the channels of distribution that effectively and efficiently deliver value to end-user customers; marketing communications, the ability to manage customer value perceptions; selling, the activity to fulfill customer orders; market information management, the practice to acquire and use market knowledge; marketing planning, the ability to create marketing strategies that optimize the match between the firm's resources and its marketplace; marketing implementation, the process to transform marketing strategy into realized resource deployments" (p. 153; based on Vorhies and Morgan 2005)	Akdeniz et al. (2010)
Marketing capability	"... marketing capability to be firm's ability derived from two prominent components: marketing planning ability and marketing implementation ability." (p. 850)	Chang et al. (2010)
Marketing capability	"Marketing capability is defined as the integrative process, in which a firm uses its tangible and intangible resources to understand complex consumer specific needs, achieve product differentiation relative to competition, and achieve superior brand equity" (p. 319; based on Day 1994; Dutta et al. 1999; Song et al. 2005, 2008).	Nath et al. (2010)
Dynamic marketing capabilities	"Dynamic marketing capabilities reflect human capital, social capital and the cognition of managers involved in the creation, use and integration of market knowledge and marketing resources in order to match and create market and technological change" (p. 103)	Bruni and Verona (2009)

(*continued*)

Type	Definition	Source
Marketing capability model	"... we focus on capabilities that are consistent with both Day's (1994) marketing capability model and Srivastava et al.'s (1998) framework linking market-based assets with cash-flow growth". = market-sensing capability; CRM capabilities, and brand management capabilities (p. 285)	Morgan et al. (2009a)
Two interrelated marketing capability areas	"Two interrelated marketing capability areas have been identified: capabilities concerning individual 'marketing mix' processes, such as product development and management, pricing, selling, marketing communications, and channel management (e.g. Vorhies and Morgan 2005), and capabilities concerned with the processes of marketing strategy development and execution (e.g. Morgan et al. 2003). These capabilities may be rare, valuable, non-substitutable, and inimitable sources of advantage that can lead to superior firm performance (e.g. Vorhies and Morgan 2005). Further, as knowledge-based processes that become embedded over time, such capabilities may be difficult for competitors to imitate (e.g. Teece et al. 1997)" (pp. 910–911)	Morgan et al. (2009b)
Architectural marketing capabilities and marketing capability integration	"... to simultaneously model the ways that product-market strategy influences specialized and architectural marketing capabilities and marketing capability integration" (p. 1321)	Vorhies et al. (2009)
Marketing capabilities	Marketing capabilities are divided into inside-out capabilities, spanning capabilities, and outside-in capabilities (based on Day 1994)	Jones and Tollin (2008)
	"Marketing capabilities – such as skill in segmentation, Organizational Capabilities Information Technology Capabilities and Strategic Types 9 targeting, pricing, and advertising – enable the organization to take advantage of its market-sensing and technological capabilities and to implement effective marketing programs" (pp. 8).	Song et al. (2008)
Marketing-mix capabilities	"... the capabilities used to orchestrate marketing-mix capabilities and their resource inputs involving market information management and marketing	Vorhies and Morgan (2005)

(*continued*)

Type	Definition	Source
	strategy development and execution" (p. 82)	
Marketing planning capability	"... marketing planning capability, we focus on specific elements fundamental to the overall marketing planning process" (p. 372)	Slotegraaf and Dickson (2004)
Organizational communication competence along three dimensions (and an overview of several conceptualizations/ definitions)	"... conceptualize organizational communication competence along three dimensions: competence assessment criteria, competence levels, and ecological systems. Such a conceptualization acknowledges the cognitive and behavioral components of communication competence, the developmental nature of communication competence, and the embeddedness of communication competence at various levels of analysis" (p. 833)	Jablin and Sias (2004)
Architectural marketing capabilities	"Architectural marketing capabilities are defined in the literature as the processes by which firms plan appropriate combinations of available knowledge and other resources to deploy into their marketplace(s) and execute these planned resource deployments, transforming them into realized value offerings for target market(s)." (p. 293)	Morgan et al. (2003)
Two types of marketing capabilities	"We identified and assessed two types of marketing capabilities: specialized capabilities regarding the specific marketing mix-based work routines used to transform available resources into valuable outputs [...] and architectural capabilities regarding the marketing strategy formulation and execution work routines used to develop and coordinate specialized capabilities and their resource inputs ..." (p. 106)	Vorhies and Morgan (2003)
Marketing capability	"... marketing capability is defined as integrative processes designed to apply the collective knowledge, skills, and resources of the firm to the market-related needs of the business, enabling the business to add value to its goods and services and meet competitive demands." (p. 19)	Weerawardena (2003)
Four functional export marketing capabilities	"... we focus on four functional export marketing capabilities: pricing capability, product development capability, distribution capability, and communication capability" (p. 36)	Zou et al. (2003)

(*continued*)

Type	Definition	Source
External marketing capability and internal marketing capability	MAC = Marketing Capability "... External MAC is a function of the extension of a firm's network positions and weak ties, and of such more individual competencies like the networking ability of key managers (or the owner–manager in micro firms), and their ability to develop valid cognitive maps of interrelated nets. ... second MAC is labelled Strategic marketing capability. It is composed of two principal sub-capabilities, (1) market targeting and positioning capabilities, and (2) relationship developing capability." (p. 20)	Äyväri and Möller (1999)
Marketing capability	"Marketing Capability. A firm with a strong marketing capability – exhibiting superiority in identifying customer's needs and in understanding the factors that influence consumer choice behavior – will be able to achieve better targeting and positioning of its brands relative to competing brands." (p. 8)	Dutta et al. (1999)
Marketing capabilities	"... marketing capabilities are the integrative processes designed to apply the collective knowledge, skills and resources of the firm to the market-related needs of the business, enabling the business to add value to its goods and services, adapt to market conditions, take advantage of market opportunities and meet competitive threats (Day 1994)." (p. 4)	Vorhies (1998)
Marketing capability (inside-out, outside-in, and spanning processes)	"... marketing capability represents both the upstream or outside-in processes as well as the downstream or inside-out and spanning processes in regard tp business processes." (p. 73)	Tuominen (1997)
Inside-out capability, outside-in capability, and spanning capabilities	"Capabilities can be usefully sorted into three categories, depending on the orientation and focus of the defining processes [...]. At one end of the spectrum are those that are deployed from the inside out and activated by market requirements, competitive challenges, and external opportunities. [...] At the other end of the spectrum are those capabilities whose focal point is almost exclusively outside the organization. The purpose of these outside-in capabilities is to connect the	Day (1994)

(*continued*)

Type	Definition	Source
	processes that define the other organizational capabilities to the external environment and enable the business to compete by anticipating market requirements ahead of competitors and creating durable relationships with customers, channel members, and suppliers. Finally, spanning capabilities are needed to integrate the inside-out and outside-in capabilities" (p. 41)	
Organizational communication competence	Conceptual definition of organizational communication competence consists of 13 related categories based on telephone interviews listing: friends; personal manner; successful behaviors; good leadership skills; understanding human nature; motivation; professionalism; organizational involvement; organized; feedback; interaction skills; effective verbal style; demonstration of knowledge (pp. 524–529)	Wellmon (1988)
Marketing capability	"The marketing capability of a firm is a multi-faceted phenomenon. It is a complex combination of the human resources or assets, market assets, and organisational assets of a firm" (p. 187)	Möller and Anttila (1987)

Source: by the author

Part IV
Best Practices

Chapter 19
Science Comes Alive! The Internet Film Portal DFG Science TV

Eva-Maria Streier, Nicole Pfeffermann and Jörn Grapp

Contents

19.1 Media Communication in Science

Communication is the way to exchange with other people world-wide and to be informed about current topics and individual stories. Both new media channels, many-to-many information ways (internet, e-mail), and a combined communication using also mass media communication, one-to-many information transmission

E.-M. Streier (✉)
Presse- und Öffentlichkeitsarbeit, Deutsche Forschungsgemeinschaft (DFG), Kennedyallee 40, 53175 Bonn, Germany
e-mail: Eva-Maria.Streier@dfg.de

N. Pfeffermann and J. Grapp
Systems Management, International Logistics, School of Engineering and Science, Jacobs University Bremen, Campus Ring 1, 28759 Bremen, Germany
e-mail: Nicole.Pfeffermann@googlemail.com, j.grapp@jacobs-university.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, 293
DOI 10.1007/978-3-642-17223-6_19,

(television, radio, newspaper, magazine, museums), are of expanding interest in science (e.g., Kahlor and Stout 2009; Bucchi and Trench 2008; Stocklmayer et al. 2001). In particular, the implementation of new media communication with the focus on young recipients and social media channels is an emerging issue. The so-called **Web 2.0 features** can be found often on websites nowadays with the objective to connect web users in communities, sharing and creating knowledge and to use the interactivity of the medium internet (Morris 2010).

In the context of a **scientific communication process** (Björk 2007), the use of new media communication channels allows sharing and distributing scientific knowledge in a more effective way regarding the reached audience world-wide and the amount of disseminated information on websites, on general information portals, in research communities, and partner cooperation websites. In the process of written and visual communication of scientific knowledge, communication tools such as press releases, videos/films/animations/simulations/, brochures, and also web pages can be used to present updated project steps, main findings and scientific results in final reports (Lindberg Christensen 2007). In particular a mixture of those channels and an overall concept including target group definition and key messages is necessary in the complete scientific communication process.

One way of using new media communication in science is represented by the **project DFG Science TV**. This innovative project aims at providing insights into day-to-day research work and informing target groups on its Internet film portal.

19.2 The Concept of DFG Science TV: Science Comes Alive!

Financed by the German federal and state governments, the Deutsche Forschungsgemeinschaft (DFG) offers particularly funding for basic research projects in all research areas and with a budget of 2,3 billion Euro it is the largest central research funding organisation in Germany. The academies of science, German universities, non-university research institutions and scientific associations are members of the DFG. Other main fields of the DFG concentrate on the funding of young researchers and the support of international research collaborations. Top priority takes scientific quality and excellence in research.

19.2.1 The Basic Idea of DFG Science TV

'DFG Science TV is a window on science. The project, developed in collaboration with partners Gisela Graichen, Hamburg, and Peter Prestel, Eichstätt, (film production) and implemented for the web in cooperation with 3point-concepts from Berlin, is primarily aimed at a teenage audience, but is also intended for the general pubic as a whole. In 3-min shorts, the portal follows DFG-funded projects and

shows the researchers' day-to-day work in chronologically developing film diaries.' (DFG press release no. 19, 2009)

DFG Science TV is a continuously growing Internet film portal that presents short films of selected research projects in different series à ten projects made by scientists, covering a wide spectrum of research disciplines, and also provides additional background information, further links, and several Web 2.0 features. For each project, one specific research questions is embedded in an interesting story which is portrayed in 6–12 3-min shorts; finally leading to research film diaries. Thus, DFG Science TV represents an interactive, international-oriented dialogue platform to share knowledge and give insights of day-to-day research work (e.g. conducting scientific studies, learning from nature) for the target groups.

The profile of DFG Science TV can be briefly described as follows:

19.2.2 Main Focus

- Six to twelve short films on research projects embedded in a fascinating story
- Additional background information of scientists and research projects
- Several communication tools (web features) to facilitate interactivity and to establish an interactive dialog platform

19.2.3 Main Objectives

- To provide insights into day-to-day research work in various disciplines
- To inform about research in order to strengthen a positive image of research and awaken enthusiasm and interest in basic research
- To gain new target groups for DFG and DFG-supported projects

19.2.4 Main Target Groups

- Fourteen to nineteen year-old web users who can become tomorrow's scientists
- Teachers who can use DFG Science TV's short films as lesson material
- Scientists who can present his/her research work in the scientific community
- Web users/public who are interested in science, research work and questions (Fig. 19.1)

19.2.5 Cooperation Partners

- Academics: http://www.academics.com
- Young Germany: http://www.younggermany.de

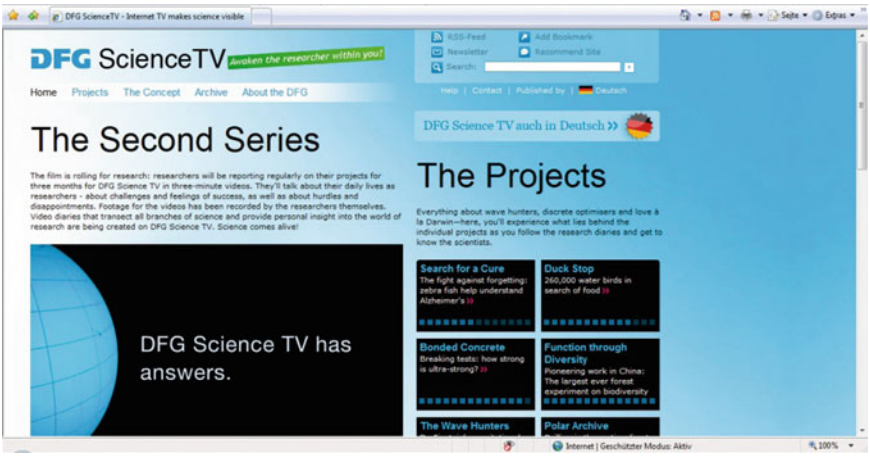


Fig. 19.1 Homepage of *DFG Science TV*
Source: authors (adapted from the DFG Science TV website)

- Zeit online: http://www.zeit.de
- Magazin Deutschland: http://www.magazine-deutschland.de

19.2.6 The Execution Program of DFG Science TV

The basic conditions of the project were on the one hand to provide technical equipment and an introduction seminar for scientists; on the other hand supporting activities for scientists in story board creation for their own film productions.

1. Introduction seminar:
   - One week intensive seminar supported by professional teams (camera, film, audio, interview and rough cut)
2. Technical equipment:
   - Camera
   - Film editing software program
   - Computer
3. Story board creation and film production:
   - In close collaboration with scientists the story boards were developed providing a framework in which all episodes are produced
   - The rough cut material of 30 min were translated into a 3-min film by the production company
   - A post production gives each film the last professional cut, effects, and audio settings

All research projects are presented in terms of professional 3-min films which are integrated in a story with the aim to answer specific and for the target group most attractive research question and give a thread of continuity.

But how can the method of storytelling be used for this project?

19.3 Communication Tools to Establish DFG Science TV

19.3.1 Storytelling as a Method for DFG Science TV

Stories are inherently visual and stimulate the imagination (Stevenson 2010). The use of stories may lead to a reflexion on experiences, an implementation of ideas, high attention, and an active dialogue between story teller and listener (e.g., Denning 2005; Frenzel et al. 2006; Simmons 2007). Thus, knowing and applying the basics of storytelling can strengthen recognition and trust.

The **method of storytelling** can be used **in the organizational context** such as in corporate communication/public relations, marketing/branding, and knowledge management (e.g., Denning 2005; Frenzel et al. 2006). As a communication tool storytelling provides a means for an interactive dialogue between the story teller (organisation) and listener (stakeholders) to shape a brand image (Fog et al. 2005), to promote and sell products/services (e.g., Maxwell and Dickman 2007; Miller 2008), and to exchange knowledge between individuals (e.g., Denning 2005). In particular, digital storytelling, which uses new technologies/internet, can inform individuals in the twenty-first century in terms of information-based projects (Miller 2008), as it can be shown with DFG Science TV.

Story mapping is a fundamental basic and helps creating a well-developed story. Telling a story in a series of pictures (storyboard) represents one means to build an emotional story. Thus, a communication and planning tool to visualize emotional-oriented film stories is **storyboarding** (Glebas 2008). Using a storyboard for editing and directing a film supports film producers to make films leading to a high recognition and a trustful, long remembered story. The planning and editing of a storyboard encompasses creating characters (protagonists). Those actors, embedded in a character-driven story (Beiman 2007), can support the imagination and identification of the audience. Moreover, the process-oriented method *storyboarding* fosters the idea creation process and generates a consensus within the creative group because the visual planning process is based on creative methods such as mind mapping (Begleiter 2010).

In the context of DFG Science TV, storyboards are used to visualise stories, referred to as the research diaries, and be a guideline for the scientists to produce the episodes of their research project. Due to the fact that the shooting for all films is done by scientists themselves, the episodes inform in an authentic way and can create a high interest in watching the chronologically produced 3-min shorts. The protagonists in the episodes are mostly two researchers who inform about

their day-to-day research work. In one of the episodes the protagonist in fact is a robot! As a result, the DFG Science TV's audience know the protagonists and going through the story to know what happens in the next episode until the last short. Additionally, the researchers were able to create storyboards, supported by a professional film production, leading to a consensus within the whole team regarding each presented scientist-made research diary.

19.3.2 Communication Along the Innovation Process

The **project DFG Science TV** can be divided into **two main steps**. In the **first project step**, the technological feasibility of making 10 up-to-date 3-min films out of 10 research projects some of them abroad should be proven and the Internet film portal launched successfully. Thus, the first step can be seen as a pilot study. After the successful implementation and validation, the **second project step** consisted of a refined execution program and a further developed online communication concept which resulted in establishing an interactive dialogue platform. In addition, each 3-min shorts as well as the complete website were translated into English.

Regarding the project as an innovative way of communicating scientific knowledge and day-to-day research work, several communication activities can be linked to the innovation process, as shown in Fig. 19.2.

Figure 19.2 highlights the development of communication activities in the two main phases within the innovation process: (**1**) **pilot study and** (**2**) **dialogue platform**. **First**, the launched Internet film portal was accompanied by a press conference; however this project steps focused mainly on the creation and publication of

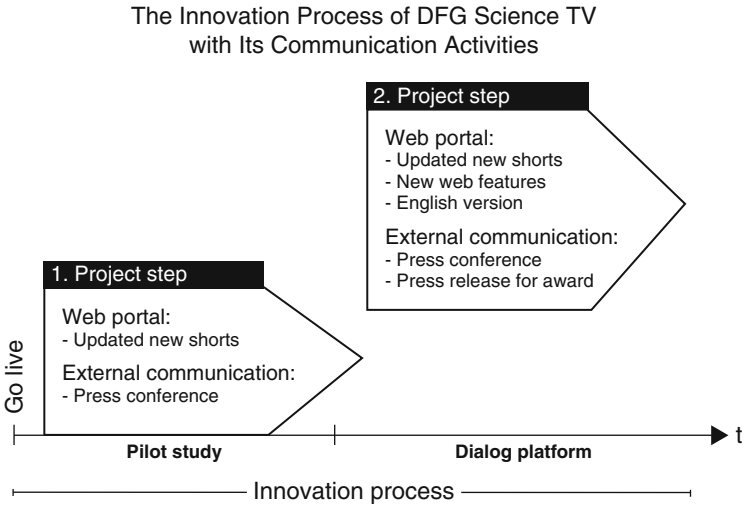


Fig. 19.2 Communication activities related to project steps of DFG Science TV
Source: authors

a series of 3-min shorts according to pre-defined research projects. **Second**, in January 2009 the English version of DFG Science TV was launched successfully. Moreover, the website was updated to offer modern Web 2.0 features and a press conference including a press release announced the second series. As a result, many interesting stories about day-to-day research work in various fields of interest were presented weekly on the new dialogue platform DFG Science TV – the first series in the archive and the second series on the homepage.

Up to now the following web features, referred to as communication tools, are offered for different target groups and promote the film portal at the same time:

- **RSS-Feed**: This service is one means to receive news of DFG Science TV's content updates.
- **Add Bookmark**: Adding several social bookmarks is another feature of the updated website DFG Science TV.
- **Recommend Site**: Website visitors can send a recommendation mail to their recipients by using this web feature.
- **Newsletter**: This service is offered on each website to inform about new episodes and any update on DFG Science TV via E-Mail or SMS.
- '**More Information on the Project**', '**Links**', **and** '**To Galleries**': The information services cover a wide spectrum of additional information materials regarding the presented projects with further links as well as photos.
- **Favourites**: An integrated ranking function gives the opportunity to present favourite projects in terms of a ranking list on the homepage.
- **'DFG Science TV on**': Finally, DFG Science TV is also represented on various social media portals such as facebook, YouTube, myspace, twitter, and flickr.

From the external communication perspective, both the launch of the project and the introduction of the second series were **supported by public relations activities** such as press conferences and press releases. The project was also promoted in DFG's overall communication activities, for instance, in face-to-face communication activities like conferences and board meetings. Another example is the presentation of DFG Science TV live on a screen in front of DFG's conference rooms. With a touch panel the interested target group can surf the Internet film portal and exchange about all episodes in coffee breaks. This is a good example of how online communication activities can be integrated into the overall communication concept of an organisation. Finally, it can lead to feedback talks and positive communication effects.

19.3.3 First Communication Effects

One press release was published when DFG Science TV was **awarded the intermedia-globe Gold Award**. This event could be evaluated as one positive effect of the successful implementation of the innovative internet film portal. The press release wrote 'Internet Film Portal Wins Prize for Outstanding Media Communication'

(DFG press release no. 19, 2009) and described the positive feedback and evaluation criteria of the intermedia-globe Gold Award in the WebTV/Information category as follows:

'The intermedia-globe has been awarded since 2000 to successful films that do not fall into the conventional categories of advertising or feature films, but instead span the broad spectrum from corporate communications to education and animation. Its Gold category stands for excellence in state-of-the-art media communication. The international award panel, which consists of communication experts, decided that DFG Science TV fulfilled the demanding requirements in terms of implementation, creativity and, first and foremost, appealed to its target audience. DFG Science TV was selected from about 550 nominations, from 30 different counties, to win the award.' (DFG press release no. 19, 2009)

Regarding further first communication effects, the evaluation of the DFG Science TV's first series was conducted externally through **online surveys, website tracking, and qualitative telephone interviews**. Those methods aim at measuring the acceptance and the use/usability of DFG Science TV. In general, the report presents positive results, as shown in the following listed main points:

- High acceptance and positive effects on the main target group *14–19 year olds*
- Positive evaluation of the presented shorts in general regarding information content and comprehensibility
- High acceptance and positive impact on the further target group *teachers*
- Additional information services and interactive web features – Web 2.0 features – are desired for the second series

Another evaluation criterion can be the **website statistics** (April 2010):

In the first series the website visitors amounts 35,000 and increased to 172,504 in the second series (in 2010: 147,186 website visitors). In total, over 371,000 films were watched in the second series – on the Internet film portal DFG Science TV and on other websites. The positive development is also seen in the number of page views which have risen from 319,000 to 1,555,217 in the second series. In 2010 the number of page views amounts in total 720,869.

19.4 Selected Project: Love à la Darwin

Do inner values matter? And what is beauty?

On the Internet film portal DFG Science TV the **selected project example *Love à la Darwin*** presents answers to those questions in 10 3-min film productions and one teaser video. As 1 out of 20 research projects, this project is a good example to show the diversity and interesting contributions on this web portal (see all research projects listed in Appendix).

The introduction text to the project on the website:

'A date with Darwin: from the perspective of evolution, beauty plays an important role in the choice of partner. But what is beauty? There are no fixed

measurements for beauty-but there are rules and laws of nature according to which we can evaluate good appearance. Modern behavioural biology examines the signal effect of face and body and recognises that our appearance has a considerable effect on choice of partner. But not all aspects have yet been sufficiently researched. With their studies, the behavioural biologists from Göttingen hope to open a new chapter in the history of the search for the ideal partner. It's sure to be anything but boring: what role do, for example, the appearance of the skin or the body movements of another play?' (DFG Science 2010).

In total ten chronological episodes are offered on the film portal and one introduction film, as shown in Fig. 19.3. The main protagonists (scientists) telling their individual story chronologically to present answers on the posed questions. Moreover, as one update in the second series, additional background information is provided. For instance, the project page and a link to the Emmy Noether Research Group at the Goettingen University which is found under 'More Information on the Project' and 'Links'. The example shows the main characteristics and possibilities of the Internet film portal DFG Science TV.

19.5 Conclusion and Outlook

Initiated by DFG and partners, the Internet film portal DFG Science TV is an innovative project with the aim to present research diaries in 3-min shorts and additionally interesting background information to web users and in particular to the target group of young people between 14 and 19 year olds, who can become tomorrow's scientists, and teachers.

The project used a **two-step online communication concept** to launch the Internet film portal and to further develop the online communication services (Web 2.0 features). The first step concentrated mainly on the basic functionalities and the feasibility to publish regularly 3-min films of ten selected research projects. The second step aimed at creating a dialogue platform through various communication channels, for instance, RSS-Feed, social media bookmarks, favourites feature, and additional information service. As one positive effect, the web portal was nominated and awarded by **intermedia-globe Gold Award** for outstanding media communication.

In the future, a **third series** is planned with produced story-oriented research diaries and detailed background information. However, a new project model will be developed. DFG is the initiator/supporter and sets up standards for the Internet film portal *DFG Science TV* but the project execution and driver function will be handed over to a full-service web agency and/or consulting services. Also the funding will have to come from the projects themselves. Regarding the content development of the dialogue platform, the structure will be changed in terms of linking the content, for instance, past-oriented and present-oriented information and films from one specific discipline.

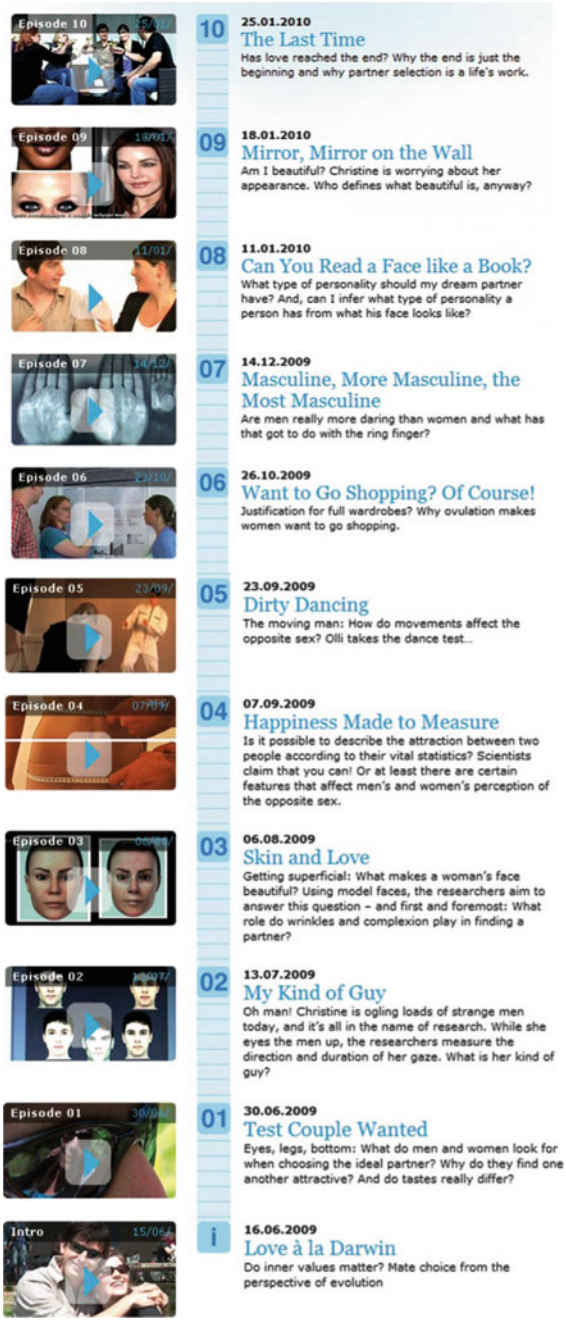


Fig. 19.3 Presentation of all episodes of the example *love à la Darwin* on DFG Science TV. Source: Authors adapted from the DFG Science TV website

Hence, the Internet film portal DFG Science TV will hopefully be growing and also in the future the dialogue platform will provide interesting research stories to inform about research and to strengthen a positive image as well as awaken interest in basic research based on the unique concept 'Science comes alive!'.

Appendix

A list of all presented research projects on DFG Science TV:

The first series:

- An Animal Invasion (scientists working at University Contance)
- The City of five Million (scientists working at University of Cologne)
- Blue Wonder (scientists working at University of Bremen)
- Textile Concrete (scientists working at Technische Universität Dresden)
- Sinking Coasts (scientists working at Deutsches Archäologisches Institut [DAI] and Rhömisch-Germanische-Komission)
- The Human Machine (scientists working at the University Karlsruhe)
- Rainforest (scientists working at Ecuador Phillips-Universität Magdeburg)
- Temple Restoration (scientists working at Fachhochschule Köln)
- Run, Lola, Run (scientists working at University of Cologne)
- Giant Dinosaurs (scientists working at Rheinische Friedrich-Universität Bonn)

The second series:

- Search for a Cure (scientists working with Professor Haass at the Ludwig Maximilians University of Munich)
- Bonded Concrete (scientists working at Institut für Massivbau / Institute for Solid Construction at RWTH Aachen)
- The Wave Hunters (scientists working at the working group of Prof. Dr. Roman Schnabel at the Albert Einstein Institute in Hanover and in the QUEST cluster of excellence)
- Stone-Age Giants (scientists working at CAU Kiel working with Professor Müller and at the RGK in Frankfurt working with Professor Lüth)
- The Start of Nature (scientists working in a research project in Cottbus (Brandenburg) in which researchers from BTU Cottbus, TU Munich and ETH Zürich)
- Duck Stop (scientists working in Constance and at the Max Planck Institute for Ornithology in Radolfzell)
- Function through Diversity (scientists working in a trilateral German–Swiss–Chinese cooperation project)
- Polar Archive (scientists working at Institute of Geology and Mineralogy at the University of Cologne)
- Discrete Optimisers (scientists working at the Institute for Mathematics at TU Berlin)
- Love à la Darwin (scientists working at the Gottingen University)

Bibliography

Begleiter, M. (2010). *From Word to Image-2nd edition: Storyboarding and the Filmmaking Process*. Michigan: Sheridan Books.

Beiman, N. (2007). *Prepare to Board! Creating Story and Characters for Animated Features and Shorts*. Burlington, MA: Focal Press/Elsevier Inc.

Björk, B.-C. (2007). A model of scientific communication as a global distributed information system. *Information Research*, 12(2) paper 307. Available at http://InformationR.net/ir/12-2/paper307.html [24-06-2010]

Bucchi, M. & Trench, B. (2008). *Handbook of Public Communication of Science and Technology*. New York: Routledge.

Denning, S. (2005). *The Leader's Guide to Storytelling: Mastering the Art and Discipline of Business Narrative*. San Francisco, CA: John Wiley & Sons Inc.

DFG press release no. 19 (2009). Available at http://www.dfg.de/en/service/press/press_releases/2009/pressemitteilung_nr_19/index.html [22-06-2010]

DFG Science TV (2010). Available at http://www.dfg-science-tv.de/en/projects/love-a-la-darwin [22-06-2010]

Fog, K., Budtz, C., Munch, P., & Blanchette, S. (2005). *Storytelling: Branding in Practice*. Berlin: Springer.

Frenzel, K., Müller, M., & Sottong, H. (2006). *Storytelling. Das Praxisbuch*. Wien: Carl Hanser Verlag.

Glebas, F. (2008). *Directing the Story: Professional Storytelling and Storyboarding Techniques for Live Action and Animation*. China: Focal Press.

Kahlor, L. & Stout, P. (2009). *Communicating Science: New Agendas in Communication*. New York: Routledge.

Lindberg Christensen, L. (2007). *The Hands-On Guide for Science Communicators: A Step-by-Step Approach to Public Outreach*. New York: Springer Science + Business Media.

Maxwell, R., & Dickman, R. (2007).*The Elements of Persuasion: Use Storytelling to Pitch Better, Sell Faster & Win More Business*. New York: HarperCollins Publishers.

Miller, C.H. (2008). *Digital Storytelling*. Burlington, MA: Focal Press/Elsevier Inc.

Morris, T. (2010). *All a twitter: a personal and professional guide to social networking with Twitter*. New York: Pearson Education Inc.

Simmons, A. (2007). *Whoever Tells the Best Story Wins: How to Use Your Own Stories to Communicate with Power and Impact*. New York: Amacon.

Stevenson, Doug (2010). *Storytelling: A Leadership Development Tool*, Available at http://storytelling-in-business.com/storytelling-for-leadership-development [24-06-2010]

Stocklmayer, S.M., Gore, M.M., & Bryant, C.R. (2001). *Science Communication in Theory and Practice, Contemporary Trends and Issues in Science Education*. Dordrecht, The Netherlands: Kluwer Academic Publishers.

Chapter 20
DHL Open Innovation: Program for the Development, Deployment and Promotion of Innovative Solutions in Logistics

Keith Ulrich

Contents

20.1 Logistics and Innovation

Innovation is a key factor for growth for business and industries. But what can be said about logistics industry? Is logistics an innovative industry?

A brief historical review shows that logistics industry wasn't famous for innovative solutions. Only a few innovations can be mentioned, such as the standard container, barcode, automated sorting center or e-Services. In fact, logistics industry primarily concentrates on efficiency and cost savings.

However, in the recent years, innovation and thus innovation management have been of expanding interest in logistics industry. Amongst others two main reasons seems to be (1) the effects of globalization which tend to influence the business requirements and necessity for the implementation of innovative solutions in worldwide logistic processes and (2) the consolidation of information flow and material handling processes based on changes in advanced information and communication technologies. Moreover, emerging issues are communication of innovations and strategy formulation in innovation management – based on the open innovation view (e.g.

K. Ulrich
DHL Solutions & Innovations, Head of Research and Innovation, Deutsche Post AG, Junkersring 55, 53844 Troisdorf/Spich, Germany
e-mail: K.Ulrich@DeutschePost.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, 305
DOI 10.1007/978-3-642-17223-6_20,

Chesbrough 2003, 2006; Chesbrough and Garman 2009; Gassmann et al. 2010) – in order to manage innovation processes and implement innovative solutions successfully.

Consequently, DHL Solutions & Innovations, a corporate center unit of Deutsche Post DHL, focuses on innovation and innovative solutions with its unique globally oriented DSI program.

20.2 DHL Solutions & Innovations (DSI): Three Pillars for Successful Innovative Solutions

The umbrella DHL Solutions & Innovations, short brand name DSI, encompasses a building and supporting function for innovation based on an innovation funnel perspective. Regarding to state-of-the-art approaches in innovation management (e.g. Baldegger 2008; Schilling 2008), an innovation funnel can be used to define a well-developed innovation process for choosing and managing innovation projects. The innovation funnel is thus a concept for DSI to align its resources, capacities and communication networks, which are spread world-wide, and to define an innovation strategy and implementation process for new technological developments based on the open innovation view.

The three main tasks of DSI are to develop, deploy and promote innovative solutions in logistics. The development of innovative solutions is concerned with the management of the DSI project portfolio in an active and reactive way by using the DSI funnel process. The key task is to develop innovative solutions with customers and internal business units who are involved in all project steps. The deployment task addresses all market-related activities to ensure a successful market launch. Moreover, this process step facilitates multi-divisional cooperation and represents the function of an incubator, if required (i.e. venture projects up to 3 years with case-by-case decisions).

The promotion task is dedicated to the invitation of customers for a "solution dialog," to the support at market launch and to the promotion of successful innovative solutions and innovation in logistics industry.

The overall building function of the DSI program includes both strengthening of trust within Deutsche Post DHL and fostering the partner network (Sect. 20.2.1). On the other hand, the supporting function represents a fundamental basis to deal with further management tasks, such as the patent management group-wide, as well as the offering of technological expertise and the testing environment located at DHL Innovation Center (Sect. 20.2.2).

Regarding the developed DSI innovation funnel, the main innovation process is divided into two phases:

1. DSI development of innovative solutions incl. idea generation phase
2. DSI deployment of innovative solutions incl. promotion phase (Fig. 20.2)

Development phase in the DSI funnel process: The DSI funnel process for the development of solutions includes the idea generation, concept, and development

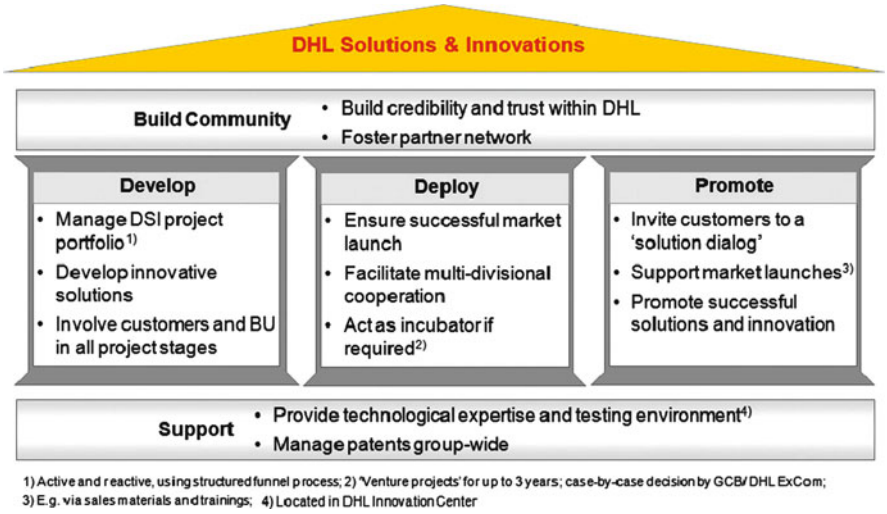


Fig. 20.1 DSI House
Source: DHL Solutions & Innovations

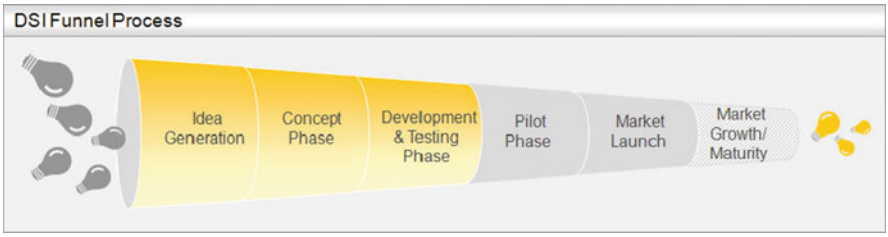


Fig. 20.2 DSI Funnel process with development phases
Source: DHL Solutions & Innovations

and testing phases. The sources for ideas are several communication tools, such as customer feedback, workshops, trend and technology scouting, exchange with business divisions, and market research (e.g. Delphi studies or future scenario workshops with experts). Furthermore, ideas are a result of sector strategies and emerging public issues in logistics industry. After the idea phase, the concept phase starts to create a basic conception of the idea with relevant information for decision-making. The subject of the next step is the development of a first prototype solution which can be tested in the DHL Innovation Center. The initiated projects consist of a project steering committee with representatives of all multi-divisional involved business units and joint project teams of DSI. Besides the internal partners, external partners are involved as well. Both internal and external partners create the DHL innovation community (Sect. 20.2.1). DSI has an active part in joint projects, such as the contribution of expertise and development parts; besides the project management and coordination part.

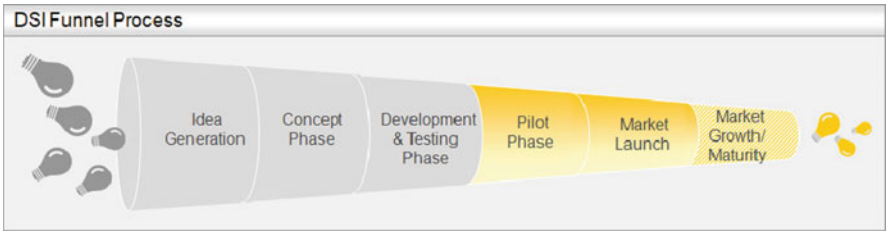


Fig. 20.3 DSI Funnel Process with deployment phases
Source: DHL Solutions & Innovations

Deployment phase in the DSI funnel process: The deployment of innovative solutions covers the pilot phase, market launch and market growth phase.

In the pilot phase of the innovation process, the project lead is gradually handed over to business divisions. Revenues for the developed solutions are allocated to business divisions and thus it doesn't exist any direct recharge of DSI costs to the business units.

In the market launch phase, DSI contributes to the process of innovative solutions by promoting the innovation, for instance, with sales material and trainings. Only in exceptional cases, DSI may also set up "venture projects" with the aim to lead projects beyond market launch. DSI exits after market launch and focuses on post-project monitoring.

20.2.1 DHL Innovation Partner Concept

Partnerships are one essential impact factor for innovation success. Together with its partners, DSI can bring forward innovative solutions as a result of a combination of new developments and existing market solutions.

The DHL innovation community aims at providing a communication platform for internal and external partners and has already established a common culture of innovation across all divisions/business units, regions, and sectors. Both the internal community (divisional management, functional experts, employees, sector teams, global customer solutions) and external community (research partners, industry partners, technology partners, and customers) is integrated, as shown in Fig. 20.4. The DHL innovation community is globally oriented to share ideas, transfer knowledge and create innovative technological logistic solutions world-wide.

The so-called promoters of innovation (Zerfass and Huck 2007) can thus support to find new solutions, to combine new ones with existing market solutions and communicate positively about the upcoming solutions. In fact, the DHL innovation community combines several promoters as "... key persons who help a matter or a topic to get into the focus of selected stakeholders and spread the benefits of the innovation within the boundaries of an organization and beyond" (Zerfass and Huck 2007: 112).

Fig. 20.4 DHL internal and external innovation community
Source: DHL Solutions & Innovations

The externally oriented innovation community includes three partnerships: DHL Technology Providers, DHL Industry Partners and DHL Research Partners. The three types of partnerships have different meanings in the DHL partner cluster, which can be described in the following (DHL innovation partner concept 2010):

- DHL Global Innovation Partner are premium partner which can foster innovations in a joint approach on a global level.
- DHL Technology Providers are companies which link their (technological) know-how with Deutsche Post DHL's logistical expertise in order to promote innovations in the field of logistics.
- DHL Industry Partners are companies which represent a sector and contribute requests for innovations in the field of logistics from their customers' point of view.
- Research Partners are partners from Science and Research who help to identify trends and innovative developments.

A list of partners including a description of their profile and business can be found on www.dhl-innovation.de.

As shown in Fig. 20.5, the external partners of the DHL innovation community comprises a broad scope of partnerships, which contribute to the development of innovation projects including additional funding. The illustrated partnership model involves industry partner, technology provider, research partner and global innovation partner.

Since March 2007 first joint projects have already been implemented. Amongst the implemented joint projects, one innovation project is "SmartTruck" (Sect. 20.2.3), which represents a technological innovation for dynamic route planning and was developed, deployed, promoted and implemented in cooperation with internal partners (DHL Express and Deutsche Post Direkt) and external partners, namely German Aerospace Center (DLR), Institute for Information Systems (IWi) German

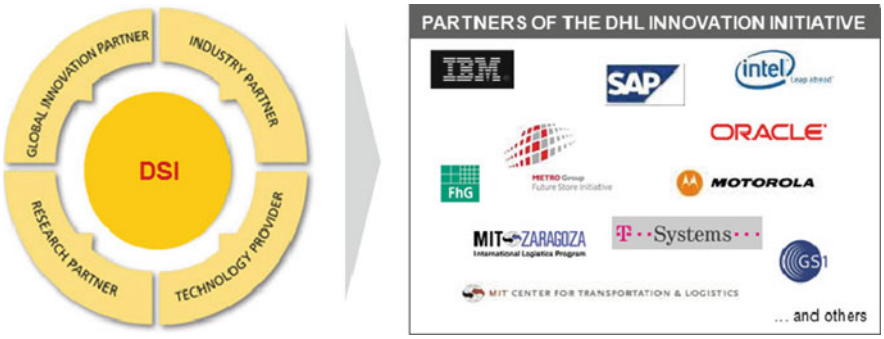


Fig. 20.5 The DHL innovation community
Source: DHL Solutions & Innovations

Research Center for Artificial Intelligence (DFKI), infoware, Motorola and Quintiq.

20.2.2 DHL Innovation Center

Since March 2007, the DHL Innovation Center in Troisdorf is a unique communication instrument in logistics industry. Covering an area of approximately 3,500 m^2 workspace, DHL Innovation Center offers a communication platform for sharing ideas, knowledge exchange and development of innovative solutions for logistics industry (DHL Innovation Center 2010). The project managers of DSI are working together with internal business units and external partners to develop, deploy and promote innovative solutions in the form of prototypes.

Integrated in the DSI program, the DHL Innovation Center offers a dialog platform for internal and external partners while the development, deployment or promotion of innovative solutions is underway. Besides the exchange about academic, industrial and technological topics related to current technology solutions, the conference area provides an international forum for academia and business to exchange knowledge and discuss emerging logistic issues and future scenarios for logistics industry. DSI's innovative capability and capacity for innovation are visible for visitors and the internal and external innovation community (Fig. 20.6).

The DHL Innovation Center portfolio, illustrated in Fig. 20.7, includes four areas: Laboratory, Hands-on Lab, Showroom, and Conference Area.

Laboratory: The research area allows for a flexible working environment and offers joint testing and development of innovation prototypes. The laboratory further provides the infrastructure to conduct feasibility studies/validation test to prepare the innovative solution for market launch. This area in the DHL Innovation Center shows new means by offering a variable set-up consisting of project rooms, testing environments and IT infrastructure, illustrated in Fig. 20.8.

Fig. 20.6 DHL Innovation Center (front and inside view)
Source: DHL Solutions & Innovations

Hands-on Lab: This area of the DHL Innovation Center combines interactive demonstrations of prototypes and a deeply presentation of current projects and solutions. The visibility is given through the interaction and various presentations of innovative technological solutions and visitors of the DHL innovation community can exchange regarding further refinements or future developments.

Showroom: The interactive showroom gives a new impression and simultaneously a multi-sensory experience of innovative solutions in logistics. The technological solutions of DPDHL are demonstrated along the supply chain in a separate showroom with special effects. Besides the visibility of solutions in a specific process-oriented view, this communication platform offers the possibility to discuss emerging issues and future logistic scenarios in guided tours. These tours can be booked for various groups and especially for customers and partners. A customization is possible regarding to industry, focus topics, and length of the tour.

Fig. 20.7 The DHL Innovation Center portfolio
Source: DHL Solutions & Innovations

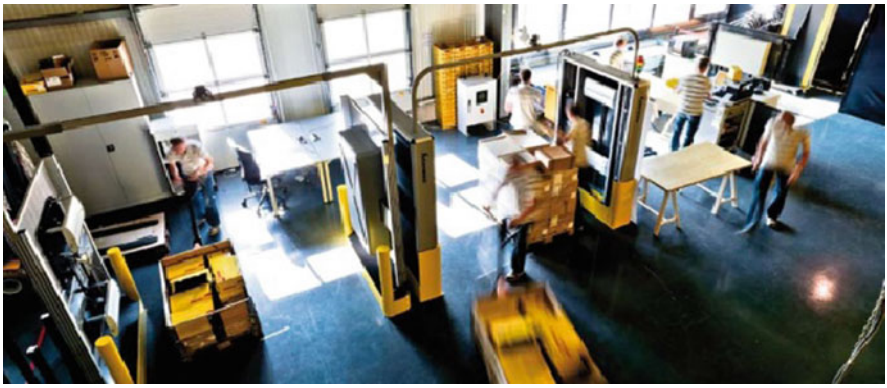


Fig. 20.8 DHL Innovation Center: laboratory
Source: DHL Solutions & Innovations

Conference Area: The whole area of the DHL Innovation Center provides a capacity for around 200 people to conduct seminars/trainings, workshops, symposium or other meetings. The offer covers several variations ranging from multimedia room, a high-tech conference room to a VIP lounge. This location and also the meeting rooms in the conference area create an innovative, modern and communicative business atmosphere.

20.2.3 DHL Innovation Projects: RFID Solution and SmartTruck

Two selected DSI projects will be described to provide information about successfully executed partnership projects regarding the described DSI program (see also DSI project flyers or website):

1. RFID solution for retail: "RFID is ready to be put into practice."
2. SmartTruck: The greener and brighter way!

20.2.3.1 RFID in Logistics for Retail (RFID Solutions 2010)

Companies in all industries are facing challenges and opportunities, but in particular the fast moving consumer goods industry demands more transparency and a more efficient design of logistics processes. This should enable a simplified planning of stock and shop inventory and optimized information for consumers. As a result and starting current situation, shorter product life cycles and faster changes of assortment in consumer goods industry involve increasing requirements for logistics processes. In addition the proof of origin becomes more important, especially for groceries.

Hence, the task is to implement RFID (Radiofrequency Identification) in logistics processes for customers of the retail and consumer goods industry with the objective to assure goods transparency (e.g. origin and shelf life) and to optimize product availability.

In the DHL innovation community, the internal partners (DHL Supply Chain France) collaborate with external partners (Neopost NBG ID, Oracle, Metro Cash & Carry France) to develop the specific software program (software partner: Oracle), to offer demanded services (system integrator: Neopost NBG ID) and to implement the first solution under realistic environmental conditions (first customer: Metro Cash & Carry France).

Finally, the solution is a showcase description of RFID in a consumer goods supply chain using the example of METRO Cash & Carry in France:

- DHL operates the warehouse management for METRO Cash & Carry France out of six DHL locations across France in the area of dry food and beverages.
- DHL tags the pallets which are transported from the DHL distribution centers to 91 METRO Cash & Carry stores (volume: about 1.3 million pallets per year).
- The pallets are read-out automatically via RFID at goods issue in the DHL warehouse. A respective dispatch notification with the expected shipment data is sent to the METRO store.
- At goods receipt in the METRO Cash & Carry store the pallets are read-out automatically and the data is matched with the dispatch notification.

Fig. 20.9 RFID in logistics for retail
Source: DHL Solutions & Innovations

DHL provides customers in consumer goods logistics the rollout, implementation and support of RFID applications. In doing so DHL implements the required infrastructure, selects the required RFID components and integrates them into existing and new processes.

The benefits of the innovative solution at a glance:

- More transparency – RFID makes transport processes from the start to the point of sales more transparent: This allows high level of guaranteed product availability.
- Proof of origin is possible – RFID supports origin transparency: a proof of origin is indispensable, especially as quality promise for perishables.

As the outlook of the RFID solution is concerned, the first nation-wide RFID rollout in consumer goods logistics is running since August 2008 in cooperation with METRO Cash & Carry in France. The cooperation with DHL is affirmed by METRO's membership as DHL Industry Partner in the DHL Innovation Initiative. Next to concrete activities with METRO, DHL will expand the service for further customers of consumer goods industry. Deutsche Post DHL demonstrates with the rollout: "RFID is ready to be put into practice".

This cooperation thus represents a basis for the implementation of RFID applications for a wider range of retailing customers (Fig. 20.9).

20.2.3.2 SmartTruck (SmartTruck 2010)

Until the starting point of the project local traffic planning generally proceeds static as a result of pre-advised pickup and delivery orders. This planning presumes ideal traffic situations due to the impossibility to respond timely in case of disarrangements, such as traffic jams, road works and short-term changes of customer orders.

Consequently, the task encompasses to develop intelligent delivery vehicles for an optimized tour planning and usage of vehicle capacity regarding local traffic situations.

The solution *SmartTruck* includes the integration of multiple technologies. More precisely, Smart Truck is a combination of dynamic tour planning, navigation and communication technologies for a tour planning and dispatch system. The gathered data incl. record vehicle position, loading, traffic jam information etc. is send to a dynamic tour planning and disposition system and thus the innovative solution uses the acquisition of the latest vehicle and telematics data. As a result, optimized usage of vehicles' capacity and dynamic tour planning is possible. Planning based on the latest vehicle and telematics data, consideration of customer availability (for example: office hours) and situational changes through the driver information in one learning dispositional system. Hence, the innovative technological solution SmartTruck is a planning and optimization system with integrated editing system, geo and telematics data, navigation- and communications- technology.

The DSI project managers developed this technology with internal and external partners of the DSI innovation community: Internal partners were DHL Express and Deutsche Post Direkt; external partners were German Aerospace Center (DLR), Institute for Information Systems (IWi) at the German Research Center for Artificial Intelligence (DFKI), infoware, Motorola and Quintiq. The project was supported by the Federal Government and the Federal Ministry of Economics and Technology as part of the "Intelligent Logistics in goods and commercial transport – innovation offensive for tomorrow's markets" initiative.

The following requirements could be fulfilled with the SmartTruck solution:

- High flexibility and keeping of delivery times for customers
- Higher transparency for customers by optimized communication
- Higher carbon efficiency by optimized tour planning, as well as sustainable ecological and economical design of PUD operations

With this SmartTruck solution DPDHL can offer dynamic route planning that allows a significant saving of mileage per tour. The intelligent local traffic planning encompasses the current traffic situation, ad hoc order data and transport related restrictions. Besides the efficient structuring of single tours through the dynamic route planning, the consideration of transport relevant data facilitate an optimization of entire local PUD operations. In addition, the dynamic planning enables a more flexible response to customer orders.

The following benefits can be stated for the SmartTruck solution:

- Service enhancement: Delivery and pick up activities become more transparent and flexible for customers and dispatchers. Smart Truck enables additionally an active dialog with the clients via SMS and E-Mail
- Optimize resource consumption: Delivery and pick up are handled with reduced and more efficient driving performance by means of traffic data

Fig. 20.10 SmartTruck
Source: DHL Solutions & Innovations

- Increasing efficiency: With raising number of shipments the optimization of delivery and pick up processes enables time saving and an improvement of service quality

The project has been kicked-off officially in January 2008. In Q2 2009 a 3 month SmartTruck pilot in delivery and pick up had been established in Berlin, Germany. During the pilot phase, it was proven that Smart Truck works profitable and the underlying technologies are reliable in terms of availability and functionality. At the same time the pilot achieved a significant reduction of resource consumption and the increase of the usage of vehicles' capacity.

Currently the technical components of Smart Truck will be developed towards the maturity phase. At the same time the coverage of Smart Truck delivery and pickup will be expanded to further areas in the German Capital of Berlin (Fig. 20.10).

20.3 DSI Program: Innovative Solutions in Logistics

To conclude, DHL Solutions & Innovations (DSI), as a corporate function of Deutsche Post DHL and a unique program in logistics, aims at successfully developing, deploying and promoting innovative solutions for logistics industry. The DSI program is based on the three pillars: DHL innovation community, DHL Innovation Center, and DHL innovation projects. As one critical success factor, the DHL innovation community enables to create innovative solutions due to dialogs among the internal and external partners. Second, the DSI's innovative capability and capacity for innovation are visible for visitors and the DHL innovation community through the DHL Innovation Center with its laboratory, hands-on lab, interactive showroom and conference area. Third, the DSI projects, which are consequently selected via an innovation funnel process, pick up the identified

logistics needs and make use of the expertise of the partnership network to develop and deploy innovative logistics solutions.

Hence, the future-oriented DSI program supports to globally share knowledge in the development, deployment and promotion phase of technological innovations, establish a culture of innovation, and foster the implementation of innovative solutions in logistics. Moreover, DSI manages patents world-over and provide technological expertise and a professional testing environment.

Finally, innovation becomes a major business opportunity also for logistics industry and DSI Solutions & Innovations will be a catalyst to bring forward innovative solutions in logistics.

Bibliography

Baldegger, R.J. (2008). *Entrepreneurial Strategy and Innovation*. Fribourg: Growth.

Chesbrough, H.W. (2003). The era of open innovation. *MIT Sloan management review*, 44(3): 35–41.

Chesbrough, H.W. (2006). Open Innovation: A New Paradigm for Understanding Industrial Innovation. In H.W. Chesbrough, J. West, & W. Vanhaverbeke (Eds.), *Open Innovation: Researching a New Paradigm* (pp. 1–14). Oxford: Oxford University Press.

Chesbrough, H.W. & Garman, A.R. (2009). How open innovation can help you cope with lean times. *Harvard Business Review* (December 2009), 68–76.

DHL innovation partner concept (2010). Available at: http://dsi.dhl-innovation.com/en/partner/index [2010-08-12].

DP DHL Innovation Center (2010). Available at: http://www.dhl-innovation.de/en/center/index.php [2010-06-07].

Gassmann, O., Enkel, E., & Chesbrough, H.W. (2010). The future of open innovation. *R&D Management*, 40(3): 213–221.

RFID Solutions (2010). Available at: http://dsi.dhl-innovation.com/en/products/rfid [2010-08-17].

Schilling, M.A. (2008). *Strategic Management of Technological Innovation* (2nd Ed.). New York: McGraw Hill.

SmartTruck (2010). Available at: http://dsi.dhl-innovation.com/en/aboutus/projects/innovation-projects/intelligentdelivery [2010-08-17].

Zerfass, A. & Huck, S. (2007). Innovation, communication, and leadership: New developments in strategic communication. *International Journal of Strategic Communication*, 1(2): 107–122.

Chapter 21
Communication Management Via Web: The Web-Based Tool *ICOM Compass*

Hans-Werner Jäger and Annegret Jäger

Contents

21.1 Communication Management for Innovations Via the Web

In the twenty-first century communication is mobile, transactional, and more complex in its structures according to mixtures of traditional and new media communication (Flew 2008; Miller 2005; Mohr et al. 2010). Thus, modern communication management requires considering new technologies, such as Web 2.0/3.0 techniques and mobile tools, and finding innovative means to attract stakeholder's attention. Information transmission with stakeholders takes place in dynamic contexts; formal and informal dialog situations ensue at any time; and

H.-W. Jäger (✉) and A. Jäger
EBI Jäger e.K., Katernberger Str. 171, 42115 Wuppertal, Germany
e-mail: wernerj@ebi-jaeger.de, annej@ebi-jaeger.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_21,

communication covers up-to-date information and any emerging issues regarding products, services or ideas. Hence, a company's communication activities have to concentrate on resource markets (e.g. Web 2.0/3.0 techniques and mobile tools), communication markets (e.g. upcoming issues and stakeholder-oriented topics) and sales markets (new products/services). From this organizational perspective and in this challenging context, communication management can be defined as follows:

Communication management is understood as a set of various activities of a company which consist of:

- The planning of the portfolio, i.e. the use of a number of specific fields and tools/techniques based on a systematic integrated approach
- The coordination of resources, competences, and processes
- The execution and monitoring of all interactions with stakeholders
- The development of innovative tools to send messages to various stakeholders
- The evaluation and reporting in terms of key performance indicators, drivers and key figures
- The establishment of interfaces and interrelations (e.g. knowledge management, strategic management, reputation management, technology/innovation management)
- The use of networks with new means of information transmission
- The use of technologies to support information processing and information transmission procedures
  (based on Bruhn 2005, 2009; Cornelissen 2008; van Riel and Fombrun 2008)

A growing field of interest is new media communication because the medium Internet provides new communication channels, for instance, to store and share information using social networking channels (Facebook, Twitter, MySpace, etc.), to present business information in interactive corporate websites, and to disseminate information quickly through channels such as RSS-Feed, chat forums, blogs, and social media channels. However, all such activities have to be managed from a company's point of view in order to send communication messages that establish reputation, build up company image, strengthen brands, support an innovation's diffusion, and position strategic issues.

But how can companies deal with these tasks? Do they use special supporting tools for the management of organizational communication?

Table 21.1 provides an overview of communication management tools and highlights main features and the main focus of the named tool. In fact, tools concentrate on process-oriented marketing activities or special tasks in corporate communication, such as reputation management. The listed tools show that the market primarily focuses on marketing management tools and only a few tools offer modules/features in corporate communication management. Thus, need exists for the development of integrated communication management tools in organizational communication; especially focusing on strategic communication tools such as storytelling, portfolio mapping, and scenario planning on organizational communication level.

Table 21.1 Overview of communication and marketing management tools

Tool/Company name	Main features	Main focus
Alterian Integrated Marketing Platform/ Alterian Technology Limited	– Social media marketing – Email marketing – Web content management – Campaign management and analytics – Web behavior analytics	Integrated marketing platform
Aprimo Marketing Studio/Aprimo Software GmbH	For B2B and B2C marketers – Brand management – Campaign management – Email marketing – Event management – Lead management – Marketing resource management – Performance analysis – Plan management – Social marketing – Spend management – Workflow and project management	Integrated marketing software Enterprise Marketing Management (EMM) software
BrandMaker/BrandMaker GmbH	– Marketing planer – Media pool and management – Brand management – Job manager – Event manager – CI portal – Shop portal	Marketing process chain as a Web front end
CAS genesisWorld Modul Marketing/CAS Software AG	– E-mail marketing tool (Inxmail as extra tool) – Planning of multi-step campaigns using the workflow designer feature – Customer Relationship Management (CRM)	Marketing software – modul marketing
DNA13/dna13 Inc.	– Media monitoring – Communications management (campaigns, issues and crises management) – Reporting	Reputation management software and corporate communications software
GATEtoMarketing/ RAVINIA GmbH	– Top-down budgeting – Bottom-up cost accounting – Planning of communication tools (integrated templates) – Planning of marketing objectives – Key performance indicators – Evaluation and reporting – Contact management – Campaign management	Web-based marketing software
Convento/convent GmbH	– Mailing and contact/relationship management – Dialog management – Analyses – Project and event management – Office integration	Management solution for corporate and financial communications leading in German speaking countries

(*continued*)

Table 21.1 (continued)

Tool/Company name	Main features	Main focus
	– E-mail management – Document management – Media and investor databases – Clip management – Web hosting and housing	
Marketing Cockpit/ doubleSlash Net-Business GmbH	– Marketing management – Identity management – Business monitoring – Mobile services – Product management	Enterprise Marketing Management (EMM) software
Marketo/Marketo Inc.	– Lead management – Website monitoring – E-mail marketing – Social media marketing – Marketing asset management – Marketing ROI analytics	B2B marketing automation software
Neolane marketing automation platform/Neolane Inc.	– Neolane campaign management – Neolane lead – Nealane MRM – Neolane interaction – Neolane message CENTER	Enterprise marketing software
Right On Interactive/ Right On Interactive	– Customer lifecycle marketing – Campaign management – E-mail marketing – Lead scoring – Lead nurturing – Customer nurturing – Multi-channel marketing – Sales and marketing systems integration – Reporting and analysis	ROI Customer lifecycle marketing automation software
SOCOTO/socoto gmbh & co. kg	– Advert – Poster – Print and PoS – Radio – Insert – Mailings – WebAds	Marketing management system
UNICA/Unica Corporation	– Interactive marketing – Outbound and inbound marketing – E-mail marketing – Event-based marketing – Web analytics – Marketing operations – Lead management	Enterprise marketing management (EMM) software
UPPER:NEO/UPPER Network GmbH	– UPPER:NEO Planning – UPPER:NEO Execution – UPPER:NEO Intelligence	Process oriented marketing software solution including the UPPER:NEO Process Engine®

Source: by the author (sorted alphabetically and is not to be understood as a complete review)

21.1.1 Focus on Communication of Innovations

Innovations are one means for companies to grow and be profitable over their lifetime. In order to adapt to changing environments, companies develop new concepts, business models, products or services and launch them into markets. But many success factors have to be considered for an innovation to be successful.

One essential impact factor for an innovation's success is the communication of innovations (Zerfaß et al. 2004; Zerfaß and Ernst 2008; Zerfaß and Möslein 2009). Communication can support the innovation process, in particular the innovation readiness, through the exchange between companies and its stakeholders throughout the innovation process. As a result, inter alia the mental application and the reduction of uncertainty can be influenced positively and lead to an individual's decision to adopt an innovation.

Communication of innovations covers a broad spectrum of activities to support the adaption and diffusion processes of innovations based on the definition of communication management. Thus, communication of innovations should be defined.

> Besides marketing/brand communication, finance communication or internal communication, *innovation communication* (*ICOM*) is understood as one modern communication field of a company or collaborative network which encompasses the planning, execution, monitoring, evaluation, and optimization of all activities – required for the interactive information exchange between a company or collaborative network and its stakeholders over a period of time – relating to ideas, issues, processes, objects, models, concepts, programs, initiatives, design, business models, products, services or clusters that should be perceived as new and be adapted by any stakeholder (based on Daschkovska et al. 2010; icom capability 2010; Pfeffermann et al. 2008; Pfeffermann 2010).

ICOM aims at:

(1) Enabling the adoption of a specific innovation or innovation cluster from the idea creation to launch (innovation process)
(2) Establishing the reputation asset of a company or collaborative network and
(3) Facilitating the diffusion processes of the whole innovation portfolio of a company or collaborative network

Based on this ICOM definition, information management is crucial to communicate innovations from idea to launch and to present the whole innovation portfolio of a company or collaborative network to stakeholders.

21.2 Information Management and Modern Web Technologies

21.2.1 Information Management

Information management is closely related to communication management, knowledge management, information and communication (ICT) technologies, business

intelligence/data mining and enterprise document management. Hence, many industries, for instance, high-tech (IT, telecommunication, and consumer electronics), consulting, and communication/marketing/branding agencies offer products and services in information management and the other related fields. And information work leads to knowledge which is supported by ICT because it can "facilitate communication within and between organizations" (Conrad and Poole 2005: 55). One selected example is the ELO Enterprise content management software (ELO 2010), which allows information to be organized in terms of workflows and document archives. In this context, information management can be understood as follows:

> *Information management* is process-oriented, resource-oriented, network-oriented, and technology-oriented and focuses on strategic planning of information processes, technology implementation for information transmission, storing and sharing of information, archiving and enriching information, and presenting structured information with the aim to fulfill the requirements of individual's restricted information processing and additional information requirements to create knowledge and to obtain value-capturing through efficient information management.

Due to the fact that information management requires ICT technologies to design and implement efficient information transmission processes, interest in the implementation of Web technologies has risen. These technologies are especially of interest for business that use social networking services to create brand awareness, to establish reputation, to share knowledge and scientific results, or to get informed and learn about innovations and competitors' new products and services. Emerging Web technologies, such as social networking techniques, semantic Web or Silverlight animations, are used to create connectivity among Web users and new means of communication and information sharing in a proactive setting (Mohr et al. 2010).

21.2.2 Selected Web Technologies

1. *Social networking*: New techniques to share information among Web users based on XML-based formats or syndication formats (e.g. for *RSS* or *Atom Web feeds*). Moreover, the concept of "real time streamed activities" is used in common social networking services such as Twitter and Facebook.
2. *Semantic Web*: Semantic Webs encompass many techniques to support intelligent viewing of related information and ideas of knowledge representation. Examples are the Web Ontology Language (OWL) and Resource Description Framework (RDF).
3. *Silverlight*: "Silverlight is a powerful development platform for creating engaging, interactive user experiences for Web, desktop, and mobile applications when online or offline. Silverlight is a free plug-in, powered by the .NET framework and compatible with multiple browsers, devices and operating systems, bringing a new level of interactivity wherever the Web works" (Microsoft 2010).

Subsequently, the number of benefits and limitations should briefly be described for the use of modern Web technologies in information management.

21.2.3 Benefits

- Innovative features to store and share information (e.g. documents, links, photos as well as news, stories, and ideas)
- Facilitates international collaborations at any time via the Web through information platforms and communication techniques
- Very fast dissemination of innovations (new products, services, issues) through several channels

21.2.4 Limitations

- Too much information, which may lead to information overload
- Unstructured information processing due to a huge range of one-to-one, one-to-many, many-to-many, and many-to-one information channels
- Less standardization for efficient and qualified structured information processing, archiving and sharing of information, and presenting information from an organizational communication management perspective
- Fewer features for strategic planning of information processing and information strategies (e.g. for communication management including reputation management and knowledge management)

To sum up, information management can use modern Web technologies to provide a basis for professional communication management. However, this leads to the necessity of developing an integrated communication approach in order to use information efficiently and thus fulfil the requirements of modern organizational communication, for instance, avoiding information overload and unstructured information policies.

21.3 An Integrated Communication Approach for the Web-Based Tool ICOM Compass

21.3.1 Perspectives and Modules of ICOM Compass Based on an ICOM Transfer Conception

One important point in the ICOM Compass project (see Appendix) was considering an integrated communication approach *to overcome the fragmentation of organizational communication* (van Riel and Fombrun 2008) and to provided needed information

for communication experts and journalists (see main findings from the conducted Germany survey INNOVATE 2006). One conceptual approach for integrated marketing communication is provided by Bruhn (2005, 2009). A basic conception for ICOM Compass was developed that aims at providing a Web-based solution for information management, process management, and interface management of all organizational communication activities and especially focusing on ICOM tools. As far as the basic ICOM transfer conception is concerned, ICOM Compass is divided into three modules and one value-added tool *ICOM Minds*. The *three modules* represent the three phases in a management process (1) planning, (2) monitoring, and (3) reporting.

1. *ICOM Planning* perspective
   - Defining standardized and ad-hoc communication processes
   - Creating innovation stories
   - Developing portfolio maps to visualize an innovation portfolio and/or innovations' issues
   - Storing and sharing documents, links, and photos (knowledge management)
2. *ICOM Monitoring* perspective
   - Monitoring all communication activities on-demand for an employee, a division or external partners
   - Providing an on-demand overview of communication activities linked to a specific innovation or activity plan (e.g. activity plan for an innovation story)
3. *ICOM Reporting* perspective
   - Evaluating communication process data (e.g. a comparison between planned and executed activities)
   - Reporting individual key performance indicators and key figures
   - Developing automatically communication reports
   - Integrating evaluation data in other management tools/controlling tools (based on Flyer ICOM Compass 2010)

An overview of ICOM Minds and the three modules along the management process including their selected features is shown in the Fig. 21.1.

The integration of corporate communication activities and marketing activities to communicate innovations is considered in the management process. Special features support the (1) information management, (2) process management, and (3) interface management of companies and collaborative networks, for example:

(1) Information management is considered in several features, including the upload functionalities in ICOM IN-Stories and the innovation portfolio feature. Direct upload into the knowledge data base as well as into the picture gallery to store and share documents, links and photos is possible.
(2) Process management is divided up in the overall process-oriented view of ICOM Compass and in the process management feature for communication processes:
   a. *The process-oriented view of ICOM Compass*:
      1. Process step (ICOM Planning): defining a standard process and developing standard activity plans with several communication activities for a specific defined communication process

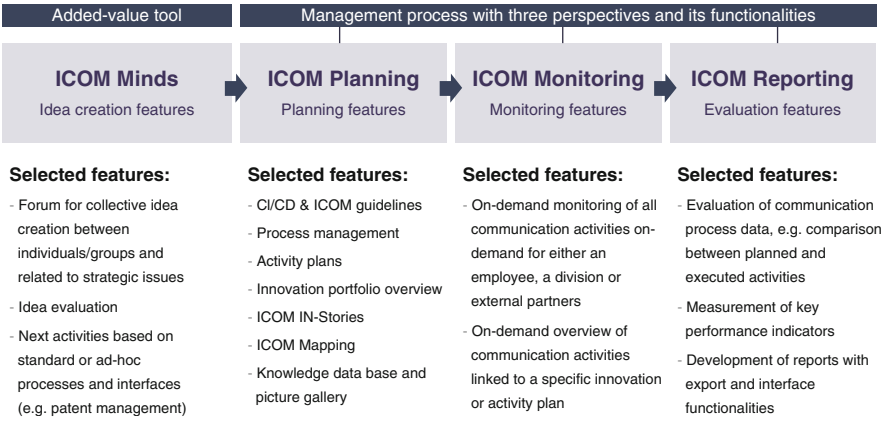


Fig. 21.1 ICOM compass: overview of modules and features
Source: by the authors

2. Process step (ICOM Monitoring): activating standard activity plans including adapting those plans for the execution phase with the aim to provide on-demand monitoring view of all activities
3. Process step (ICOM Reporting): evaluating and reporting of the processes and activities including resources

b. *The process management feature:* Creation and visualization of standard or ad-hoc processes including four main views for activities, milestones, functions or information flows.

(3) Interfaces are implemented providing needed information such as the connection to an innovation portfolio/management tool, a product data base or idea management tool. On the other hand, interfaces can be defined in terms of processes or activity plans to collaborate and work in teams on national and international levels.

The *added-value tool ICOM Minds* offers features for idea management, but concentrates mainly on the communication parts in idea management. For instance, the interactive forum tool collects ideas related to defined main issues into predefined groups. After the idea evaluation, based on a company's evaluation criteria catalogue, next activities can be determined in defining processes or activity plans by using the process management feature or the activity plan feature.

Additionally, ICOM Compass provides modern Web features such as RSS-Feed, chat function, "post-it function" with an export option to MS Outlook Task Manager, e-mailing function and agenda function through a MS Outlook interface integrated on each Website within this tool.

The main advantages of the Web-based tool are as follows (Flyer ICOM Compass 2010: 1):

- *Integrated process management to communicate innovations* (*linkage to innovation processes and business processes*)

- *On-demand monitoring of the overall communication activities* (*e.g. global or local division view or partner view*)
- *Professional planning, execution, and reporting of ICOM processes and activities*
- *Collective idea exchange and integrated idea management in ICOM Compass with the additional module ICOM Minds*
- *Up-to-date technologies* (*e.g. Web 2.0 features, Silverlight, and Office Communicator*), *export features, and several interfaces*

The Web-based tool has many features that offer the possibility to design an integrated approach of organizational communication. One example for an integrated communication approach is the process management feature which will be described in more detail. This Web feature supports defining, drawing and visualizing standardized and ad-hoc processes for several communication activities, for instance, along an innovation process for a radical innovation or an idea communication process for a collaborative network.

After drawing and storing the process data, a user can choose among the four main perspectives to visualize the communication process:

1. *Activity perspective* in a step-by-step view to define standard channels
2. *Decision-making and milestones perspective* to focus on the main points
3. *Information perspective* with Web 2.0 features and automatic information flow/processing tasks (e.g. newsletter function, chat function, RSS-Feed, a content-management system and knowledge data base connectors) to inform and communicate with other defined intra-organizational and inter-organizational persons/groups
4. *Functional perspective* shows the interfaces and workgroups to support team working processes

In particular the latter perspective can display interrelations and interfaces among divisions according to the innovation process or innovation portfolio which may lead to a new organizational design of interface management, information management, and process management. Regarding an integrated communication approach, a basic assumption of the ICOM conception is that the focus on innovations tends to cause another functional perspective of organizational communication. More precisely, an integrated communication approach is no longer divided into primary and supplementary communication activities but rather divided into processes-related, interactive exchanges between a company or collaborative network and its stakeholders concerning resources, competences, processes, structures, strategies, and stakeholder groups.

In order to adapt to changing environments, as one of the tasks of management, the coordination and collaboration tasks of a company or collaborative network are important. Therefore, ICOM Compass concentrates on the planning and decision-making phases of interactive processes, information activities, strategies, resources and competences and on coordination and collaboration in organizational communication.

21.3.2 Features: ICOM Minds, ICOM IN-Stories, ICOM Mapping

21.3.2.1 ICOM Minds

Every innovation starts with a good idea, therefore idea management is a central function to launch successful innovations into markets. In order to collect ideas, modern Web technologies provide new means of collective idea creation in forums and blogs. The use of such techniques can lead to group inventions and innovative approaches based on multidisciplinary perspectives.

The value-added tool *ICOM Minds* simplifies the management of such forums and additionally offers functionalities for activities after the idea creation phase, such as the idea evaluation. A well-defined criteria catalogue of a company can foster a standard process with automated idea classification and information processing. ICOM Compass provides interfaces to transmit information to other departments/functions, for instance, patent management or innovation management/research and development (R&D) departments. Regarding the open innovation approach, this Web-based module can also be used to collect information along the innovation process (1) from internal and external information sources in the idea creation phase, (2) in the R&D phase if customers bring forward ideas in pilot studies, and (3) in the commercialization phase to communicate innovations in new ways based on collective idea creations (Fig. 21.2).

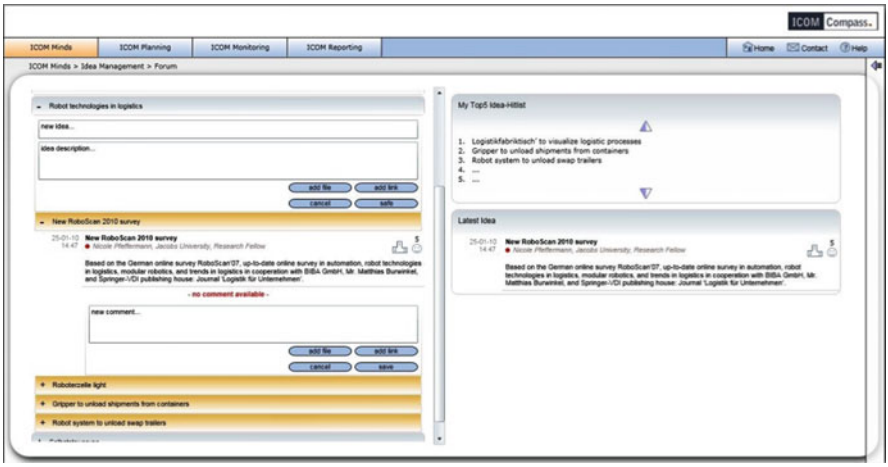


Fig. 21.2 ICOM minds
Source: by the authors

21.3.2.2 ICOM IN-Stories

Stories are emotional and can facilitate idea creation through imagination and the high recognition caused by emotions. Thus, companies can use the method of storytelling in organizational communication with the aim of creating emotional stories between the company (story teller) and a stakeholder (story listener) with leads to higher attention, to stronger emotional ties to images/brands and support in selling new products/services (Denning 2005; Fog et al. 2005; Frenzel et al. 2006; Simmons 2007).

ICOM IN-Stories is a Web communication feature in ICOM Compass that aims at designing interesting stories for innovations and storing all needed information sources related to this story. This feature supports the storytelling process by strategic planning of communication activities for a story over a period of time and in connection with other stories told in the past, be told in the present and will be told in the future. Information sources include internal sources, such as needed templates, brochure information, suitable story photos, and text parts of the annual report about strategic directions of a company. On the other hand, external information sources include, for instance, related information on Web sites, other publications related to the story, and news/good articles scanned from a magazine or newspaper. The activity plan for a specific story or story cluster can be activated in the monitoring view of ICOM Compass in order to provide an on-demand overview of all communication activities related to an innovation story.

In the future it is possible to connect this feature to common used media data bases and reputation management software to search for issues related to a story on communication markets.

21.3.2.3 ICOM Mapping

Portfolio mapping is a visualization tool based on the strategic analytic method *portfolio analysis*. For example, a commonly used portfolio mapping tool is the Boston Consulting Growth-share matrix which is a chart to support companies in analyzing and evaluating their business fields and product lines. Moreover, in issues management the position-importance matrix (Cornelissen 2008). Using the maps of specific portfolios can facilitate the decision-making process in strategic management, brand/marketing/communication management and innovation management.

As one feature of ICOM Compass, ICOM Mapping focuses on the development of charts to present, for instance, the innovation portfolio or a combination of innovations and related issues. As a result, this technique offers a useful "map" based on different evaluation criteria, such as the rate of adoption or the estimated probability of market penetration in communication markets and sales markets. Thus, ICOM Mapping can be used to provide a chart for decision-making with the aim of defining strategies or creating innovation clusters for communication purposes. It is possible to create several maps by defined group evaluation via the Web and, moreover, to export those maps into other programs. For instance, a map can be

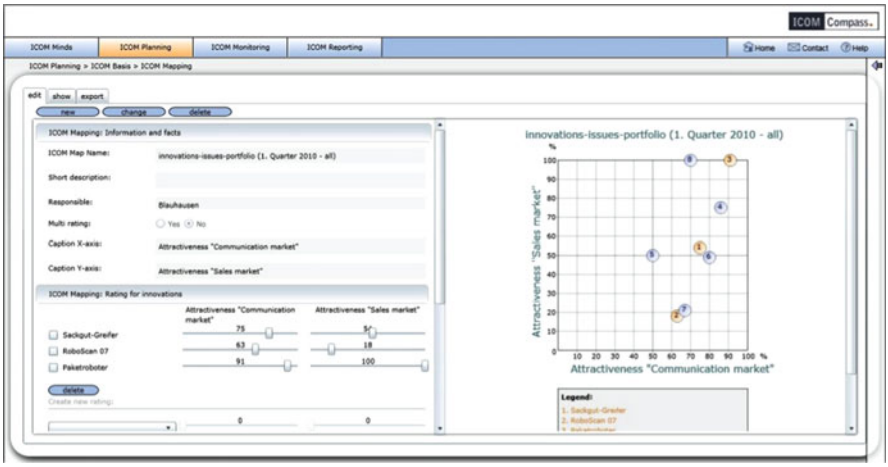


Fig. 21.3 ICOM mapping
Source: by the authors

exported to Microsoft PowerPoint to present new strategies based on those maps. All maps are stored and can be viewed at any time. This leads to a comparison of maps among several group evaluations and analyses over a period of time (Fig. 21.3).

21.3.3 Innovation Case: Implementation Scenario for High-Tech Companies

21.3.3.1 High-Tech Markets

A key factor in today's significant environmental challenges of globalization (green IT, cloud computing, embedded systems, to name a few) is the development, implementation, and the diffusion of new technologies. Entrepreneurs and corporations of all sizes invent new products, services, business models, strategies, and innovative marketing issues in high-tech industries, classified under information technology, telecommunication, consumer electronics, and new media (Mohr et al. 2010; BITKOM 2010). High technologies incorporate many industries such as biotechnology, robotics, nanotechnology, and medical equipment (Mohr et al. 2010) and companies can exhibit a broad range of innovations in their portfolios, which have to be communicated in order to launch them successfully in rapidly changing environments (e.g. growing tacit knowledge, outsourcing of technological know-how, increase in patent applications, and technological developments in several different international and interdisciplinary collaborative networks based on open innovation).

21.3.3.2 Communication/Marketing of Innovations

High-tech marketing can encompass several uncertainties regarding markets, technological developments and competitive volatility that lead to specific challenges in communication. For instance, communication requires considering the following characteristics of high-tech markets (Mohr et al. 2010) (1) rapidly changing customers' needs, unpredictable fashions, and doubts about adapting new technological products (market uncertainties), (2) the unpredictable timetable of developments and unexpected side effects of radical technological implementations (technological uncertainties), and (3) the degree of change and market strategies of competitors (competitive volatility).

In fact, a mixture of marketing communication tools are crucial in high-tech markets to face these challenges, for instance, traditional advertising tools (mass media), trade shows, promotions, public relations, publicity, direct marketing and new media with Web 2.0 techniques, mobile marketing (Mohr et al. 2010).

In particular, communicating new products and services is a main task in marketing of innovations (Trommsdorff and Steinhoff 2007), but also in corporate communication and reputation management to strengthen an innovation's profile by the public (Hofbauer et al. 2009; Zerfaß and Möslein 2009). Linked to communication in high-tech markets, marketing and corporate communication have to deal with challenges in presenting and launching new products and services, ideas and new business concepts world-over through a broad spectrum of different channels related to stakeholder groups. For instance, the coordination of resources, internal and external information sources and integrated communication activities by using storytelling for several innovations over a period of time, is an effective method to sell new products/services or build a positive brand image (Denning 2005; Frenzel et al. 2006).

21.3.3.3 ICOM Compass for High-Tech Companies

The Web-based tool ICOM Compass provides features to strengthen the modern communication field ICOM and establish it as a core competency for high-tech companies. Several communication tools, transferred into activities, can be coordinated with this day-to-day instrument over time. In fact, the communication management tool supports systematic planning, execution, and value-added reporting of communication activities not only for each innovation or innovation cluster but also for the whole company's innovation portfolio. The idea and innovation portfolio can be surveyed at any time. Moreover, as illustrated in Fig. 21.4, the company and collaborative network view is considered, because, especially in high-tech industries, ideas arise with in a company itself (intra-organizational view) but also through collaboration with customers and partners (inter-organizational view). As a starting point, the module *ICOM Minds* is integrated into ICOM Compass with the objectives of sharing knowledge, exchanging ideas and enriching them by means of collective idea creation via the Web interface. These options lead to successful integrated idea management

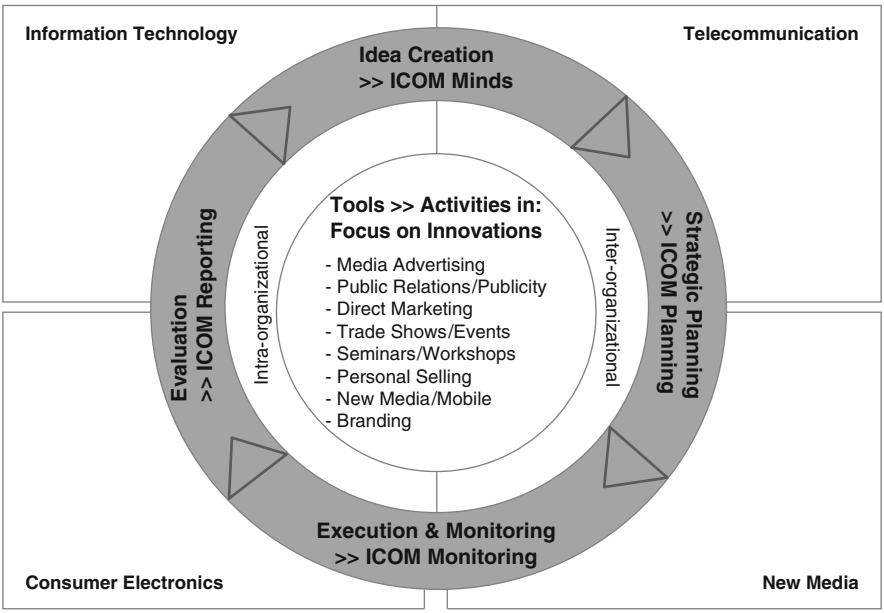


Fig. 21.4 Marketing communication tools for high-tech companies related to ICOM Compass' modules
Source: by the authors

and a company's best ideas are supported from the idea to market launch based on the features of the three modules of ICOM Compass (see Sect. 21.3.1), for instance, the feature *ICOM IN-Stories* to coordinate communication activities related to innovation stories. Hence, ICOM Compass offers many features for high-tech integrated communication management for each innovation from idea to launch and for the innovation portfolio of a company or collaborative network.

21.4 Conclusion and Future Possibilities

Communication of innovations is one success factor for companies to introduce and successfully highlight ideas, new concepts, and products and services. As one of a company's communication fields, innovation communication has to be integrated in modern communication management to overcome the fragmentation of several different communication tools and activities in communicating innovations on strategic and operational level and provided needed information on time. Moreover, modern communication management requires efficient information management, which can be provided by the use of modern Web technologies and applications. Hence, systematic, integrated communication management via

the Web is one emerging issue for companies and collaborative networks in the twenty-first century.

With the Web-based tool ICOM Compass communication activities of a company or collaborative network can be planned, executed and evaluated systematically. Standardized communication processes or strategic maps for innovations related to issues can be strategically planned in the module *ICOM Planning*. This modern Web application integrates corporate communication and marketing tasks into one management tool and moreover offers interfaces to technology/innovation management, idea management and controlling systems. Focusing on innovations, the exchange of ideas and collective idea creation are considered within the value-added tool *ICOM Minds*. This leads to a close collaboration in international team work, in intercultural, multidisciplinary work groups, and in innovation networks/programs with internal and external stakeholders. From the organizational perspective, the features of ICOM Compass support connecting different communication fields such as marketing/brand communication (customer/public relations), internal communication (employee relations), and finance communication (investor relations). In particular ICOM Compass focuses on strategic planning tools to provide a basis for tactical and operational activity plans.

To conclude, this book chapter demonstrates the need for Web-based communication management and presents a tool to support companies and collaborative networks in managing communication activities based on efficient information management and modern Web technologies. Moreover, possibilities were shown for modern communication management via Web by presenting in more detail the Web-based tool *ICOM Compass* with its three special features *ICOM Minds, ICOM IN-Stories,* and *ICOM Mapping* and an implementation scenario for high-tech industries.

Acknowledgments First, we would like to thank Nicole Pfeffermann for the idea *ICOM Compass*, her initiating steps to realize the project and her developed comprehensive transfer concept including layout drafts and first descriptions of Web features, which served as a basis for programming the Web-based tool. Her ideas are integrated in this book chapter. Our gratitude further goes to Dr. Carsten Rudolph, who also saw a considerable market potential and supported the project *ICOM Compass* in the program Microsoft BizSpark™ – A program that provides Software, Support and Visibility for Software Startups (current Project Manager High-Tech-Gründerinitiative "unternimm was" Stephan Jacquemot).

Bibliography

Bruhn, M. (2005). *Unternehmens- und Marketingkommunikation. Handbuch für ein integriertes Kommunikationsmanagement*. München: Vahlen.

Bruhn, M. (2009). *Integrierte Unternehmens- und Markenkommunikation: Strategische Planung und operative Umsetzung*. (5th ed.) Stuttgart, Germany: Schäffer-Poeschel.

BITKOM Bundesverband Informationswirtschaft, Telekommunikation und neue Medien e.V. (2010). Available at http://www.bitkom.org/en/about_bitkom/42611.aspx [date: 28.06.2010].

Conrad, C. & Poole, M.S. (2005). *Strategic Organizational Communication: In a Global Economy* (6th ed.). Belmont, CA: Thomson Wadsworth.

Cornelissen, J.P. (2008). *Corporate Communication – Theory and Practice (2nd ed.)*. London: Sage.
Daschkovska, K., Pfeffermann, N., Meyer-Larsen, N., & Hülsmann, M. (2010). Adoption Framework for Innovations in Logistic Transport Chains. In W. Kersten, T. Blecker, & C. Lüthje (Eds.), *Pioneering Solutions in Supply Chain Management. A Comprehensive Insight into Current Management Approaches* (pp. 347–364). Berlin: Erich Schmidt Verlag.
Denning, S. (2005). *The Leader's Guide to Storytelling: Mastering the Art and Discipline of Business Narrative*. San Francisco, CA: Wiley.
ELO (2010). Available at http://www.elodigital.com.au/ [date: 28.06.2010].
Flew, T. (2008). *New Media: An Introduction*. (3rd ed.). South Melbourne: Oxford University Press.
Fog, K., Budtz, C., Munch, P., Blanchette, S. (2005). *Storytelling: Branding in Practice*. Berlin: Springer.
Frenzel, K., Müller, M., & Sottong, H. (2006). *Storytelling. Das Praxisbuch*. Wien: Carl Hanser Verlag.
Hofbauer, G., Körner, R., Nikolaus, U., & Poost, A. (2009). *Marketing von Innovationen. Strategien und Mechanismen zur Durchsetzung von Innovationen*. Stuttgart, Germany: Kohlhammer.
icom capability (2010) Available at http://www.icom-capability.com/en/icomserv_en.php [date: 28.06.2010].
ICOM Compass (2010). Available at http://www.icom-compass.de/en/downloads_en.php [date: 28.06.2010].
ICOM Compass/Cases (2010). Available at http://www.icom-compass.de/en/cases_en.php [date: 28.06.2010].
INNOVATE 2006 (2006). INNOVATE 2006. Innovationskommunikation in dynamischen Märkten. Zweite deutschlandweite Trendumfrage unter Journalisten und Kommunikationsfachleuten Ergebnisse im Überblick. Universität Hohenheim, Fachgebiet Kommunikationswissenschaft und Journalistik und MFG Baden-Württemberg, Available at http://www.innovationskommunikation.de [date: 17.08.2010].
Microsoft (2010). Available at http://www.silverlight.net/getstarted/ [date: 28.06.2010].
Miller, K. (2005). *Communication Theories: Perspectives, Processes, and Contexts*. (2nd ed.). New York: McGraw Hill.
Mohr, J., Sengupta, S., & Slater, S. (2010). *Marketing of High-Technology Products and Innovations*. (3rd ed.). New Jersey: Pearson.
Pfeffermann, N. (2010). Innovation Communication as a Cross-Functional Dynamic Capability: Strategies for Organizations and Networks. In M. Hülsmann, & N. Pfeffermann (Eds.), *Strategies and Communications for Innovations* (Chapter 18). Berlin, Germany: Springer.
Pfeffermann, N., Hülsmann, M., & Scholz-Reiter, B. (2008). Framing Innovations to Grasp Stakeholders' Attention: A Dynamic Capability-based Conception of Innovation Communication. *Research Report 2007/08 International Graduate School for Dynamics in Logistics*, Vol. 01, 2008, pp. 40–44.
Simmons, A. (2007). *Whoever Tells the Best Story Wins: How to Use Your Own Stories to Communicate with Power and Impact*. New York: Amacon.
Trommsdorff, V. & Steinhoff, F. (2007). *Innovationsmarketing*. München: Franz Vahlen.
van Riel, C. & Fombrun, C. (2008). *Essentials of Corporate Communication. Implementing Practices for Effective Reputation Management*. New York: Taylor & Francis.
Zerfaß, A. & Ernst, N. (2008). *Kommunikation als Erfolgsfaktor im Innovationsmanagement. Ergebnisse einer Studie in deutschen Zukunftstechnologie-Branchen*. Leipzig: Universität Leipzig.
Zerfaß, A. & Möslein, K.M. (2009). *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation*. Wiesbaden: Gabler.
Zerfaß, A., Sandhu, S., & Huck, S. (2004). Innovationskommunikation – Strategisches Handlungsfeld für Corporate Communications. In G. Bentele, M. Piwinger, & G. Schönborn (Eds.), *Kommunikationsmanagement. Strategien, Wissen, Lösungen* (August 2006; 1.24) München: Luchterhand.

Appendix

The Web-based tool ICOM Compass at a glance:

Profile: ICOM Compass is a modern, unique Web-based tool with several Web features that deals with a company's or collaborative network's planning, monitoring, evaluation, and optimization of organizational communication activities with the focus on innovation communication as one of a company's communication fields. ICOM Compass aims at supporting transparent and efficient communication management, and offers a day-to-day instrument for integrated communication and using modern Web technologies for an international, multidisciplinary teamwork in groups on intra- and inter-organizational levels.

Benefits

- Transparency and efficiency in organizational communication on a strategic and operational level through information management, process management, and interface management
- Integrated communication approach for corporate communication, marketing, idea management, technology/innovation management by using special ICOM features such as process management, ICOM Mapping and on-demand monitoring related to innovations, innovation stories, and innovation clusters
- Web-based tool for global companies and collaborative networks to support international teamwork, intercultural and multidisciplinary work groups and innovation networks/programs with internal and external stakeholders

Main Target Groups (see also Innovation Cases on http://www.icom-compass.de)

- Innovation-oriented global corporations from all industries
- Technology areas, regional innovation clusters, and technology networks
- Technology transfer agencies and international communication/marketing/branding agencies
- Inter/national research projects (e.g. DFG projects, EU projects)

Special Features

- Focus on communicating innovations and the innovation portfolio of a company or collaborative network with the features ICOM Minds, ICOM IN-Stories, ICOM Mapping, innovation portfolio, to name a few

- Process management feature to draw, store and visualize communication processes with four main perspectives to provide transparency and efficiency in information management, process management and interface management
- Open innovation view with ICOM Minds for collective idea creation via the Web and Web collaboration opportunities by using all features in the three modules in collaborative networks

ICOM Compass Project: ICOM Compass is a collaborative project between the corporations EBI Jäger e.K. (programming and Web application design) and NP Pfeffermann Consulting (idea, basic concept and module layout) since March 2009. Since 15.07.09 the project ICOM Compass is supported by the program Microsoft BizSpark™. Continuous know-how transfer and close collaboration provided the possibility to present the prototype ICOM Compass in March 2010 to potential customers. More Information can be found on http://www.icom-compass.de.

Chapter 22
Case Study Electro-Mobility: RWE Mobility

Katja Reimann and Carolin Reichert

Contents

22.1 The Electro-Mobile Revolution Has Begun

"We're putting green power on the road" – with that aim in mind, RWE began in 2008 to develop electro-mobility as a new business segment within its strategic area. The high pace of developments setting in on the market at about the same time led to a rapid and extensive broadening of the Group's e-mobility activities. In the early development phase, a key point of public debate was the "chicken and egg" problem of electric cars and charging infrastructure: without e-cars no need for charging points, but without charging points there will not be sufficient numbers of e-cars on the roads.

From the very outset, RWE had set itself the goal to demonstrate the energy to lead and resolve this issue. So the Group quickly assumed the role as innovation leader amongst the European energy suppliers in the area of electro-mobility and began building up a network of charging points for e-cars across Germany.

K. Reimann (✉) and C. Reichert
E-Mobility, RWE Effizienz GmbH, Freistuhl 7, 44137 Dortmund, Germany
e-mail: Katja.Reimann@rwe.com

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_22,

Today, RWE has successfully positioned itself in Germany and Europe as a provider of charging points for electro-cars and eco-power in the form of the "RWE Autostrom Natur" product.

About RWE:

RWE counts among the five leading electricity and gas suppliers in Europe and is the Number 1 power generating company in Germany. Besides generating power, the Group operates in energy trading and transport and sales of electricity and gas. Over 70,000 employees supply more than 16 million customers with electricity and around 8 million customers with gas. In financial year 2009, RWE generated revenues of around €48 billion.

RWE is investing at a record rate. In building up new, climate-friendly and flexible generating capacities, investments of €7 billion per year are planned in power plants, grids and open cast mines, of which more than €1 billion in renewable energies, mainly in wind power and biomass.

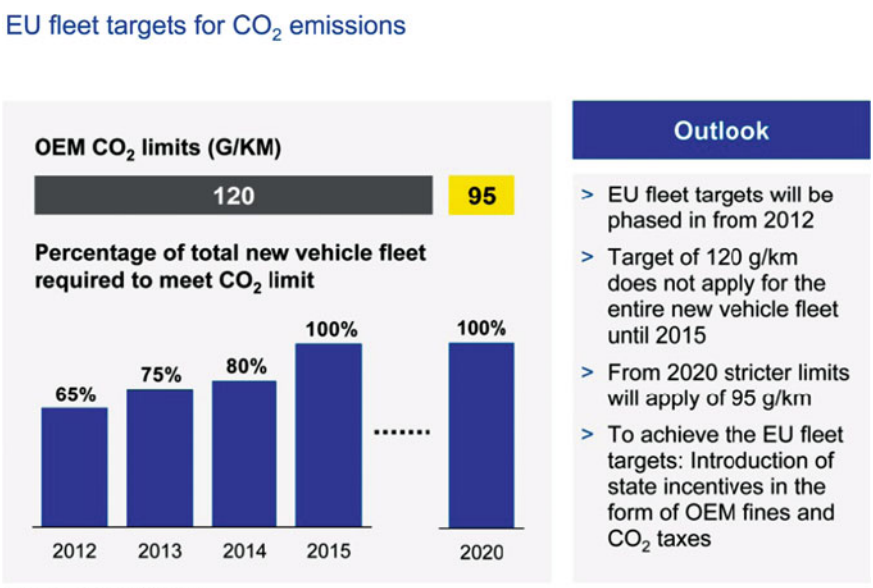
In sales, RWE is adjusting to the changed customer needs. Climate protection and energy efficiency are becoming ever more important thereby. One focal point here is electro-mobility.

22.1.1 The Market for Electro-Mobility: Rapid Growth from 2015

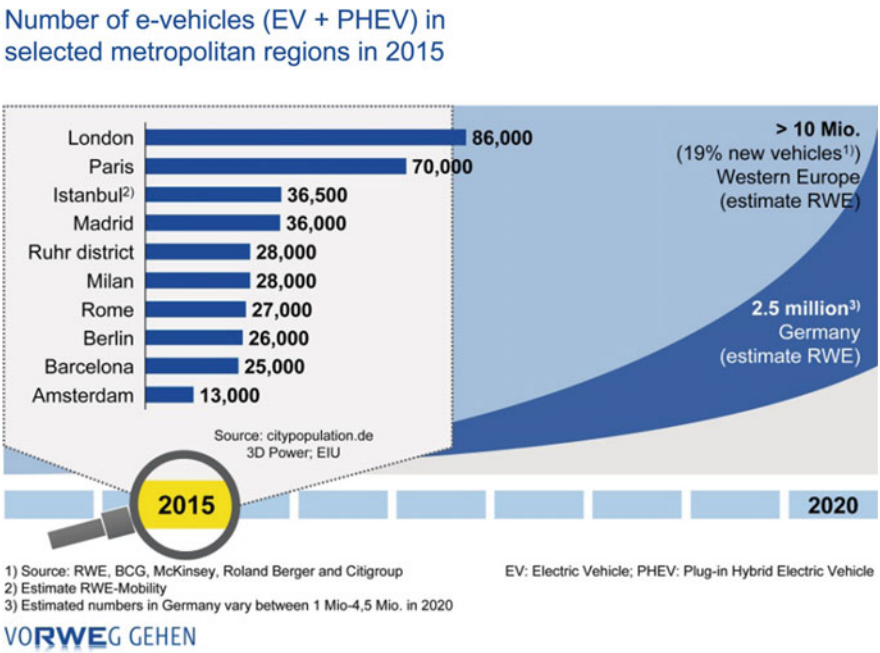
Electro-mobility has a high priority on the political agenda worldwide. Stringent environmental targets and new technology are setting the market in motion. Many established car manufacturers will begin bringing their first series of electric models to market from 2011/2012. In parallel, the battery manufacturers are working on the latest generation of lithium-ion batteries with significantly greater ranges and shorter charging times. A high pace of innovation is expected in the next few years in battery costs and charging times. So the mass market for electric cars in Europe may be heralded in as soon as 2015. To do that, though, the appropriate framework must be in place at an early stage.

For the carmakers, systematic integration of electric drives in their vehicle fleets will be an absolute must if the climate targets in Europe and above all the USA are to be met. The beginning of the mass market in Europe with a market share of more than 10% of new vehicles is possible from 2015. The focus at the beginning in building up the public charging infrastructure is on megacities and conurbations worldwide. This is where most cars with electric drives will be found by 2015.

For 2020, the EU is demanding a significant reduction in fleet emissions from the vehicle manufacturers. Otherwise, fines in billions of Euros are threatened. This target can only be achieved cost-effectively by use of hybrid and electric vehicles.



The German government is calling for at least one million electric vehicles in Germany in 2020. RWE expects up to 2.5 million vehicles in Germany and over 10 million in Western Europe, or a 19% share in new registrations in Western Europe. For 2015, RWE is already estimating a fleet of over 300,000 e-cars and plug-in hybrids in the key EU megacities. How high the number will ultimately really be depends on many variables. But one thing is certain: the e-car is advancing and is unstoppable!



22.1.2 RWE's Contribution

RWE is making a key contribution to the market breakthrough of the electric car. As a financially strong energy supplier with innovation power, RWE has the energy to lead and already began building up charging points for electric cars in 2009. Here, RWE is working together with municipal utilities and top companies across Germany and with various partners in other European countries. The expansion to an across-the-board public charging infrastructure in Germany and Europe is being driven forward with great energy. Every electro-mobility customer should be able to charge his car wherever he parks anyway: be it at home, at the workplace, while shopping or during an evening at the cinema. To do that, RWE has developed advanced and intelligent quick-charging stations that are pre-empting future standards.

Together with the leading automotive manufacturers, RWE is driving the development and international standardisation of charging plugs and data communication. The aim is for every electric car to be compatible with every charging point – Europe-wide. For customers, RWE even today already offers appropriate products for more electro-mobility: the innovative and intelligent RWE charging technology permits convenient quick-charging of electric cars in the private and in the public sphere. RWE is combining this with the RWE Autostrom product made up of 100% regenerative energy sources. All components together produce attractive electro-mobility solutions that satisfy all the requirements in terms of security of supply, operating convenience, charging times and environmental compatibility.

22.1.2.1 Regenerative Energies: The Key to Sustainable Mobility

Regenerative energies and electro-mobility are inextricably linked with one another at RWE. RWE charging stations, for instance, will be supplied exclusively with green power. So RWE is offering every customer environmentally compatible mobility both at public charging points and for private owners of charging stations or charging boxes. The electricity fed in for all Autostrom products stems 100% from regenerative sources of energy, such as hydropower, wind energy, photovoltaic, biomass and geothermal. The technical standards organisation "TÜV Süd" audits the procurement processes for eco-power at regular intervals.

With its electro-mobility plans RWE is taking a decisive step forward in the direction of sustainable, climate-friendly mobility and, with the use of green power at all RWE charging stations, is making a further contribution to environmental and climate protection.

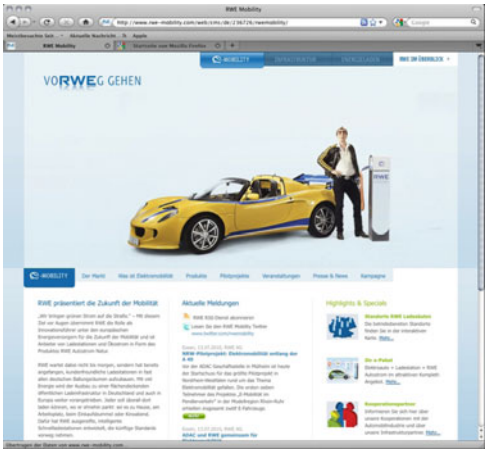
22.2 The Time Is Ripe for Innovative Communication

In its role as innovation leader RWE has set itself the goal not to develop electro-mobility behind closed doors but to communicate actively with the consumer. Studies in 2008/2009 showed that the average consumer had little

knowledge on the subject of electro-mobility. On the contrary, the topic was even perceived in a negative light: many consumers associate electro-mobility with cars with top speeds of 30 kph, electric wheelchairs, low range and uncomfortable.

RWE took those results as a reason to launch an extensive communication campaign to show: electromobility is up-to-date and fun to drive. The communication was based on two pillars: The website http://www.rwe-mobility.com in order to educate the broader public on electro-mobility, and the RWE Autostrom Roadshow to target urban centres to make electro-mobility more tangible and real for the people living there. With this initiative, RWE is living up to its role as the company with the energy to lead and has succeeded in positioning itself positively and sustainably on the market for electro-mobility.

22.2.1 rwe-mobility.com: Exploit the Internet as an Information Portal



rwe-mobility.com is the central information portal for RWE's activities surrounding electro-mobility. The goal when developing the website was to create an innovative portal to accompany and communicate the rapidly advancing technical trends and the business segment developments at RWE itself.

The site offers information about the current developments on the market, as well as about RWE products and services, and presents actual pilot projects, alliance partners in the automotive industry and the infrastructure area, current events and much more.

Visitors to the site can get answers to many questions with a mouse-click: What is RWE doing to make electro-mobility popular and usable? What advantages do the RWE charging stations have? How can I work together with RWE as a business? Where can I see electro-mobility live?

But over and above the pure information, the website is intended to address its users emotionally and invite them to explore electro-mobility in a playful manner. With the help of 3D elements and flash-animated graphics, for example, visitors can watch how an electrically-driven car works or the process of charging at an RWE charging point. Video contributions, for example, show the building of a charging point frame-by-frame or convey an impression of the "RWE Energie-laden" – the e-mobility flagship store in Berlin. Via an interactive image cloud, visitors to the website are invited to publish their own ideas and visions on the future development of mobility in the form of pictures or collages in combination with texts.

"We want to make electro-mobility tangible with the portal. The 3D animations support the user in understanding the technology and the processes", says Katja Reimann, responsible for the RWE-Mobility Portal at RWE.

For the http://www.rwe-mobility.com website, RWE won the internationally coveted iF communication design award in 2009 in the categories of Animation and Screen Design. Based in Hanover, the iF International Forum Design presents its design awards annually as an accolade for successful and especially innovative design services in industry.

communication design award 2009

With the Internet portal designed in cooperation with Dortmund-based agency GetIt, RWE was able to assert its position in the competition for the iF communication design award against more than 1,300 bidders from 24 countries. The jury of 17 praised the originality, user-friendliness and good target group addressing of the rwe-mobility website. A quote from the jury's citation: "The design [of the portal] supports the theme and conveys it in an emotional and intellectual form. [The e-mobility and Infrastructure pages] will suit the differing requirements of the target groups [. . .]"

An extensive relaunch of the site in 2010 with an enrichment with the latest information, trends and products addressed the rapid development of the market and RWE's activities in the area of electro-mobility.

22.2.2 *RWE Autostrom Roadshow: Experience the Mobility of Tomorrow*

The future of mobility is electric. And with the help of the RWE Autostrom Roadshow, RWE is bringing that future to people today. The Roadshow tours for 2 years and targets urban centres, where electro-mobility will primarily establish itself. In all cities and regions where RWE is present, the company has committed itself to building charging infrastructure for electric cars. The goal is to make electro-mobility tangible and real for the people living in those regions already at an early stage. "The main aim of our Roadshow is to give people extensive information about electro-mobility and hopefully also to excite them. We want to show: Electro-mobility is not only good for the environment, but it's also fun", says Carolin Reichert, Head of Division for Electro-mobility at RWE.

Visitors can get information about electric cars and "filling up" with power interactively in a two-storey event installation. Downstairs the focus is on the fun of driving and recharging. Visitors here have the opportunity to experience driving electrically themselves for once. They can test-drive modern electric cars, such as the Tesla Roadster, and also electric two-wheelers like e-Bikeboards and Segways are available for testing. And there is a realm of experience and play for the young e-car drivers of tomorrow.

The infotainment area is located upstairs, where the visitor can obtain information interactively with the help of state-of-the-art technology such as a Multi-Touch desk. And there's an Energy Shop on tour too, where one can buy a little or perhaps bigger present as a memento of an exciting experience

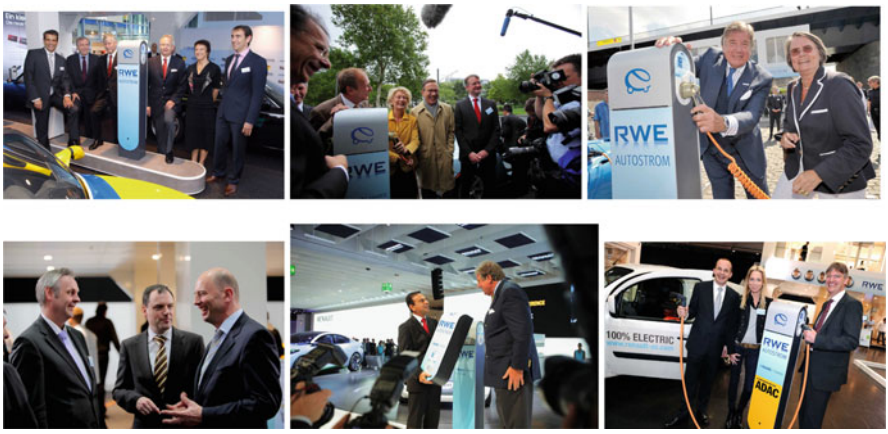
In 2009 the Roadshow stopped in Berlin, in Essen for the Ruhr region, in Düsseldorf, Hamburg, Frankfurt am Main for the IAA motor show, Stuttgart, Mainz and Munich. In 2010 the Roadshow started at the Geneva Motor Show to then move on to Leipzig for the AMI, then Mannheim, Klagenfurt and Kiel.

The Roadshow is being supported by partners from industry and business who want to move electro-mobility forward together with RWE. To lend the young topic of electro-mobility credibility and bolster the trust of visitors, involvement of RWE's alliance partners at the Roadshow was an element of the concept from the outset. Both the ADAC, Germany's biggest automobile association, and Sixt, market leader among car hire companies in Germany and Austria, are at the Roadshow to present their core themes in electro-mobility in their own "partner containers". They are joined by Renault, the renowned French automotive group, which entered into an alliance with RWE for joint development of consumer products surrounding electro-mobility in 2009.

The kick-off press events that take place at every Roadshow stop have been able to recruit many prominent external proponents. They include among others Maria Krautzberger – Secretary of State for Transport and Urban Development, Christa Thoben – Minister of Economic Affairs for the state of North Rhine-Westphalia, Margit Conrad – Environment Minister in the Rhineland-Palatinate, Petra Roth – Mayor of Frankfurt, Dr. Wolfgang Reiniger – Mayor of Essen, Erich Sixt – CEO of Sixt AG, Dr. Marc André Micha – COO Apcoa Parking Holdings GmbH, Thomas Veith – Managing Director Apcoa Autoparking GmbH, Wolfgang Dehen – CEO Siemens Energy, Stefan Müller – Chairman of the Board at ADAC, Hans Roth – Director Global Business Development Harman International, Carlos Ghosn – CEO Renault/Nissan, Achim Schaible – CEO Renault Deutschland AG.

From the RWE side as well, the Roadshow has attracted high-ranking attention: Among the visitors and speakers at the RWE Roadshow have been Dr. Jürgen Grossmann – CEO of RWE AG, Dr. Rolf-Martin Schmitz, Member of the Board of RWE AG, Leonhard Birnbaum – Vice President Strategy RWE AG, Prof. Fritz Vahrenholt – CEO RWE Innogy GmbH, Ingo Alphéus – CEO of RWE Effizienz GmbH and Carolin Reichert – Head of Electro-mobility division at RWE.

Politicians especially heaped praise on RWE's and it's partners' commitment and effort for contributing to enabling electro-mobility and making it visible to a broad public. Likewise the underlining and supporting of environmentally friendly strategies of major cities and municipalities and the companies' efforts of being at the forefront of innovation have been appreciated.



22.3 Conclusion and Outlook

The success of the communication measures for electro-mobility in 2009 and 2010 is remarkable:

With about 22,000 visits per day (visit = an uninterrupted visit to a website) and an upward trend (as of 31.08.2010) the rwe-mobility.com website has more than lived up to its role as a broadly effective communication platform.

With eight stops in 2009 of in total 51 days of presence, the RWE Autostrom Roadshow reached approximately 700,000 visitors. Of them 250,000 took the opportunity to try out electric cars, electric motorcycles and other electric vehicles. Approximately 550,000 people have visited the Roadshow so far in 2010.

With the help of supporting PR measures in 2009, a total of approximately 400 articles about RWE Mobility were launched in radio, TV and print media, realising approximatey 600,000,000 contacts.

With its early-stage, active and consistent communication, RWE has been able to position itself as a contact and business partner to be taken seriously for

companies, industry federations and politics in the market for electro-mobility. At the same time, the group has succeeded in enhancing its image among the population and with political decision-makers.

RWE will rigorously pursue its active communication strategy over the next few years and aim it at specific target groups. The main pillars here are the stronger positioning of the  -brand, the implementation of a specific marketing product for municipal utilities and infrastructure partners, targeted appearances at German and international trade fairs, forums and congresses, the expansion of the energy shop activities in the "RWE Energieladen", the constant updating of the information in the Internet and the continuation of the extensive press work.

Chapter 23
A Holistic Approach to Communicating Innovations: Siemens and Its Environmental Portfolio

Ulrich Eberl

Contents

23.1 Introduction

Environmental technology has the potential to become the most important industry of the twenty-first century. This is indicated by numerous studies, such as those published by McKinsey or Roland Berger Strategy Consultants. On the world market for environmental technologies, companies are already posting revenues of more than €1 trillion annually – and in the next 10 years this market could triple. In California, billions of dollars of risk capital are today being invested in ambitious environmental technologies, rather than in the Internet technologies that used to interest investors 10 years ago. US President Barack Obama and other government leaders are now talking about the need for a "green industrial revolution."

China has decided to invest almost 40% of its stimulus program in a more environmentally friendly economy in order to combat the economic crisis. That amounts to over €150 billion – almost half of the total investments in green technologies that are earmarked in all economic stimulus programs worldwide. China is determined to play a leading role in the development of environmental technologies. Nevertheless, Germany is still the number one country in this regard,

U. Eberl
Corporate Communications and Government Affairs – Technology Press and Innovation Communications, CC MR1, Siemens AG, Wittelsbacherplatz 2, 80333, München, Germany
e-mail: ulrich.eberl@siemens.com

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, 351
DOI 10.1007/978-3-642-17223-6_23,

as it holds a 16% share of the global market. Second place is occupied by the US, with a share of 15%. Europe as a whole produces almost half of all products related to environmental technology worldwide.

That includes renewable energies such as wind and solar power, technologies for keeping air and water clean, the recycling industry, alternative drive systems, and energy-efficient devices of all kinds, ranging from energy-saving lamps and LEDs to building technology and power-saving industrial motors. All of these environmentally friendly products and solutions are also part of Siemens' environmental portfolio, which is the broadest and most comprehensive in the world.

This portfolio brought Siemens sales of 28 billion euros in business year 2010 – more than a third of its total sales. In 2010 alone, Siemens customers could reduce their greenhouse gas emissions by 270 million tons of carbon dioxide by using products from the company's environmental portfolio. This amount is equivalent to the total annual emissions of New York, Tokyo, London, Delhi, Singapore and Hong Kong – and it is more than 50 times the amount of CO_2 emissions generated by the Siemens company itself. In fiscal 2014, Siemens wants to exceed the 40 billion euros revenue mark with green technologies. (Siemens Sustainability Report 2010).

With its environmental portfolio as well as with its other products, Siemens relies on its international presence in more than 190 countries, solutions that bring huge benefits to its customers, and its leadership in the field of innovations. The company invests around 4 billion euros annually in research and development, and well over one third of that amount is invested in the further development of "green" technologies.

Closed laboratory doors are a thing of the past at Siemens – the current buzzword is "open innovation". Accordingly, Siemens' success is due in part to the more than 1,000 cooperative research projects in which it participates every year with top universities in the US, China, Russia, India, and Europe. As a result, the 30,100 R&D employees submitted some 8,800 invention reports in 2010.

Innovative strength and top engineering have been part of the company's DNA ever since Werner von Siemens laid the foundation of modern telecommunication with his pointer telegraph 164 years ago. Soon after that, in 1866, he performed the same service for electrical technology when he discovered the dynamo-electric principle, and thus the most economical method of generating electricity.

Innovations from Siemens have set the course for modern industrial society. They include the first electric railroad in 1879, the first power plant in 1881, the Electric Victoria – the first electric car in small-batch production – in 1905, the first electron microscope ready for series production in 1939, the first industrial automation system in 1959, and world records in LEDs, gas turbines, and wind turbines in recent years.

That's why innovations communication – ranging through all media, countries, and target groups – is one of the main pillars of Siemens' corporate communication. The aim is to attract new R&D partners, show customers the benefits of the company's innovative solutions, and demonstrate Siemens' technological leadership with convincing examples. Siemens' vision, strategy, results, and added value for the customer must be communicated in a sustainable and credible manner. The company's "House of Innovations Communication" symbolizes this task. It consists of the three levels: "Strategy and Vision", "Success Stories", and "R&D Highlights", as well as the two pillars: "Continuity" and "Consistency" (Fig. 23.1).

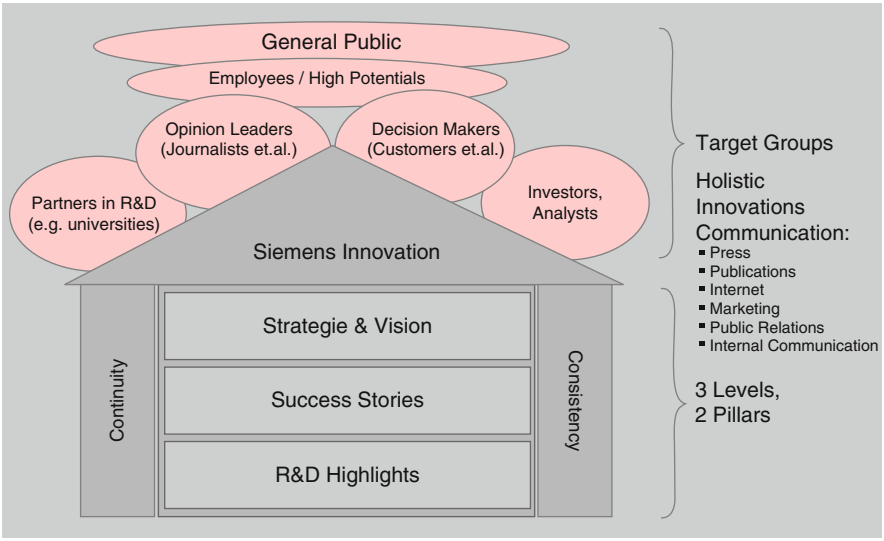


Fig. 23.1 The "House of Innovations Communication" at Siemens

23.2 The Keys to Successful Innovations Communication

The "Strategy and Vision" level deals with questions such as: What are Siemens' ideas about the future? Which trends will have an impact on our lives in the coming years? And what does the company's R&D strategy look like? For over a decade, Siemens has had its own well-established method of strategically planning the future – Pictures of the Future. This technique combines extrapolations of how today's business activities could develop in the future with holistic scenarios depicting what the world might look like in 10, 20 or 30 years. These visions are used as the basis for deriving future customer demands, new business options, and technologies that offer huge growth potential and great synergy effects and could therefore trigger revolutionary changes and paradigm shifts. The systematic and holistic approach of these Pictures of the Future makes them unique. They can therefore serve as an excellent leitmotif of the company's innovations communication, for example, either in print form (http://www.siemens.com/pof) or on Siemens' innovation website http://www.siemens.com/innovation.

"Success Stories" are concrete demonstrations of the usefulness of these innovations. The customer magazines of the different Siemens sectors play an important role here, as do press releases, TV broadcasts, interviews, presentations, trade fairs, special events, and advertising campaigns. These are also the channels through which the third level of the "R&D Highlights" is communicated. This includes results from the R&D laboratories, which are so innovative that they promise to solve major problems and so appealing that they attract the interest of many media representatives.

Experience has revealed some key elements of successful innovations communication:

- Individual reports on successful developments are not enough. Reputation building requires the continuous and consistent utilization of a multitude of communication channels. This is why Siemens established a special media service in 1996 as an innovations communication channel to the media. Since then, the media service has been publishing two to three innovation bulletins every week, written in terms that can be easily understood by the general public (http://www.siemens.com/innovationnews). Since 2007 it has also published the media services ResearchNews, which covers research topics exclusively (/researchnews), once a month, and PhotoNews (/photonews) every 2 weeks. It also regularly posts multimedia slideshows of captivating photographs, films and audio statements on the Internet. A "message cockpit" on the Intranet is one of the elements that makes sure the messages are consistent and distributed worldwide. It contains tools and theme packages for the Siemens communicators in over 190 countries.
- Innovations communication must be factually correct, and it must also be presented in an easily understandable manner. Unless it is part of an advertising campaign, this communication should impress its audience as being objective rather than promotional in nature. The goal is not to emphasize how innovative a solution is but rather to demonstrate as vividly and objectively as possible the added value provided by the new product or the new technology.

The following six key criteria for success were compiled at Siemens to guide the selection of themes for innovations communication:

1. A high level of topicality, resulting in high news value
2. Relevance for everyone, resulting in great practical value
3. Economic or social significance
4. Surprise effects or records achieved
5. Fascinating images (photographs/films), see also Fig. 23.2
6. Themes that can be personalized or provide a look behind the scenes

The innovation themes are prioritized according to these criteria and harmonized with the overall aims of the communication strategy and planning, such as a focus on the megatrends of climate change, demographic change, urbanization, and globalization. The result is a flow chart for the themes and their positioning in the communication channels.

23.3 Communication Channels, from Media to Marketing

In 1996 – 15 years ago – Siemens started its central innovation communications structure, which initially comprised just one employee in the media relations unit. The team and the tasks it deals with have grown continually since then, but the focus has remained the same. Innovations communication is regarded as a cross-sectional

Fig. 23.2 A high-speed train in an icy wind tunnel, organic LEDs, and solar-powered lamps for fishermen on Lake Victoria – examples of appealing innovation photos from Siemens' PhotoNews media service. The Lake Victoria picture won the prestigious obs award (from Deutsche Presse Agentur) for press photography in 2009

function, whether it's a matter of media relations, internal communications, public relations or marketing. Today the central team consists of nine employees and dozens of freelance journalists specializing in science and technology and based in several countries. It covers the following areas:

- Media coverage of overall innovation themes and topics, in the print media as well as on radio and television
- Publications such as the magazine *Pictures of the Future* (www.siemens.com/pof) and the book *Innovative Minds* (http://www.siemens.com/innovation/book), which uses portraits of 30 researchers and developers to reveal how innovations are actually generated and what obstacles had to be overcome in the process (Eberl and Puma 2007). The latest book called "Life in 2050" describes in an easily understandable manner all the major trends which will shape our life in the coming decades – from green technologies to the IT and healthcare revolution (Eberl 2011).
- The innovation website, a comprehensive set of slides about innovation, and articles for the Annual Report, the Sustainability Report, and other publications

- Internal innovations communication, including articles in *SiemensWorld* and on the intranet, as well as communicating events such as Siemens' Innovation Day – an annual "innovation fair"

The team also is responsible for communicating innovations via the following channels:

- Presentations and signed articles by members of the Managing Board and other executives
- The "Answers" program of the Corporate Marketing unit
- Exhibitions such as EXPO 2010 in Shanghai and Max Planck Society's exhibition train "Science Express", which traveled through 60 German cities in 2009
- Studies carried out by Siemens, e.g., the series about sustainable urban development, which has so far dealt with more than 30 cities in Europe – the European Green City Index (Economist Intelligence Unit and Siemens 2009) – as well as with 17 large cities in Latin America (Economist Intelligence Unit and Siemens 2010), and special studies of London (McKinsey and Siemens 2008) and Munich (Wuppertal Institute and Siemens 2009); there will also be future studies of cities in Germany, Asia, and Africa
- Special Siemens events such as "Pioneering Achievements of Electromobility, 1905–2010" on a huge stage on Potsdamer Platz in the center of Berlin (Fig. 23.3)
- Cooperative projects such as the one with Disney in the EPCOT theme park in Florida, where the thousands of visitors who board Spaceship Earth every day can find out about crucial inventions and the trends of the future in an entertaining way. Siemens' Pictures of the Future were a major source of inspiration for the Walt Disney Imagineers who created Spaceship Earth.

The magazine *Pictures of the Future* has been serving as Siemens' leading innovations communication medium since 2001. The magazine's objectives are to provide a comprehensive overview of the innovation activities at Siemens, describe the international context of these activities, provide experts from outside the company with a forum, present the customers' viewpoints, indicate the economic significance of innovative developments – and to be an exciting read for professionals and interested nonprofessionals alike (Fig. 23.4).

Pictures of the Future is published twice a year in eight languages, currently with a run of almost 100,000 copies. Each issue is about 108 pages long. The magazine is sent to subscribers in more than 100 countries; anyone can order a subscription free of charge (http://www.siemens.com/pof). *Pictures of the Future* has several times received the Distinguished Award – the highest honor, in the Publications category, as well as the "Best of Show" prize of the Society for Technical Communication in Washington, DC (with 14,000 members, it is the world's largest English-language association of professional technical journalists).

The magazine's main target groups are Siemens' current and potential R&D partners in the context of the open innovation process. That primarily includes the technical community at top universities and research institutes all over the world, R&D experts and managers at other companies as well as government institutions

Fig. 23.3 The "Pioneering Achievements of Electromobility 1905–2010" event on Potsdamer Platz in Berlin featured not only ultramodern electric vehicles and infrastructure solutions (such as fast recharging for electric cars) but also the first-ever presentation of a perfect reconstruction of the Electric Victoria. This, the first series-produced electric vehicle, was used on a daily basis starting in 1905 – at a time when horse-drawn carriages were still the main mode of transportation. With a range of 80 km per battery charge, it was used primarily as an elegant hotel taxi in Berlin

and technical associations. *Pictures of the Future* also addresses multipliers in the area of popular opinion, especially science, technology, and business journalists, as well as members of the general public who are interested in innovations and students majoring in the natural sciences, technology, and business. The magazine is also used to establish and maintain contact with customers, even though it is not a traditional customer magazine that primarily focuses on a company's products.

Back in 2001, the basic idea behind the magazine was just as new as Siemens' concept of strategic planning for the future. *Pictures of the Future* is not a mere compilation of interesting but unrelated articles. Instead, 24 or more pages of every

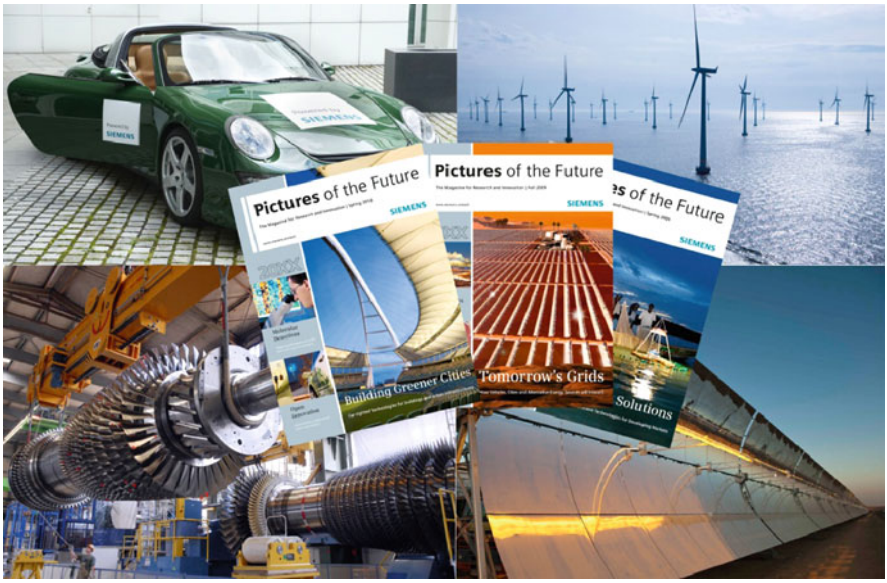


Fig. 23.4 Electric vehicles, wind farms, highly efficient gas turbines, and desert solar power – examples of environmental themes from the Siemens magazine *Pictures of the Future*

issue deal with three main themes that illuminate an issue from every important perspective: in terms of Siemens' innovations, the international context, and the market trends and economic forecasts.

In addition, the magazine does not start out from the status quo as traditional magazines do, but instead uses the future as the starting point of its "retropolation". Each of three main themes is introduced by a story from the year 20XX (in most cases it's 2020 or 2030) that describes in a casual style all of the trends that will be dealt with in greater depth and with more technical details on subsequent pages of the issue. These introductory future scenarios are made even more vivid by illustrations specially drawn for them.

To ensure that the articles can be understood by the general reader, the authors are drawn from a group of in-house technical editors as well as a large pool of their colleagues outside the company. The team also includes engineers for the multimedia Internet presentations, freelance photographers specializing in technical themes, service companies for image editing, layout, graphics, and illustrations, and of course professionals for translation, printing, managing the mailing lists, and distribution.

For example, the six most recent issues deal with the following theme areas:

- Sustainable Mobility, Demographic Challenge, and Emerging Markets on the Move (Fall 2010)
- Green Cities, Molecular Detectives, and Open Innovation (Spring 2010)
- Tomorrow's Power Grids, Modernizing Infrastructures, and Virtual Realities (Fall 2009)

- Life Cycle Planning, Digital Watchmen, and Innovations for New Markets (Spring 2009)
- The Future of Raw Materials, Sustainable Buildings, and Early Detection of Diseases (Fall 2008)
- Energy for Everyone, Tailored Solutions, and Digital Assistants (Spring 2008)

23.4 Environmental Technology and Climate Protection: The Leading Theme of the Twenty-First Century

A good current example of how holistic innovations communication works at Siemens is the set of solutions in the company's environmental portfolio that help to reduce energy demand, CO_2 emissions and combat climate change. The in-depth communication concerning this environmental issue began in April 2007 with a focus in *Pictures of the Future* and continued thematically in subsequent issues of the magazine. In parallel, articles were generated for internal communication, culminating in a completely "green" issue of *SiemensWorld* in summer 2008.

The series was accompanied by a large number of in-house and external interviews of members of the Managing Board and experts from R&D units, as well as a focus in the international "Answers" marketing program on the question "How can you power a planet hungry for electricity without damaging it?" As part of this program, advertisements were broadcast all over the world, TV spots, billboards, and displays were reserved, and the Siemens Internet pages were redesigned. The overall slogan was "Siemens provides answers to the toughest questions of our time."

A major element of the "Answers" program was a series of 12-page supplements that were simultaneously published in 2007 and 2008 in major European print media such as *Die ZEIT*, *F.A.Z.*, the *Sunday Times*, *El Mundo*, *La Tribune*, and *La Repubblica*. For example, the supplement on climate change appeared shortly before the international climate change summit meeting in Bali. Intensified media activities were running in parallel.

The topics covered included energy-saving LEDs that won the German Future Prize in December 2007, the first ignition of the world's largest gas turbine, portraits of environmental innovators, wind farms and intelligent networks, energy-saving high-speed trains, energy recovery systems in industrial facilities, and new methods for producing drinking water. In the past 3 years, hundreds of articles about these and similar Siemens-related environmental topics have been published in many major media, from the *Süddeutsche Zeitung* to the magazines *Focus* and *Der SPIEGEL* and from *Business Week* to the *New York Times*.

In addition, the Science Express was accompanied in 2009 by several eight-page "advertorials" in *Der SPIEGEL* as well as articles in SPIEGEL.online and TV reports which backed up the argument that climate protection and the economic crisis should not be played off against each other. On the contrary, these articles pointed out that many environmental technologies save energy and costs in the long

run – and in particular represent a tremendous opportunity for Germany, because German companies are the world leaders in these fields (Fig. 23.5).

This campaign was continued at the climate conference in Copenhagen, where Siemens presented several projects, including its electromobility projects, to media representatives and also introduced the European Green City Index, which combines and evaluates the environmental achievements and activities of 30 major European cities. Similar city indices will also be prepared for cities in the Americas, Africa, and Asia.

The communication of Siemens' environmental portfolio was continued in 2010 with examples from the area of renewable energies, such as the construction of Siemens solar power plants in southern Spain, the massive expansion of offshore wind farms, and the low-loss transmission of electricity over thousands of kilometers via high-voltage direct-current lines. Siemens is also focusing strongly on innovations in the area of energy-saving building technology as well as the rapid development of electromobility and the integration of electric cars into smart energy grids, where they can also serve as mobile power storage units.

In short, Siemens believes the world is on the brink of a new era of electricity, with electrical power as a universal energy carrier that is also especially environmentally friendly. That's because electric power can be generated without CO_2

Fig. 23.5 In parallel with Max Planck Society's exhibition train "Science Express", supplements in Der SPIEGEL magazine dealt with the topic of environmental protection as an opportunity in the economic crisis (the photo shows a railroad car equipped with energy-saving LED light panels from Osram)

emissions, transmitted with only minimal losses, and used with very high degrees of efficiency by consumers. That makes the new era of electricity an ideal topic for Siemens' innovations communication.

23.5 Conclusion

All of this shows that innovations communication works best when it is comprehensive and holistic. Its value for the company lies in its direct manner of addressing customers and partners and especially in its positive effects on the company's reputation. Some time ago, the media analysts at CARMA evaluated a total of 540,000 articles worldwide over a period of 3 years according to the criterion of "favorability." They concluded that articles dealing with new products, technologies, and innovations have much more positive results for the companies mentioned in the articles than do articles about mergers and acquisitions, straight business topics or financial reports.

After all, innovations include more than just solutions to major problems. At Siemens at least, there is also a very clear correlation between the technological leadership of business units, their position in the worldwide markets, their returns on investment, the added value of their innovations for customers, and the creation of new jobs. Clearly revealing these connections is one of the most important tasks of successful innovations communication.

Bibliography

Eberl, U. (2011) Life in 2050 – How We Invent The Future Today, Beltz & Gelberg, Weinheim

Eberl, U., and Puma, J. (2007) Innovative Minds: A Look Inside Siemens' Idea Machine, Publicis Corporate Publishing, Erlangen

Economist Intelligence Unit and Siemens AG (2009) European Green City Index. Siemens AG, Munich

Economist Intelligence Unit and Siemens AG (2010) Latin American Green City Index. Siemens AG, Munich

McKinsey and Siemens AG (2008) Sustainable Urban Infrastructure – London Edition – A View to 2025. Siemens AG, Munich

Pictures of the Future, Siemens' research and innovation magazine, published by Ulrich Eberl and Arthur F. Pease for Siemens AG, Munich. Twice per year, free copies via http://www.siemens.com/pof

Siemens Sustainability Report (2010), Siemens AG, Munich

Wuppertal Institute and Siemens AG (2009) Sustainable Urban Infrastructures – Munich: Paths to a CO_2-free Future. Siemens AG, Munich

Chapter 24
User-Centered Radical Innovation at Deutsche Telekom Laboratories

Fee Steinhoff and Henning Breuer

Contents

24.1 Introduction

The telecommunication industry depends heavily on innovation: New products and services with high degrees of innovativeness turn out to be important sources of sustainable growth (Deloitte 2007). But despite all the exciting technological innovation there remains always the crucial question: what do users want and expect from new offerings?

The position of the user has successively changed over the last 30 years from a passive recipient to an active co-designer in the creation of value (Breuer 2002). Successful innovators use competence within an extended network which particularly includes the competence of users (Prahalad and Ramaswamy 2000; Gemünden et al. 1996). In this context, the ability to integrate users is decisive. Iansiti and Clark

F. Steinhoff (✉)
Deutsche Telekom Laboratories, Leader User Driven Innovation, Ernst-Reuter-Platz 7, 10587 Berlin, Germany
e-mail: fee.steinhoff@telekom.de

H. Breuer
Deutsche Telekom Laboratories, User Driven Innovation, Ernst-Reuter-Platz 7, 10587 Berlin, Germany
e-mail: Henning.Breuer@telekom.de

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6_24,

(1994) understand this to mean the ability to allow information about users and their needs to flow into the process of innovation on the basis of mutual learning processes.

Radical innovation projects present a particular challenge to management, owing to the different opportunity to risk ratio, when compared to incremental innovations (O'Connor and Veryzer 2001). However, conceptual literature refers to limits of user input in radical innovation projects. For example, users may not be able to imagine what is technologically possible, to provide new solutions and to anticipate and articulate future needs as a consequence of "functional fixedness" (Ulwick 2002). On the other hand, if the advice to "ignore your customers" (Martin 1995) is taken literally; there is a high danger of introducing radical innovations which do not fit users' needs and thus fail in the market (Danneels 2003). It can be assumed that the concept of user orientation must be considered in a balanced way. Positive effects may depend upon the research methods used and the type of users focused on.

In the following paragraphs we first set a common ground for understanding dimension of innovation in general and the impact of open innovation activities on radical innovation in particular. At Deutsche Telekom Laboratories we developed a user-centred innovation approach in order to generate, identify and specify options for radical innovation. We describe exemplary methods to be applied in three phases – initiation, business modelling and market driving. Focusing on the initiation phase we describe and exemplify the futures workshop approach and its utilization of pre-inventive forms (Finke 1990) to trigger utopian ideation.

24.2 Radical Innovation

Innovations are new products or services which are significantly different to a previous state, through the combination of purpose (the need addressed) and means (the technology used; Hauschildt and Salomo 2007). The novelty of an innovation is not a one-dimensional construct, but rather should be described and operationalized (1) by multiple perspectives ("new for whom?": micro- vs. macro-perspective) and (2) by multiple determinants and consequences ("new in what respect?": market, technology, organization and environment). Product innovativeness can be conceptualized with the help of the following four dimensions (Salomo 2003; Garcia and Calantone 2002; Green et al. 1995):

- *Degree of market innovation*: The degree of market innovation provides information on how greatly the innovation differs from existing products in the market. From the perspective of the innovating company (micro-perspective), a high degree of market innovation is connected with addressing a new market and new customer groups. Such innovations give rise to relatively high levels of uncertainty, but also to the opportunity to fundamentally improve the company's market position. From the view of the industry (macro-perspective), innovations with a high degree of market innovation offer profoundly new benefits, but are normally also connected with extensive changes in learning and behaviour as well as increased adoption risk for potential customers (Rogers 2003).

- *Degree of technological innovation*: The degree of technological innovation is derived from the scope of technical novelty associated with the innovation. The use of new technological principles makes possible great leaps in performance and, as a result, frequently displaces existing technologies. Consequently, innovations with a high degree of technological innovation both at the micro- and macro-levels are associated with comparatively great technological uncertainties.
- *Degree of organizational innovation*: The degree of organizational innovation focuses on the internal micro-perspective. Profound innovations are frequently associated with new, formal, organizational structures and processes. However, they also affect informal characteristics of organizations, for example, by changing corporate culture. This is reflected, for example, in intensified and more open collaboration with external business partners which can significantly increase the complexity of the processes (Peters 1999). Strategic realignment is also a feature of innovations with a high degree of organizational innovation.
- *Degree of environmental innovation*: The degree of environmental innovation is an aspect of the industry-wide macro-perspective that has frequently been neglected. Innovations influence not only the direct market players. High product innovativeness frequently demands the set-up of new infrastructure, as well as considerable adjustments to regulatory and social conditions.

Different types of innovations can be defined based on the combination of the four dimensions of product innovativeness. Incremental innovation is limited to discontinuities on the micro-level and as a rule shows changes in only one dimension. By contrast, the opposite extreme of radical innovation shows comparatively high levels of discontinuity and uncertainty in all four dimensions (Salomo 2003; Garcia and Calantone 2002).

24.3 Open Innovation and User Orientation in Radical Innovation Projects

In the management literature, it is assumed that radical innovations exhibit a risk–reward ratio that deviates from that of incremental innovations (Zirger 1997). According to this, radical innovations offer the possibility of sustained differentiation from the competition (e.g., Song and Parry 1999) and the opportunity for exceptional success (e.g., Baker and Sinkula 2005). At the same time, however, the high levels of uncertainties entailed in radical innovations mean that both the probability and degree of success are uncertain (Danneels 2002).

Radical innovation projects pose particular challenges to innovation management: “Is it reasonable to expect that an innovation strategy used on an incremental innovation can be equally effective for a radical innovation? Most likely not. Innovation strategies must be tailored to the nature of the innovation and the degree of uncertainties present” (Lynn and Akgün 1998).

One relevant innovation management aspect refers to the concept of open innovation which has developed at high pace in the recent past. High degrees of uncertainties require less closed but more open innovation models (Chesbrough 2003). Chesbrough's (2003) definition of open innovation focuses on the combination of internal and external ideas to value creating business models and the use of internal and external channels to market. This "openness" to the multiple sources of origin distinguishes open innovation from the traditional closed innovation approach. The full potential of open innovation calls for two key elements. The first is to combine internal and external knowledge to improve innovations, and the second is to bring monetary value to technical knowledge (van der Meer 2007).

Incorporating knowledge from externals demands real collaboration between internal and external innovation competences. In order to motivate others to contribute their findings companies using open innovation have to provide instrumentality for a structured way of contribution (Braun and Herstatt 2006; Prügl and Schreier 2006). By increasing the number of participants involved, open activities heighten the degree of complexity within the management of innovation and thus create new challenges in management processes that extend beyond the boundaries of the firm (Erner et al. 2008; Chesbrough and Crowther 2006).

Open innovation activities can be characterized as either inbound or outbound based on the direction in which they steer information flow (Lichtenthaler 2008). One focus of inbound activities is that of user innovation. User innovation has been discussed widely in the context of the lead user paradigm (von Hippel 1986). The full potential of open innovation can only be truly exploited if a company has the skills to determine the profoundness of user generated ideas, to differentiate between normal (lead) users and the set of users who are able to foster radical innovation, and has the absorptive capacity to exploit radical inputs (Cohen and Levinthal 1990). Companies not using their ideas with alacrity but remaining inwardly focused, and cultivating a "not-invented here" syndrome, risk missing major and minor trends. In sum, companies should not store its ideas on an inventory shelf because the knowledge will inevitably leak out (Chesbrough and Crowther 2006).

However, capturing and defining ideas for innovative new products and services is not an easy task. Finding "the right job for your product" (Christensen et al. 2007) or answers to market-related questions such as "What are latent and future customer needs?", presents a major challenge to innovating companies. Furthermore, radical innovation projects often find it difficult to assess the potential and development of the market (Min et al. 2006). Especially in the early phases, it is frequently relatively unclear which market is to be addressed by the innovation at all (Sandberg 2005). On the other hand, the length and costs of processes in radical innovation projects are frequently above average (e.g., Danneels 2002), which makes an early amortization of the investment in the market more difficult. Finally, many of the methods used in traditional market research (e.g., quantitative surveys) are unsuitable for highly innovative offerings. Traditional methods are often too superficial and have a strong tendency to associate with the past. This makes them unsuitable for identifying latent and future customer requirements (Day 2002). Innovation

Management can nevertheless draw on a number of "intelligent" tools which produce reliable market information, even in cases where it is difficult to envisage the future involved (Rosenthal and Capper 2006). These tools are part of the user-centered radical innovation concept of Deutsche Telekom Laboratories which is described in the next section.

24.4 User-Centered Radical Innovation at Deutsche Telekom Laboratories

24.4.1 Deutsche Telekom Laboratories

Innovative new products and services form an important source of sustainable growth and are future critical in a phase of technological change (Münchner Kreis 2009). For Deutsche Telekom it is Deutsche Telekom Laboratories that account for research and development across the company. In the Berlin-based Laboratories, which are constituted as an affiliated institute of the Technical University Berlin, scientists and industry experts study and develop technologies and solution for tomorrow's communication. The bundling of business and science creates the condition for a successful transfer of research results in marketable products and services. Thus, Deutsche Telekom profits from the results of fundamental research and of the potentials of unconventional thinkers that are crucial for high-grade innovations.

Five research fields constitute the strategic direction for innovations of the Deutsche Telekom Laboratories: Intuitive Usability, Integrative Service Components, Intelligent Access, Infrastructure Development, and Inherent Security. These 5i of innovation provide a common orientation for the two think tanks "Strategic Research Laboratory" and "Innovation Development Laboratory". While Strategic Research is concerned with the basics of the communication technologies of the future, Innovation Development conducts product development and, thus, functions as a pre-stage for new products and services of the company's business fields. The focus of the interdisciplinary work lies in the technical as well as the market-oriented development and evaluation of innovative ideas, the realization of prototypes and demonstrators, the derivation of business models, and the transfer of the results into the business fields. The requirement for implementation is a combination of technical innovation and business relevance: on the one hand, what differences does the development make in comparison to the status quo and, on the other hand, what expectations does the user have for new products and services (Deutsche Telekom Laboratories 2009)?

To deliver answers to this question from the user perspective is the task of the project field User Driven Innovation, which cooperates very closely with the technical competence fields. The mission of the project field is the (further) development and implementation of suitable methods of user orientation along the innovation development process. To guarantee user orientation in radical innovation projects, a specific method toolbox is being applied, which is presented in the next section.

24.4.2 User-Centered Radical Innovation Toolbox

Radical innovation ideas do not fall out of the sky draining into a funnel of selection (Breuer et al. 2009). Instead, time, budget and tools for their generation must be allocated upfront. Sources of variation provide new perspectives from positions parallel to established lines of development. Different methods are more or less suitable to come up with ideas and concepts for rather incremental or radical innovation. While resource-oriented approaches tend to result in sustaining or incremental innovations that fit well into existing business processes, divergent methods like, e.g., futures workshops or blue ocean analysis have a greater potential to generate ideas for potentially radical innovation. Figure 24.1 contains an overview of user-centered radical innovation tools used at Deutsche Telekom Laboratories.

Goals of the user-centered radical innovation toolbox are (1) Identification of new search fields and market opportunities, (2) Generation of qualified user requirements, focused concepts, experience prototypes and business models and (3) Measures for market preparation including definition of suitable markets and market driving strategies.

One important aspect refers to choosing suitable users for integration based upon specific characteristics (Alam 2006; Gruner 1997). Typical "average" users might have difficulties imagining the future and anticipating and articulating their more or less unconscious future needs. In this context the term "functional fixedness" refers to the users' tendency to concentrate on their existing knowledge about the way products are used at the present. As a consequence, they may not be able to imagine what is technologically possible or to provide new solutions (Leonard 2002).

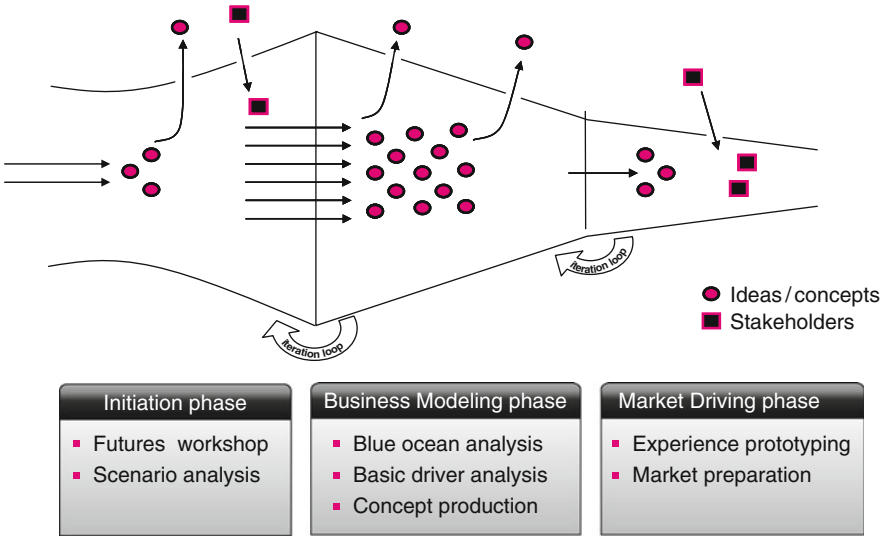


Fig. 24.1 User-centered radical innovation toolbox

In addition to that users can exhibit the psychological tendency to resist change and thus to show little interest in new features and functions or even disruptive changes (Ulwick 2002; Christensen and Bower 1996).

On the other hand, users who are for instances experts in the market, in the product category or in the core technologies might be very well able to provide sufficient high quality information in the context of radical innovations. Expertise enhances the users' ability to articulate their needs and to evaluate radical innovation concepts precisely (Reidenbach and Grimes 1984). Still, Kristensson and Magnusson (2010) recently provided empirical evidence that ordinary users (idea creators who are unaware of any technological restrictions) tend to produce more radical service ideas than idea creators with information on potential feasibility.

Lead users (von Hippel 1986) are particularly advanced customers who will especially benefit from the solution to a particular customer problem that is relevant for the future. They differ from average customers both in their ability to perceive the needs of the market at an early stage and in their significant interest in a solution to a problem, with the associated high motivation for cooperation. Providing a leading opinion in the sector can be seen as a further, potentially relevant characteristic, as mouth-to-mouth propaganda can affect the adoption processes of other target customers (Enkel et al. 2005).

In sum, users to be integrated into the innovation process should be selected carefully and with respect to the specific information needs of the referring phase. There are many models for the process of innovation, which vary in the terminology used, by the number of process phases, by the diversity of the structuring and presumptions about activities being sequential or in parallel. In the context of radical innovation generically and thus largely independently of the sector or situation, one can discriminate between the phases initiation, business modelling and market driving (Steinhoff 2006).

24.4.2.1 Initiation

The initiation phase refers to this initial fuzzy front end of an innovation project. How to proceed from nothing to something? Identification of search fields for new business, but also the generation of new ideas in science, design, and engineering are usually considered ill-defined, or even random. We tend to assume that ideas fall like raindrops from the sky, and we just have to funnel or filter out the good ones to come up with the next big thing (Breuer et al. 2009). Within the concept of open innovation the number of input channels and methods has been increased.

Initiation aims at a deep understanding of (future) users on the one hand and at the identification of (technological) search fields for innovations on the other hand. A search field confines area for exploration of business potentials in terms of generating revenue or reducing costs. It is not a trend, product, or feature, but it may be specified by relating trends and high impact developments in business, technology or society.

Exemplary tools as applied in the initiation phase at Deutsche Telekom Laboratories are:

- *Futures workshop*: Futures workshops are based upon divergent thinking in order to enlarge windows of opportunities, systematically identify search fields, and generate innovative, radical ideas. Divergent thinking is understood as productive and deviating from conventional habits. It is appropriate for problems, which do not have a fixed solution already or to which alternative solutions may apply. A futures workshop typically includes domain experts from separate fields and consists of phases for critique, utopian imagination and realization (Jungk and Müller 1987; Kuhnt and Müller 2003; see in detail Sect. 24.4.3).
- *Scenario analysis*: Since the mid-twentieth century, futures studies are well familiar with the limits of extrapolation to predict the future and developed an own history of working with multiple perspectives and alternative scenarios. Scenario analysis proceeds from identifying key impact factors to describing alternative future projections, and combines them into scenarios (Fink et al. 2000). "Wild Cards" may be introduced in order to reflect disruptions with low probability but high impact (Steinmüller and Steinmüller 2003), challenging established assumption and fostering thinking beyond the beaten tracks. The method aims at the identification of new search fields and market opportunities and furthermore the sensitization for potentially radical developments.

24.4.2.2 Business Modelling

The business modelling phase relates to the development of ideas and concepts for radical innovations as well as any pre-selection. Creativity is required, which can be supported by creativity techniques, whereby apart from internal sources especially external sources such as experts and users come into question. Afterwards a first investigation of the feasibility and the return on investment of the innovation in the marketplace take priority. To assess the commercial feasibility, particular care must be taken to see if and when the innovation will be accepted by the target customers (Ram and Sheth 1989).

The user-centered radical innovation toolbox provides a number of methods to facilitate the search for, concretion and pre-selection of ideas, for example:

- *Blue ocean analysis*: The blue ocean analysis aims at creating ideas in new uncontested market space by varying and adding strategic performance dimensions. Four actions can create a new value curve (1) Reduce: Which factors should be reduced well below the industry's standard? (2) Create: Which factors should be created that the industry has never offered? (3) Raise: Which factors should be raised well above the industry's standard? and (4) Eliminate: Which of factors that the industry takes for granted should be eliminated? (Kim and Mauborgne 2005). These questions provide a rough

guideline how to find value innovations from eliminating and reducing, and simultaneously raise and create new value.

- *Basic driver analysis*: The basic driver method is a structured guide to quickly shape existing (loose) ideas towards user focused and profitable concepts. Goal is the identification of initial users, their drivers in life, and rough market size estimation. Consumers prioritize spending time and/or money in satisfying primary drivers, e.g., Hope (e.g., hope for abundant money), Feel important (e.g., show off to peers) and Get more out of life (e.g., most value for my money, improve myself; see Ross; Merlin Consulting Limited). If a product or service can address some of these drivers, it is more likely to be adopted. Furthermore, by thinking of alternative drivers new potential target groups may be identified and quantified.
- *Concept production*: Iterative ideation, rough assessment, and rapid modification of a variety of tangible concepts help to explore the design space. Low-fidelity (e.g., paper) prototypes suffice as means of formative evaluation and yield quick answers to upcoming questions, thus addressing the need for confidence in the face of uncertainty. Therefore multiple and fast iterations are more important than individual versions. A variety of materials is being applied to stimulate divergence: Illustration and moderation kits provide new means for co-construction and communication. Results are qualified lists of prioritized concepts, use cases and business models.

24.4.2.3 Market Driving

Afterwards the emphasis is on development activities, which are generally dominated by the production and test of prototypes and the introduction of the innovation to the market (Gruner and Homburg 2000). In the context of radical innovation there is an increased need for information, not just on the side of the innovating company, but also for the customers targeted by the innovation. Communication has an above average influence on the successful spreading of an innovation in the marketplace (Lee and O'Connor 2003). Using suitable information, when preparing the market, the establishment of new knowledge and attitude structures can be supported as well as lowering barriers to adoption and lowering an increased perceived risk (Binsack 2003).

Exemplary tools in the market driving phase are:

- *Experience prototyping*: Experience prototypes enable users to interact with vivid representations of product and service ideas. Depending on the focus topic and level of detail being required a variety of prototypes from rough paper and pencil sketches to illustrations and video prototypes may be used to apply methods like heuristic walkthrough and usability testing. Results are concrete user requirements and evaluated experience prototypes.
- *Market preparation*: Market preparation tools support entrepreneurs to create and "drive" new markets. Preparing the market can be understood as "readying

the 'market' for the change" (Easingwood and Harrington 2002). This concerns specific actions both in advance and during the introduction to the market, with the goal of lowering user uncertainty and thus positively influencing the spread of the new product in the marketplace. Preparing the market can be conceived of as building market awareness (e.g., via product announcements) and educating prospective customers (e.g., via product demonstrations, active use of opinion leaders in the market; Sandberg 2005).

24.4.3 Example: Futures Workshop

In the previous chapter, a short overview about the methods of the user-centered radical innovation toolbox was given. This chapter is designed to intensify one of the methods: the futures workshop.

In principle, a futures workshop can be interpreted as a catalyser for reducing the discontent with the current situation and for showing positive development possibilities for the future (Jungk and Müller 1987). Normally, a futures workshop lasts several days and is subdivided into three sequential process phases: the critique phase, the utopian phase and the realization phase; see Fig. 24.2).

In the first phase, participants collect problems as well as resentments and make comments on dissatisfactory situations within a specific subject area. The illustration of problem fields by formulating negative news headlines is an

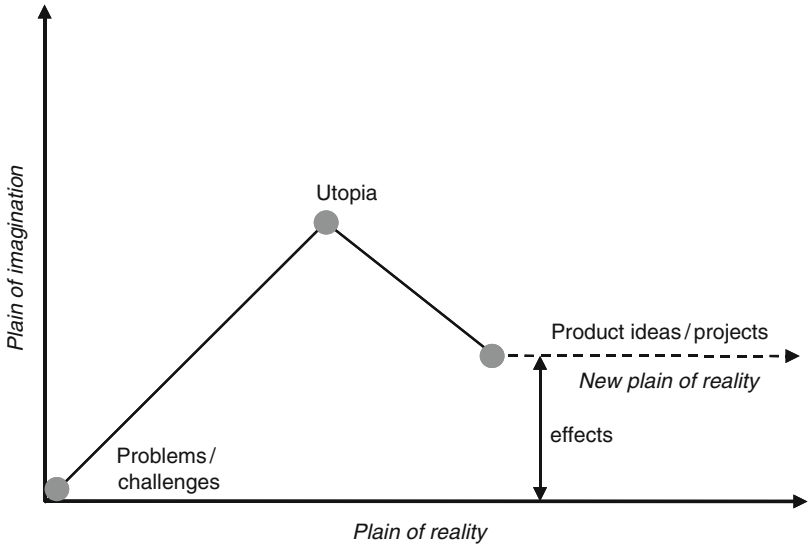


Fig. 24.2 Three-phase model according to Kuhnt and Müller (2004)

appropriate way to make the significance of a problem and its implications for the future clear. By individual evaluation, relevant problem complexes are being selected for the next phase. As an example, insights from a futures workshop conducted by User Driven Innovation within the event "Labs Talks" of Deutsche Telekom Laboratories in August 2009 are given. The topic of the experimental futures workshop was "Deutsche Telekom on the Moon in 2020". Firstly, participants uttered their worries and collected negative news headlines for the year 2020. Some participants forecasted upcoming "bandwidth wars", others saw the "Big Brother chip" being implanted in every human being, so that total surveillance would become reality. Another negative headline collected was that the attack of hackers triggered another world war.

In the utopian phase, it is assumed that any limitations of real life are not valid and that, in principle, everything is possible. Hereby, participants portray an exaggerated picture of the future driven by desire. The problems of the critique phase are being reformulated so that they result in a positive statement, e.g., positive news headlines. Building upon that, possible solutions are being identified. The neutralization of any limitations stimulates unusual and unconventional ideas and solution concepts (Kuhnt and Müller 2004). In the futures workshop "Deutsche Telekom on the Moon in 2020" the utopian phase meant that mankind is travelling to the moon to have a fresh and all new start. In order to encourage participants to reformulate the headlines already collected into positive ones, the following questions were asked: How does the communication on the moon look like? Which distinctive features can be found in this new world? How does ideal communication function? Positive headlines like the followings were formulated by participants: "Networks of trust establish world peace" or "No energy problems on the moon due to innovative generation method" or "Open access to all public data with individual control for private documents".

The third phase, the realization, re-establishes the connection with everyday life. The ideas and solution concepts of the utopian phase are being critically examined. The participants analyse how single aspects of the utopian vision can be realized in reality. Especially, the needs on which the utopian visions are based on offer starting points for the realization with today's and upcoming means, e.g., technologies. Participants of the experimental futures workshop transferred their utopian vision of life on the moon into various ideas that could be realized with modern technology. For example, some participants suggested building a chip of trust that would prevent all unauthorized access to data. Others developed an N-Beat device that would enable its carrier to communicate via neuro-communication. A third idea was the Open T-Secure tool that would filter all incoming messages due to their relevance and their character (private or public). Thus, some of the underlying needs of the participants were, e.g., the wish to cope with the information overload of today's communication and information society as well as automatic and context-sensitive security systems. These exemplary user insights and first ideas can be used as starting points for subsequent R&D activities.

24.5 Conclusion

User centricity is a critical factor, both for the success of the company as well as for the success of the new product. Despite this, a lack of user orientation continues to be a frequent phenomenon in the process of innovation – especially in the context of radical innovation (Mason and Harris 2005). Radical innovations exhibit a risk–reward ratio that deviates from that of incremental innovations. Actively dealing with market uncertainties presents a significant challenge to the management. Overcoming the bottleneck factor of user orientation translates into the need for intelligent information generation. This ability can be seen as a part of broader network competence which makes it possible for companies to establish and successfully use relationships to external partners within their innovation processes (Ritter and Gemünden 2004).

The described methods within the user-centered radical innovation toolbox may all be characterized by detour: They do not go directly to the target, but work around what may appear as the most efficient way to hit the goal. They do not give a direct shot, but pass the ball to another player, even if she or he is not on the playground (like users, non-users, experts from other domains or future visions are outside the realm of an organization). Futures research applies for example wild card irritating well established expectations. This basic approach is supported by psychological research on "pre-inventive forms" (Finke 1990) that may foster creative thinking more than targeting at a specific purpose. Principles of detour apply external points of reference in order to enable multiple shifts in perspective. Detour allows to find "new combinations" (Schumpeter 1910) of potentials inside and opportunities outside the box.

To sum it up: The concept of user-centered radical innovation as applied at Deutsche Telekom Laboratories offers a systematic approach for generating insights and ideas for highly innovative new products and services.

Bibliography

Alam, I. (2006). Removing the Fuzziness from the Fuzzy Front-End of Service Innovations Through Customer Interactions. Industrial Marketing Management, 35 (4), 468–480.

Baker, W. E., & Sinkula, J. M. (2005). Market Orientation and the New Product Paradox. Journal of Product Innovation Management, 22 (6), 483–502.

Binsack, M. (2003). Akzeptanz neuer Produkte. Vorwissen als Determinante des Innovationserfolgs. Wiesbaden: Deutscher Universitäts-Verlag.

Braun V., & Herstatt, C. (2006). Barriers to User-Innovation: The Paradigm of Permission to Innovate. IEEE International Conference on Management of Innovation and Technology, Conference Proceedings, June 20–23 2006, Singapore.

Breuer, H. (2002). Interfacegestaltung und Imagination: Kultivation von Unternehmensidentitäten in digitalen Medien. (Interface Design and Imagination). Berlin: Waxmann.

Breuer, H., Hewing, M., & Steinhoff, F. (2009). Divergent Innovation: Fostering and Managing the Fuzzy Front End of Innovation, Proceedings of 9th Portland International Center for Management of Engineering and Technology Conference (PICMET Conference), August, 02–06 2009, Portland, OR, USA, 1–8.

Chesbrough, H. W. (2003). Open Innovation: The New Imperative for Creating and Profiting from Technology. Boston: Harvard Business School Press.
Chesbrough, H. W., & Crowther, A. K. (2006). Beyond High Tech: Early Adopters of Open Innovation in Other Industries. R&D Management, 36 (3), 229–236.
Christensen, C. M., & Bower, J. L. (1996). Customer Power, Strategic Investment, and the Failure of Leading Firms. Strategic Management Journal, 17 (3), 197–218.
Christensen, C. M., Anthony, S. D., Berstell, G., & Nitterhouse, D. (2007). Finding the Right Job For Your Product. MIT Sloan Management Review, 48 (3), 37–47.
Cohen, W. M., & Levinthal, D. A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. Administrative Science Quarterly, 35 (1), 128–152.
Danneels, E. (2002). The Dynamics of Product Innovation and Firm Competences. Strategic Management Journal, 23 (12), 1095–1121.
Danneels, E. (2003). Tight-Loose Coupling with Customers: The Enactment of Customer Orientation. Strategic Management Journal, 24 (6), 559–576.
Day, G. S. (2002). Managing the Market Learning Process. Journal of Business & Industrial Marketing, 17 (4), 240–252.
Deloitte (2007). Telecommunications Predictions: Technology Media & Telecommunications Trends 2007, 1–24.
Deutsche Telekom Laboratories (2009). Jahresbericht 2009.
Easingwood, C., & Harrington, S. (2002). Launching and Re-Launching High Technology Products. Technovation, 22 (11), 657–666.
Enkel, E., Kausch, C., & Gassmann, O. (2005). Managing the Risk of Customer Integration. European Management Journal, 23 (2), 203–213.
Erner, M., Arnold, H., & Presse, V. (2008). Organisatorische Implikationen von Open Innovation auf das Innovationssystem. In W. H. Schmeisser, & H. Mohnkopf (Eds.). Ausgewählte Beiträge zum Innovationsmanagement, zur empirischen Mittelstandsforschung und zum Patentschutz. München und Mering: Rainer Hampp Verlag.
Fink, A., Schlake, O., & Siebe, A. (2000). Wie Sie mit Szenarien die Zukunft voraus denken. Was Szenarien für die Früherkennung leisten und wie sie konkrete Entscheidungen unterstützen. Harvard Business Manager, 8 (2), 34–37.
Finke, R. A. (1990). Creative Imagery: Discoveries and Inventions in Visualization. Hillsdale, New Jersey: Eribaum.
Garcia, R., & Calantone, R. (2002). A Critical Look at Technological Innovation Typology and Innovativeness Terminology: A Literature Review. Journal of Product Innovation Management, 19 (2), 110–132.
Gemünden, H. G., Ritter, T., & Heydebreck, P. (1996). Network Configuration and Innovation Success: An Empirical Analysis in German High-Tech Industries. International Journal of Research in Marketing, 13 (5), 449–462.
Green, S. G., Gavin, M. B., & Aiman-Smith, L. (1995). Assessing a Multidimensional Measure of Radical Technological Innovation. IEEE Transactions on Engineering Management, 42 (3), 203–214.
Gruner, K. E. (1997). Kundeneinbindung in den Produktinnovationsprozess. Wiesbaden: Gabler.
Gruner, K. E., & Homburg, C. (2000). Does Customer Interaction Enhance New Product Success? Journal of Business Research, 49, 1–14.
Hauschildt, J., & Salomo, S. (2007). Innovationsmanagement. München: Verlag Vahlen.
Iansiti, M., & Clark, K. B. (1994). Integration and Dynamic Capability: Evidence from Product Development in Automobiles and Mainframe Computers. Industrial and Corporate Change, 3 (Special Issue 1), 557–605.
Jungk, R., & Müller, N. (1987). Future Workshops: How to Create Desirable Futures. London, England: Institute for Social Inventions.
Kim, C., & Mauborgne, R. (2005). Blue Ocean Strategy: How to Create Uncontested Market Space and Make the Competition Irrelevant. Boston: Harvard Business School Press.

Kristensson, P., & Magnusson, P. R. (2010). Tuning Users' Innovativeness During Ideation. Creativity and Innovation Management. Oxford: Blackwell Publishing Ltd.
Kuhnt, B., & Müller, N. (2004). Moderationsfibel Zukunftswerkstätten: Verstehen, Anleiten, Einsetzen. 3rd Edition. Neu-Ulm: AG SPAK Bücher.
Lee, Y., & O'Connor, G. C. (2003). The Impact of Communication Strategy on Launching New Products: The Moderating Role of Product Innovativeness. Journal of Product Innovation Management, 20 (1), 4–21.
Leonard, D. (2002). The Limitations of Listening. Harvard Business Review, 80 (January), 93.
Lichtenthaler, U. (2008). Open Innovation in Practice: An Analysis of Strategic Approaches to Technology Transactions. IEEE Transactions on Engineering Management, 55 (1), 148–157.
Lynn, G. S., & Akgün, A. E. (1998). Innovation Strategies Under Uncertainty: A Contingency Approach for New Product Development. Engineering Management Journal, 10 (3), 11–17.
Martin, J. (1995). Ignore Your Customer. Fortune, (May 1), 83–86.
Mason, K., & Harris, L. C. (2005). Pitfalls in Evaluating Market Orientation: An Exploration of Executives' Interpretations. Long Range Planning, 38 (4), 373–391.
Min, S., Kalwani, M. U., & Robinson, W. T. (2006). Market Pioneer and Early Follower Survival Risks: A Contingency Analysis of Really New Versus Incrementally New Product-Markets. Journal of Marketing, 70 (1), 15–33.
Münchner Kreis e.V., EICT GmbH, Deutsche Telekom AG, & TNS Infratest (Hrsg.). (2009). Zukunft und Zukunftsfähigkeit der Informations- und Kommunikationstechnologien und Medien. Internationale Delphi-Studie 2030. Retrieved from http://www.zukunft-ikt.de.
O'Connor, G. C., & Veryzer, R. W. (2001). The Nature of Market Visioning for Technology-Based Radical Innovation. Journal of Product Innovation Management, 18, 231–246.
Peters, L. S. (1999). Inter-Firm Knowledge Management and Technology Development in Radical Innovation. In D. F. Kocaoglu, & T. R. Anderson. Portland International Conference on Management of Engineering and Technology (PICMET), 179–185.
Prahalad, C. K., & Ramaswamy, V. (2000). Wenn Kundenkompetenz das Geschäftsmodell mitbestimmt. Harvard Business Manager, 22 (4), 64–75.
Prügl, R., & Schreier, M. (2006). Learning from Leading-Edge Customers at The Sims: Opening up the Innovation Process Using Toolkits. R&D Management, 36 (3), 237–250.
Ram, S., & Sheth, J. N. (1989). Consumer Resistance to Innovations: The Marketing Problem and its Solutions. Journal of Consumer Marketing, 6 (2), 5–14.
Reidenbach, R. E., & Grimes, S. (1984). How Concept Knowledge Affects Concept Evaluation. Journal of Product Innovation Management, 1 (4), 255–266.
Rogers, E. M. (2003). Diffusion of Innovations. New York: Free Press.
Rosenthal, S. R., & Capper, M. (2006). Ethnographies in the Front End: Designing for Enhanced Customer Experiences. Journal of Product Innovation Management, 23 (3), 215–237.
Ross, M.; Merlin Consulting Limited.
Salomo, S. (2003). Konzept und Messung des Innovationsgrades: Ergebnisse einer empirischen Studie zu innovativen Entwicklungsvorhaben. In M. Schwaiger, & D. Harhoff. Empirie und Betriebswirtschaft. Entwicklungen und Perspektiven, 399–427.
Sandberg, B. (2005). The Hidden Market: Even for Those Who Create It? Customer-related Proactiveness in Developing Radical Innovations. Turku: Turku School of Economics and Business Administration.
Schumpeter, J. (1910). Über das Wesen der Wirtschaftskrisen. Zeitschrift für Volkswirtschaft, Sozialpolitik und Verwaltung, 19, 271–325.
Song, X. M., & Parry, M. E. (1999). Challenges of Managing the Development of Breakthrough Products in Japan. Journal of Operations Management, 17 (6), 665–688.
Steinhoff, F. (2006). Kundenorientierung bei hochgradigen Innovationen: Konzeptualisierung, empirische Bestandsaufnahme und Erfolgsbetrachtung. Wiesbaden: Deutscher Universitätsverlag.
Steinmüller, A., & Steinmüller K. (2003). Wild Cards. Wenn das Unwahrscheinliche eintritt. Munich: Gerling Akademie Verlag

Ulwick, A. W. (2002). Turn Customer Input into Innovation. Harvard Business Review, 80 (1), 91–97.
van der Meer, H. (2007). Open Innovation – The Dutch Treat: Challenges in Thinking in Business Models. Creativity & Innovation Management, 16 (2), 192–202.
von Hippel, E. (1986). Lead-Users: A Source of Novel Product Concepts. Management Science, 32 (7), 791–805.
Zirger, B. J. (1997). The Influence of Development Experience and Product Innovativeness on Product Outcome. Technology Analysis & Strategic Management, 9 (3), 287–297.

Chapter 25
The High-Tech Innovation "ParcelRobot": Patent Strategy and Communication Tools

Moritz Rohde, Nicole Pfeffermann, Wolfgang Echelmeyer, and Carsten Rasch

Contents

M. Rohde (✉)
Bereich IPS, Bremer Institut für Produktion und Logistik GmbH, Hochschulring 20, 28359 Bremen, Germany
e-mail: roh@biba.uni-bremen.de

N. Pfeffermann
Systems Management, International Logistics, School of Engineering and Science, Jacobs University Bremen, Campus Ring 1, 28759 Bremen, Germany
e-mail: Nicole.Pfeffermann@googlemail.com

W. Echelmeyer
ESB Reutlingen – Business School, Reutlingen University, Alteburgstr. 150, 72764 Reutlingen, Germany
e-mail: Wolfgang.Echelmeyer@Reutlingen-University.DE

C. Rasch
ThyssenKrupp System Engineering, ThyssenKrupp Krause GmbH, Richard-Taylor-Str. 89, 28777 Bremen, Germany
e-mail: carsten.rasch@thyssenkrupp.com

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*, 379
DOI 10.1007/978-3-642-17223-6_25, © Springer-Verlag Berlin Heidelberg 2011

25.1 The Open Innovation Process with a Dialog Perspective

Innovations have a crucial impact on the viability and profitability of a company, but the process of innovating has shifted from a closed to an open innovation view (Chesbrough 2003). Companies switched from taking a defensive position in the traditional industries to extending the interdependency of their enterprises (Davenport et al. 2006).

The open innovation paradigm has made considerable progress in research and practice in recent years (Gassmann et al. 2010). The construct *open innovation* can be understood as "... the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation [...]" and the "... processes combine internal and external ideas into architectures and systems" (Chesbrough 2006: 1). As a result, companies have to be more flexible in outsourcing (e.g., Hagedoorn and Duysters 2002; von Hippel 1988), and in finding new ways to deal with more disaggregated value chains and integrating the user in early innovation processes (Gassmann et al. 2010), such as, for instance, the user-dominated innovation process or development of products by lead users (von Hippel 1988, 2005). Moreover, the acceleration of changes in market structures and technologies has to be considered (Waarts et al. 2002); therefore managing open innovations will concentrate also on low-tech sectors, for instance, machinery, fast moving consumer goods, food, and logistics (Gassmann et al. 2010). Considering these aspects, this book chapter presents an open innovation process in logistics with the project example "ParcelRobot".

Three main process types were identified to open up the innovation process: outside-in process, inside-out process and the coupled process (Gassmann and Enkel 2004). Among these types, the coupled process is the most common used. This process considers the integration of external knowledge and licensing of multiple-use technologies, and provides a basis for working alliances. Such strategic alliances require new ways of managing intellectual property and defining licensing agreements for innovations (Mohr et al. 2010). For example, patents can be used as a revenue source via licensing.

An innovation process can be divided into three main sequential phases, as shown in Fig. 25.1, to simplify the reality of technology development (e.g., Brem 2008; Cooper 2001; Dwivedi and Butcher 2008; Herzog 2008):

1. Idea generation phase
2. R&D phase and
3. Commercialization phase

Each step includes several dialog situations between the innovation network and its stakeholders (Daschkovska et al. 2010). Hence, communication represents one main influence factor of an innovation's success (e.g., Trommsdorff and Steinhoff 2007; Zerfaß and Ernst 2008; Zerfaß and Möslein 2009).

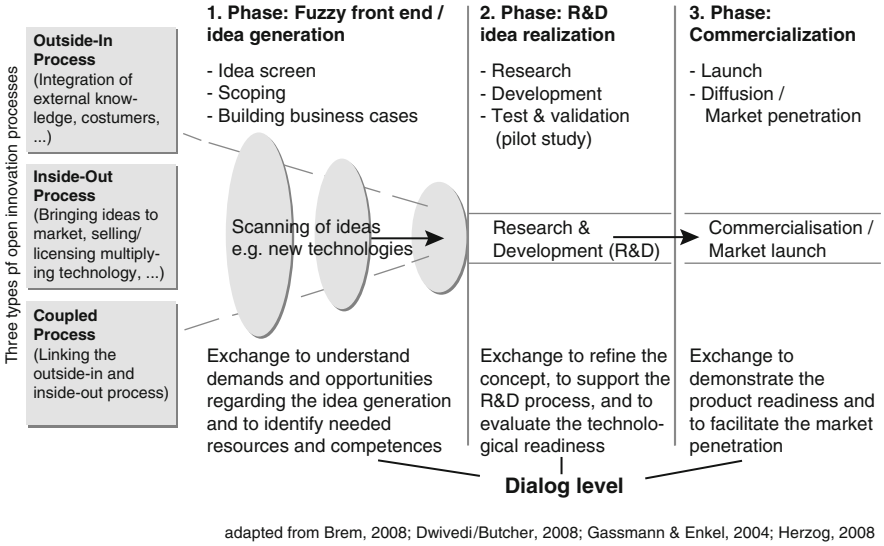


Fig. 25.1 Open innovation process with a dialog perspective

In particular, systematically planned and executed communication of an innovation facilitates its diffusion process. Regarding the open innovation process, many expected and unexpected exchanges between the innovation network and its stakeholders take place. One such exchange happens in the first phase "fuzzy front end/ idea generation" to further understanding of market demands and opportunities and to develop the basic idea according to the innovation network's environment and the type of initial innovation process (see Fig. 25.1).

25.2 The Open Innovation Project "ParcelRobot"

Goods in the European Union are mostly transported on carriers such aseuro pallets or wheeled units within swap trailers or containers. These carriers are especially matched to the requirements for automatic loading and unloading using forklifts or ground conveyors. However, a great portion of world-wide shipments are loosely stacked in swap trailers or containers; this is especially true of imports from the Far East. In general, in any given distribution center one or two employees have to unload the packages manually and put them onto telescopic conveyor belts.

Because the receiving area was one of the few non-automated areas in their distribution centre, the Deutsche Post DHL (DPDHL) decided to cooperate with the research institution BIBA GmbH (BIBA) to develop a robot system that could automatically unload loose standardized parcels from swap trailers and put them onto telescopic conveyor belts.

The division DHL Solutions & Innovations (DSI) of DPDHL was the lead user and initiator of the project "ParcelRobot". Besides DSI and BIBA, the main partners in the open innovation project were: EADS Space Transportation (EADS), ThyssenKrupp System Engineering (PT-SE), InnoWi GmbH (InnoWi), University of Bremen (University of Bremen), and WFB Wirtschaftsförderung Bremen (WFB).

Regarding partnerships in the open innovation view, DPDHL has established the organizational unit DSI to develop, deploy and promote innovative solutions.

25.2.1 Excursus: The Innovation-Network of DSI

Particularly in the logistics industry, new and intelligent combinations of technologies and innovative ways of managing information flows and material handling are crucial factors for future business. DSI as an integral part of DPDHL set up an innovation network that encompasses a partnership with industrial corporations, scientific institutions, and divisions of DPDHL to generate, develop and introduce innovations worldwide. On this basis DSI brings ideas generated through worldwide exchange in inter-cultural networks and multi-disciplinary working groups to life through a combination of spread resources, capacities, and innovative technology developments pertaining to logistic challenges. As a result, DSI forms a common understanding of innovation and thus an innovative culture across divisions, regions, and sectors.

Figure 25.2 illustrates the partner cluster of the DSI network: DHL Technology Partner, DHL Industry Partners and DHL Research Partners. The partner cluster in a nutshell consists of (DHL Innovation Center 2010):

- DHL Technology Partners are companies which link their (technological) know-how with Deutsche Post DHL's logistical expertise in order to promote innovations in the field of logistics.

Fig. 25.2 The partner cluster of the DSI network
Source: http://dsi.dhl-innovation.com/en/partner/index [12-08-2010]

- DHL Industry Partners are companies which represent a sector and contribute requests for innovations in the field of logistics from their customers' point of view.
- Research Partners are partners from Science & Research who help to identify trends and innovative developments.

A list of partners including a description of their profile and business can be found on: http://www.dhl-innovation.de.

25.2.2 The ParcelRobot's Functionality

The function of the developed robot system can be briefly described as follows: "A 3D laser scanner scans the layers of packages inside the container. The scanned picture is shown on the computer, where the coordinates for the robots" parcel gripper are then calculated. Controlled in this manner the gripper takes cubic, loose, standardised packages and puts them onto a conveyor belt. If the packages are outside of the robot's work range, the robot will drive automatically on its platform to the optimal position and will carry on unloading. The application of robots holds a great potential for the optimisation of logistical processes. Through the industrial hybrid robot the ParcelRobot system can be adapted to a variety of different loading and unloading tasks. Furthermore, it is possible to connect the process of unloading with the palletising and commissioning processes. A fully automatic receipt of goods is possible: at the entrance the ParcelRobot takes over the unloading of packaged goods and then with an additional industrial robot palletises them type- or order-related. "[. . .] Different parcels were supplied with RFID tags, unloaded autonomously, and then palletised according to their type." (BIBA 2007: 2). Related to the three main phases in an innovation process, this "ParcelRobot" project is subdivided into six sequential project steps detailed below (see also Rohde and Echelmeyer 2010).

25.2.2.1 Idea Phase

Step 1: "Feasibility Study to Validate the Conception"

At the beginning of the project a feasibility study was conducted at BIBA to identify possibilities and requirements regarding the basic idea of automating the unloading of swap trailers. The components of the robot system were arranged around a robot ensuring that it can reach all of the operating points and consider unrestricted areas to avoid collisions. A special challenge was the limited operating range caused by the container and therefore the installation had to be adapted to the environment. After six months the principle technological feasibility was proven.

25.2.2.2 R&D Phase

Step 2: "Prototype to Enable Demonstration and Testing"

In a second step the aim was to develop a prototype to demonstrate and test the standard industrial robot system. Based on some studies of gripper scenarios, a first gripper was developed that could handle cubic parcels with a length from 150 to 600 mm (5.9–23.6 inch) and a weight of up to 31.5 kg (69.4 lbs). EADS developed the image recognition software used for determining the exact position of each parcel within the swap trailer. Several tests and evaluations with different image recognition software were conducted and in a next step a suitable sensor technology was chosen based on the tests results. At the end of this step a first live presentation took place that showed the possibilities of the system for unloading loose standardized package goods from swap trailers.

Step 3: "1. Prototype in a Deutsche Post Parcel Distribution Hubs"

In a next step the system was transported to one of the Deutsche Post parcel distribution hubs. Several tests were conducted under real conditions with shipments in swap trailers from the German holding company Tchibo. The edge lengths of the parcels were within the spectrum of standard parcels and the gripper technology was tested intensively for handling goods of up to 30 kg (66 lbs). Simultaneously, BIBA conducted several tests to improve the gripper technology as well as the gripping strategy. Alternative movement strategies were applied to optimize the cycle time and the transportation of parcels. The limited operating space within the swap trailer, the parcel weight of 31.5 kg (69.4 lbs), and the weight of the used gripper represent important influence factors for the decision of using a suitable standard industrial robot. Due to its position between the stack of parcels and the telescopic conveyor belt, the standard industrial robot had to perform a rotation of 180° on its base in order to deposit parcels safety on the telescopic conveyor belt. Finally, a compromise had to be made between high-speed movement and safe transportation of parcels. But foremost, it was crucial to guarantee a secure grip to move the goods safely onto the telescopic conveyor belt. Therefore, different gripping principles were tested and analyzed to determine the optimal gripping strategy in a specific loading situation.

Additional research was carried out that investigated the robots' movement to find the optimal motion without a rotation of 180° between gripping and placing the parcel onto the telescopic conveyer belt. The main findings show that the high-tech system with an articulated robot arm could not meet the cycle time requirements due to the time-consuming 180° rotation. The movement analysis has shown that the performance of the robot system did not meet the requirements of an efficient working robot system to unload swap trailers. One main result was that this high-tech system is only profitable when the incoming goods area offers a steady capacity of shipments. Consequently, a new robot system had to be developed in

order to meet the challenges and requirements of unloading containers. All testing and evaluations as well as the decision-making were done conjointly by many members of the innovation network and also stakeholders who were integrated in the R&D process.

Step 4: "2. Prototype: Product Development Directed at Customer Needs"

The aim of the fourth phase of the "ParcelRobot" project was to develop a new robot kinematic that could fulfil the required cycle time demands. The challenge was to develop a system that did not collide with other goods or with the container or the telescopic conveyor belt while meeting the required profitable cycle time.

Subsequently, several investigations were planned and executed by the innovation network with the focus on the work environment, the parcel diversity and different stacking situations based on the previously collected knowledge. The concepts of the new kinematic variations were evaluated with the use of different simulations. The range of the new robot system was increased considerably while the material flows were optimised, leading to better performance and thus a basis for profitable use of the "ParcelRobot". A newly developed gripping system including an adjusted gripping strategy and application of an upgraded sensor technology to enable gripping parcels of overseas containers.

Step 5: "Delivery to the System Integrator and Pilot Study"

A pilot study under real business conditions is needed to develop an innovation towards marketability. Hence, the fifth step included a pilot study and the knowledge transfer as well as the delivery of the second prototype "ParcelRobot" to the system integrator, who was selected in several negotiations before. This step aimed at transferring the knowledge from the innovation network to the system integrator and refining the robot system in preparation for the market launch. The pilot study was conducted within a real business environment. The DHL distribution center (DHL Supply Chain Solution Fashion in Essen) provided a suitable location for the pilot study. Here the system could be tested for its ability to handle standardized parcels in overseas containers in the required cycle time allotted for automatically unloading the containers. After the slightly modified robot system was built by PT-SE, a three-month test phase was run, in which time to system was developed further at the production site in Bremen in close collaboration between researchers and employees of the industrial company. During this phase the system integrator PT-SE could learn from the innovation network.

In the next step the robot system was installed at the test area in the distribution center. A 10-month test and modification phase followed in which the object recognition, the gripping strategy and the robot programme were optimised. Moreover, different technical adjustments were also made to the hardware of the robot system. The pilot study was completed by an inspection including complete

documentation and training programmes. Since this acceptance test, PT-SE has been the system integrator of the innovative system "ParcelRobot".

25.2.2.3 Commercialisation Phase

Step 6: "Market Launch at the DHL Stand at the Trade Fair *transportlogistics*"

The market launch of the high-tech innovation was planned to take place in close cooperation with the main network partners BIBA, DSI, EADS, and PT-SE at the international trade fair *transportlogistics* in Munich. The complete robot system was demonstrated live at the DHL stand supported by image films, brochures and press releases in the press service center. Besides the presentation at the trade fair, several events were conducted with support from online and printed communication materials. In particular, feasibility studies focussing on the technological requirements and return on investment were offered to potential customers in order to provide a fundamental basis for decision-making for implementing the robot system into potential customers' logistics processes.

25.3 User-Oriented Patent and Licence Strategy

In the first step of the project "ParcelRobot" (see Chap. 2) the patent strategy was developed by the user DSI in cooperation with the research institution BIBA and the University of Bremen (supported by InnoWi). The strategy dictates that all patents for the robot system should be applied for jointly by DSI, the University of Bremen and BIBA. After the disclosure of the patent application, all rights should be assigned to DSI; however, the University of Bremen/BIBA should adequately participate in the patent exploitation. In this context, six patents were applied for and four have already been granted. Moreover, the specific software developments for the high-tech system were attributed solely to DSI.

The licensing strategy was mapped out by DSI in the fourth project step (see Chap. 2) and pursued through to the end of the project. The licensing strategy included granting one exclusive licence for the "ParcelRobot" to an adequate system integrator. After the fourth project step DSI and BIBA undertook a search for this exclusive licence holder, who could act in the capacity of a system integrator and at the same time offer appropriate market access for the robot system. PT-SE obtained the exclusive licence by signing a specific licensing contract as well as further contracts with the aim to determine a means for the know-how and technology transfer among all of the partners, especially between researchers and technical engineers at the University of Bremen/BIBA and PT-SE. Subsequently, a customer was chosen within the holding DSI for a pilot study. According to the terms of the contract, PT-SE and all project partners worked

together in the fifth and sixth project step to conduct the pilot study and, finally, to launch the "ParcelRobot" successfully onto the market. The technology transferred from the lead user (DSI), the research institution (BIBA) and the global corporation (EADS) – all referred to as inventors and main partners in the open innovation network – to the large company PT-SE. One specific example of technology transfer was the transfer of the know-how generated in open complex structures during the project phases 1 to 4; the technology agreements supported this know-how transfer. Close collaboration was necessary for patent applications, finding the licence holder and launching the product at the international trade fair. Moreover, another important influence factor was the communication activities for the high-tech innovation.

25.4 Communication Tools for the High-Tech Innovation

Researchers at BIBA predominately initiated the communication activities for the high-tech innovation "ParcelRobot" and the network partners were kept informed on the communication activities as they were planned and executed and actively integrated in the communication processes. Figure 25.3 provides an overview of these communication activities. The two main objectives of the communication activities were the support of the innovation process and the successful market launch of the high-tech innovation in a new business segment. Hence, communication had a creative function in developing a network reputation as well as an enabler function in fostering the adoption and diffusion processes. The requirements were to consistently communicate over a period of time and to combine all communication activities in a set of interrelated communication tools. Both lead to a communication framework with four communication channels in three main dialog phases that were linked to the three sequential phases of the open innovation process, as shown in Fig. 25.1.

For each channel a spectrum of communication tools were used in a specific dialog phase, as shown in Table 25.1. The four communication channels were: print communication, online/digital communication, face-to-face communication, and network communication. These channels were used for several communication tools to send key messages to various stakeholders. Stakeholders, referred to as the main communication partners of an innovation network, undergo change during the innovation process due to the technology development process. For example, the exchange concerning the technological readiness of the system offered the possibility to learn about potential new markets and target groups and their respective stakeholder groups for the automation process. Therefore, the communication tools were mainly directed to four communication channels related to the three sequential phases within an innovation process and, moreover, focused on innovative combinations of communication tools.

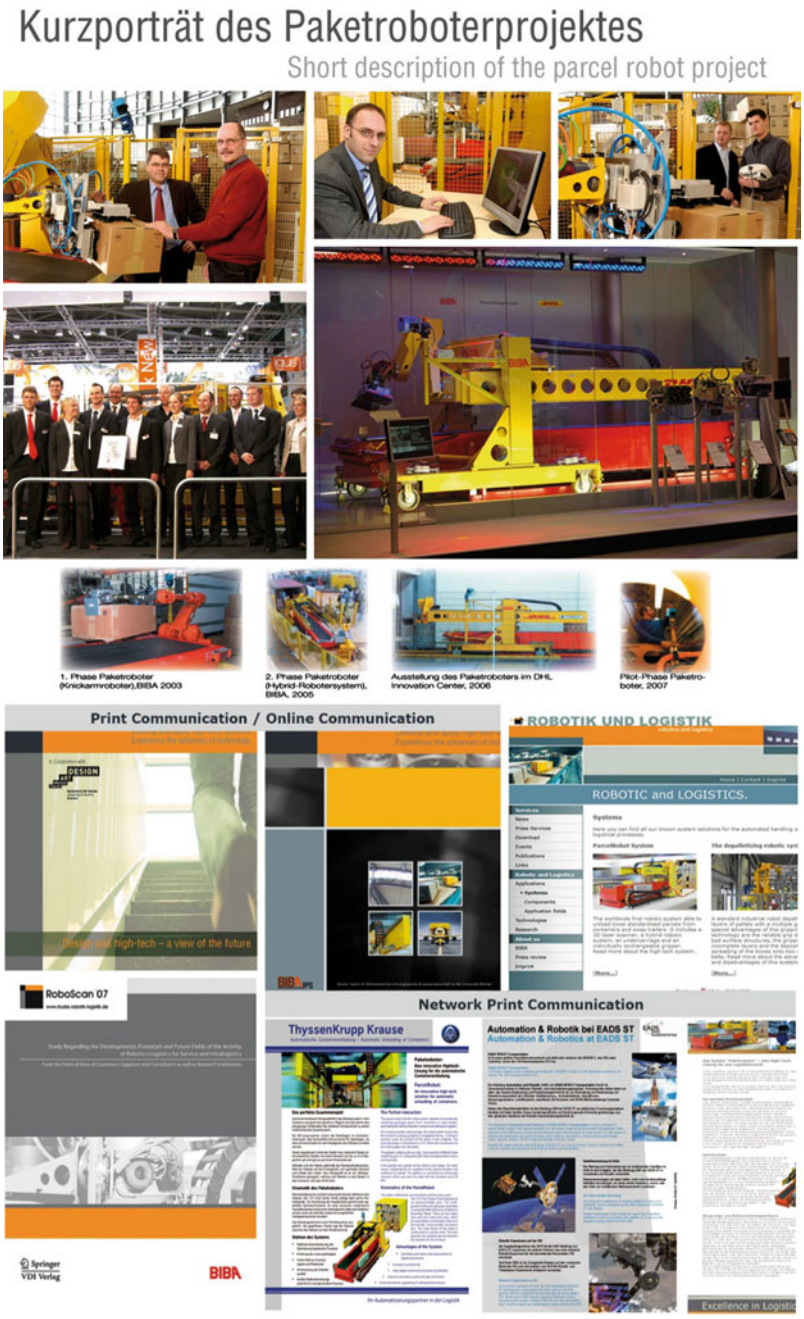


Fig. 25.3 Overview of communication tools for the high-tech innovation "ParcelRobot". Photographers: Ms. Scherz and Ms. Peterson
Source: Authors

Table 25.1 Communication tools in three main phases from the BIBA GmbH perspective

	Phases and communication tools in the innovation process		
Communication channels	*1. Phase "Idea Generation"*	*2. Phase "R&D"*	*3. Phase "Commercialization"*
Print communication	Business plan incl. market analyses, communication strategy and licence scenarios	Product design study report "ParcelRobot 2015" Fact sheet flyers Image flyers (BIBA, EADS, PT-SE)	Image flyers (BIBA, EADS, PT-SE)
Online/digital communication	Animations with future scenarios Digital presentations	Press releases Info CDs 2 project films *Online portal* "http://www.robotics-logistics.com"	Press releases Info CDs Image films *Online survey "RoboScan' 07"*
Face-to-Face communication	Events at BIBA	Feasibility studies and Business Cases for potential customers International trade fair "Automatica" incl. Walter Reis Innovation Award Presentation at BIBA and distribution centers Press conferences Events at BIBA and other locations Congresses and conferences	International trade fair "transport-logistics" (market launch) Live presentations at the distribution centers
Network communication	Internal event at DPWN	*DHL Innovation Center* DHL website Employee magazine of DPWN Mailing lists of the University of Bremen and DHL	Mailing lists of the University of Bremen and DHL DHL website

Source: Authors

The following three communication tools are described in more detail to exemplify the communication of the high-tech innovation "ParcelRobot" while the technology development and commercialisation were still underway:

- Online Information Portal "http://www.robotics-logistics.com" in 2007
- RoboScan'07: German online survey on the "robotics-logistics" market
- DHL Innovation Center

As shown in Table 25.1, those communication tools included several communication activities, for instance, a press release to announce the online survey and a printed study report to distribute the survey results. All communication tools were closely related to the innovation process. For the three examples, the communication activities were executed explicitly in the second and third phase of the innovation project "ParcelRobot".

25.4.1 Communication Tools for the Innovation's Context-Issue "Robotics-Logistics"

25.4.1.1 Online Information Portal "http://www.robotics-logistics.com" in 2007

Contrary to other common ways of presenting research projects or innovations, this online information platform presents the innovation's context-issue *Robotics-Logistics* to worldwide web users. The intention of the online platform was to share knowledge with several market participants and the public by using the communication channel *internet*. Dissemination of information through this medium meets the demands of the "new stakeholders" in the innovation economy (Davenport et al. 2006). The internet presentation also addresses yet unknown and new stakeholder groups, who are able to visit the platform from all over the world and at all times. Therefore, different sections within the platform respond to different target groups by offering individualised information. For example, the section *press services* addresses media representations; the sections *events* and *applications* are directed to potential customers; and the sections *technologies* and *research* present information material to other research institutions and logistic companies who pursue the strategy of outsourcing their R&D laboratories according to the open innovation view. Besides widespread information about robot technology applications, one section supplied information, for instance, on the RFID technology that enabled the automated palletiation as it related to the high-tech innovation "ParcelRobot". Another section presented up-to-date information about the "ParcelRobot" project. For purposes of knowledge sharing and knowledge building, the *services* category contained different sections, for instance, *events, publications* and *links*. In the download area web users could find up-to-date information about the system and the project background.

The high-tech innovation was embedded in the context *Robotics-Logistics*, more precisely, in a spectrum of information categories related to the innovation. This context may support better understanding by stakeholders of the discontinuous innovation and can offer several dialog situations with stakeholders directly to the high-tech innovation or indirectly through other issues and technologies on the market *Robotics-Logistics*.

25.4.1.2 RoboScan'07: German Online Survey on the "Robotics-Logistics" Market

A German survey was conducted between April and June 2007 with the objective to measure the awareness of the "ParcelRobot" and the potential rate of adoption at market launch (see also Pfeffermann et al. 2007; Pfeffermann 2008). The main

findings demonstrate that 98 percent of the potential customers knew of the robot system "ParcelRobot" and 54 percent could imagine adopting the discontinuous innovation. The reasons for the decision made for the innovation were given in a qualitative way:

- On the grounds of having heard about the system before from external communication by the innovation network in general
- On the grounds of having heard about the system before via media and/or word-of-mouth communication and
- On the grounds of having witnessed the presentation at trade fairs or elsewhere

The qualitative survey results show that the communication effects at market launch were positive due to several previous communication activities from idea to launch.

Regarding the communication tool "online survey", RoboScan'07 provided a means to attract stakeholder's attention for the innovation "ParcelRobot" and its context-issue *Robotics-Logistics*. Moreover, the online survey offered a basis for several communication activities with the aim to highlight the robot system, for example, press releases and the online study report including a description of the online information portal http://*www.robotics-logistics.com* and the innovation "ParcelRobot".

25.4.2 Network Communication Tools as Effective Dialog Platforms: The Example "DHL Innovation Center"

In the second phase (fifth project step), the high-tech innovation was transported to the DHL Innovation Center, a communication platform of DSI, and installed in the research area to show the new robot system to several stakeholder groups. The DHL Innovation Center is a communication platform of DSI for exchanging ideas and developing new ideas for logistics (DPDHL 2010). In the research area, project managers of DSI are working together with internal business units and external partners to develop innovative solutions in the form of prototypes.

Hence, this location offered the possibility to show the high-tech innovation "ParcelRobot" in a more realistic environment and to refine the developed functionalities of the system in close cooperation with the lead user DSI. Moreover, the location serves as a dialog platform to exchange with DSI's stakeholders about technological readiness and different scenarios for integrating the high-tech innovation in logistic processes.

The first event at the DHL Innovation Center was an international press conference where the robot system was presented and several information materials were hand out to journalists. Later the robot system was demonstrated to potential customers and special guests at the DHL Innovation Center.

25.5 An Outlook on the Market Penetration Phase: From the System Integrator Perspective

The market penetration phase with all project partners has been started with the presentation of the high-tech innovation "ParcelRobot" on the international trade fair *transportlogistics*. Parallel to these activities a completely new robot system was built by PT-SE for the pilot customer at DPDHL. Besides the validation tests in the pilot study, this system served as a prototype to show potential customers durability and functionalities of the system. Implementation in real logistic processes could show the strength of the high-tech system "ParcelRobot" and showed an exemplary integration scenario for future adopter groups; however, the target groups were limited to European contract logisticians, who distributed standardized goods in overseas containers. Hence, the distribution channels of PT-SE focused firstly on the European markets.

As the further development of the robot system as well as the second market penetration step was concerned, the high-tech innovation "ParcelRobot" should be implemented in logistic processes of new customers. In the respective market PT-SE's objective was to achieve high name recognition and high customer satisfaction. Thus, the two main evaluation criteria for a new customer were the willingness to support communication of the innovation "ParcelRobot" and a high amount of standardized packaged goods in overseas containers. For this reason, choosing the customer required looking at the customer's communication activities, the customer's corporate reputation and the amount of standardized shipments in overseas containers. Finally, an adequate customer with a high self-interest in communicating the high-tech innovation could be found and the system was implemented successfully at this customer's distribution center as well as presented to potential new customers.

Regarding the future market penetration and diffusion of the high-tech system "ParcelRobot", the product will be unitised and diversified for several implementation scenarios. For instance, further developments consider loading solutions and a new robot system will be produced with less complexity but therefore for a higher standardisation of packaged goods.

25.6 Conclusion

Within the open innovation project "ParcelRobot" a discontinuous high-tech innovation was developed and launched in the logistic market. In this context, many aspects can be considered regarding the open innovation process; nevertheless, this book chapter has focused on the patent and licensing strategy and communication tools for the high-tech innovation from idea to launch. Subsequently, the main key findings will be described based on the project experiences.

Three key findings regarding the selection of patent and licensing strategies within an open innovation network are:

- First, in the open innovation project "ParcelRobot" it was important to have a lead-user concept for the technology development and in particular for the patent and licensing strategy. The best way to integrate all inventors in a patent application was finally to allote the patent rights to the lead user and to agree on a participation scheme in the patent exploitation for the main project partners.
- Second, the interdisciplinary open project structure within the "ParcelRobot" project led continuously to new ideas and technology refinements which could support the six patent applications. The main project partners used several dialog situations in the open innovation network with "short time" project partners and other stakeholders, especially in the idea generation and R&D project phase, both to further develop the high-tech system and also to find an appropriate system integrator as the exclusive licence holder, which was finally one of the innovation's success factors.
- Third, the driver of the technological process innovation "ParcelRobot" was the lead user and, as a result, one positive effect was the value creation of the innovation because the licence holder could be sure to have one important customer/first user of the patented innovation and moreover one successful example for an implementation scenario of the high-tech system "ParcelRobot".

Three key findings for the communication of discontinuous high-tech innovations are:

- First, communication of innovation requires that standards are defined for the innovation network in order to identify and coordinate the innovation networks' resources and competences and to support standardized and ad-hoc communication and information processes from idea to launch. Based on those standards, several communication tools should be planned and integrated in a framework such as the presented four-channel-oriented framework related to three innovation phases. Regarding the open innovation process a four-channel perspective with several communication tools and their subordinate activities might be able to better match the requirements in the innovation economy than a mainly stakeholder-oriented communication framework. The stakeholder approach should be considered in a second step for each communication activity.
- Second, communication of innovation can be understood and developed as a dynamic capability of an innovation network to re-configure, create and extend the network's resource base and thus gain sustainability and also facilitate other parallel or future-oriented communication processes. The network communication perspective can encompass the communication of innovation clusters or the whole innovation portfolio of the network which may lead both to cost reductions in marketing and R&D expenditures and to a long-term value creation *network reputation*, referred to as the credibility of a network's innovative capability.

- Third, the creation of a context-issue or context-issue(s) for discontinuous high-tech innovations, such as *Robotics-Logistics* for the high-tech innovation "ParcelRobot", is necessary because it can positively influence the diffusion process. An innovation's context-issue can be understood as a frame for an innovation to improve understanding for several communication messages/information related to the innovation and can thereby foster an individual's decision-making process to adopt or reject an innovation. Thus, especially for discontinuous high-tech innovations, communication tools should systematically highlight innovations' context-issue(s) and an innovation network should introduce a consistent issues management scheme for context-issue(s) of innovations.

Acknowledgments First and foremost, our deepest gratitude goes to Dipl.-Ing. Hermann Franck, who came up with the basic idea and was the initiator of the R&D project "ParcelRobot". Our thanks go to him for his enormous engagement, supporting ideas, information policies, and also for his initiating the social activities that supported and motivated each individual and the reliable team work through all of the project phases. Our thanks go also to Prof. Dr.-Ing. Scholz-Reiter, who has supported the project phases as the director of BIBA GmbH at the University of Bremen. We would like to thank all collaborative partners, such as representatives/professors/researchers & technical employees from BIBA GmbH, Deutsche Post DHL/DSI, EADS Space Transportation, ThyssenKrupp System Engineering GmbH, InnoWi GmbH, University of Bremen, WFB Wirtschaftsförderung Bremen, as well as "short-time" business partners in different project phases, for their support, ideas and feedback throughout the innovation process. We would like to also thank all the supporting partners such as students, agencies, journalists, print services, potential customers, other universities/research institutions, and everyone who have positively contributed to the reputation of the project and the high-tech innovation "ParcelRobot".

Bibliography

BIBA (2007). Project ParcelRobot. http://www.robotics-logistics.com/fileadmin/user_upload/services/presse/broschueren/Project_ParcelRobot.pdf [2010-06-07].

Brem, A. (2008). *The Boundaries of Innovation and Entrepreneurship: Conceptual Background and Essays on Selected Theoretical and Empirical Aspects*. Wiesbaden: Gabler.

Cooper, R.G. (2001). *Winning at New Products: Accelerating the Process from Idea to Launch*. (3rd ed.) New York: Perseus Publishing.

Chesbrough, H.W. (2003). The era of open innovation. *MIT Sloan Management Review*, 44(3): 35–41.

Chesbrough, H.W. (2006). Open Innovation: A New Paradigm for Understanding Industrial Innovation. In H.W. Chesbrough, J. West, & W. Vanhaverbeke (Eds.), *Open Innovation: Researching a New Paradigm* (pp. 1–14). Oxford: Oxford University Press.

Daschkovska, K., Pfeffermann, N., Meyer-Larsen, N., & Hülsmann, H. (2010). Adoption Framework for Innovations in Logistic Transport Chains. In W. Kersten, T. Blecker, & C. Lüthje (Eds.), *Pioneering Solutions in Supply Chain Management. A Comprehensive Insight into Current Management Approaches* (pp. 347–364). Berlin: Erich Schmidt Verlag.

Davenport, T.H., Leibold, M., & Voelpel, S. (Eds.) (2006). *Strategic Management in the Innovation Economy. Strategy Approaches and Tools for Dynamic Innovation Capabilities*. Erlangen: Publics Publishing and Wiley-VCH.

DHL (2010). http://www.dhl-innovation.de/en/center/index.php [2010-06-07].

Dwivedi, A., & Butcher, T. (2008). *Supply Chain Management and Knowledge Management — Integrating Critical Perspectives in Theory and Practice*. Hampshire/UK: Palgrave Macmillan Publishers.

Gassmann, O., Enkel, E., & Chesbrough, H.W. (2010). The future of open innovation. *R&D Management*, 40(3): 213–221.

Gassmann, O., & Enkel, E. (2004). Towards a theory of open innovation: three core process archetypes. *Proceedings of The R&D Management Conference*, Lisbon, Portugal, July, 6–9.

Hagedoorn, J., & Duysters, G. (2002). External sources of innovative capabilities: the preferences for strategic alliances or mergers and acquisitions. *Journal of Management Studies*, 39(2): 167–188.

Herzog, P. (2008). *Open and Closed Innovation: Different Cultures for Different Strategies.* Wiesbaden: Gabler.

Mohr, J., Sengupta, S., & Slater, S. (2010). *Marketing of High-Technology Products and Innovations.* (3rd ed.) New Jersey: Pearson.

Pfeffermann, N., Echelmeyer, W., & Scholz-Reiter, B. (2007). *Study Regarding the Developments, Potentials and Future Fields of the Activity of Robotics-Logistics for Service and Intralogistics – from the Point of View of Customers, Suppliers and Consultants as well as Research Institutions*. Düsseldorf: Springer-VDI-Verlag.

Pfeffermann, N. (2008). Market Study RoboScan'07. In W. Echelmeyer, N. Pfeffermann, A. Kirchheim, K. Schmidt, & A.-K. Pallasch (Eds.) (pp. 4–5). Scenarios for the Integration of the High Tech System ParcelRobot, *Bremer Value Reports für Produktion und Logistik, ISBN 1866-7031*, 1(2).

Rohde, M., & Echelmeyer, W. (2010). Cooperation Possibilities Between Research and Industry: ParcelRobot. *Bremer Value Reports für Produktion und Logistik, ISBN 1866-7031*, 3(5).

Trommsdorff, V., & Steinhoff, F. (2007). Innovationsmarketing. München: Franz Vahlen.

von Hippel, E. (1988). *The Sources of Innovation*. Oxford: Oxford University.

von Hippel, E. (2005). *Democratizing Innovation*. Cambridge, MA: The MIT Press.

Waarts, E., van Everdingena, Y.M., & van Hillegersberg, J. (2002). The dynamics of factors affecting the adoption of innovations. *Journal of Product Innovation Management*, 19: 412–423.

Zerfaß, A., & Ernst, N. (2008). *Kommunikation als Erfolgsfaktor im Innovationsmanagement. Ergebnisse einer Studie in deutschen Zukunftstechnologie-Branchen*. Leipzig: Universität Leipzig.

Zerfaß, A., & Möslein, K.M. (2009). *Kommunikation als Erfolgsfaktor im Innovationsmanagement: Strategien im Zeitalter der Open Innovation*. Wiesbaden: Gabler.

Index

M. Hülsmann and N. Pfeffermann (eds.), *Strategies and Communications for Innovations*,
DOI 10.1007/978-3-642-17223-6,