

Management for Professionals

John Bessant
Claudia Lehmann
Kathrin M. Möselein *Editors*

Driving Service Productivity

Value-Creation Through Innovation

 Springer

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Driving Service Productivity

Value-Creation Through Innovation

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Preface

In a world moving towards services, driving service productivity is a central challenge for leaders and members of all types of organisations: for service businesses there is a clear need to be “productive”, but it is far less clear what this exactly means. For manufacturing firms services increasingly become a core component of the solutions they offer, but they are often just offered as “free services” or “after-sales services”, not as the value creating core for the customer. For public service organisations, it might be the customer who complains most about the “lack of productivity”, but what exactly is he or she asking for?

In earlier times the world seemed to be simple: productivity as the output–input ratio was easy to calculate for products, where output and input could be equally quantified. It has long been debated that the world of services and service systems calls for more fine-grained models that take into account that the service might be intangible, the customer might be involved in its delivery and outputs and inputs can be inseparably intertwined and differently perceived by different stakeholder groups in a service system. Still, from a business perspective it makes sense not to overcomplicate the picture: “doing more with less” has therefore become a key question in many organisations and even economies whilst new social structures and the increasing availability of online connectivity open up options for radical new service delivery. Innovation in this context emerges as a driver for value creation and a key lever for the productivity of services in and across many organisations.

In this book, we invite you on a journey that explores the ways, tools and options for driving service productivity. We take an innovator’s perspectives and look at the tricky challenge of service productivity as a landscape of options for designing the future of services. The journey follows a simple path:

The book first introduces the service productivity challenge from a service innovator’s standpoint in *part I*.

Part II offers the reader a range of “*Perspectives*”: Chap. 2 invites the reader to join us and to step back and also to look back at a forecast made over 25 years ago in order to improve our understanding of long-term dynamics and our ability to look into the future. Chapter 3 presents and analyses today’s state of the art in managing service productivity within German service companies and examines the methods

and tools used in these companies for measuring and improving service productivity. Chapter 4 looks at the current trend towards servitisation; it presents the current shift in Germany and discusses it in the context of international developments. Thus, it derives practical implications for managing the shift. Chapter 5 invites the reader to take a service-dominant logic perspective: it suggests that value is not embedded in units of output, but rather co-created with customers and other actors. This change in perspective brings major implications for how we understand and conceptualise the productivity concept and provides us with a fresh look at the cases that follow.

Part III presents and discusses insightful “Cases” from different service industries that feel the pressure of improving service productivity and deal with it in novel ways. By looking at the management of service productivity at airports (Chap. 6), in professional service firms (Chap. 7), in the healthcare sector (Chap. 8), the hotel business (Chap. 9) or large mechanical engineering companies (Chap. 10), we learn about new methods and tools, strategies and frameworks as well as challenges and barriers.

Part IV summarises these insights and looks into the “Future”. Throughout the book we also listen to the views and advices of experts from academia as well as business practice on how to drive service productivity. They discuss how and where innovation in services will drive productivity, what will affect the rate of change and elaborate on the accelerating and inhibiting factors. This provides us—and hopefully you as a reader—with the necessary food for thought to develop our own understanding of driving service productivity in different business settings.

Overall, this book is not a traditional “academic product” that summarises the views of a few, but a co-created offering that profited enormously from the contributions of so many. We thank all the chapter authors who have contributed their insights with often enormous engagement and energy: Prof. Ian Miles, Manchester Business School, Prof. Howard Rush, University of Brighton, Stephan Klingner, Stephanie Pravemann, Michael Becker, Prof. Dr. Klaus-Peter Fähnrich, all Universität Leipzig, Prof. Andy Neely, PhD, University of Cambridge, Prof. Bo Edvardsson, CTF—Service Research Center, Dr. Hagen Habicht, Friedrich W. Heidemann, both HHL Leipzig Graduate School of Management (CLIC), Alastair Ross, Codexx Associates Ltd, Bob Lillis, PhD, Cranfield University, Sabine Janeschek, EBS Universität and Prof. Dr. Matthias Gouthier, Universität Koblenz-Landau.

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We welcome any thoughts, feedback and suggestions via clic@hhl.de.

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Part I

Introduction

John Bessant, Claudia Lehmann, and Kathrin M. Möslin

Services matter. Quite apart from providing us with what we need, as citizens as well as consumers, the service sector in many countries now accounts for more than 70 % of gross domestic product and approximately 80 % of people in employment in the UK and the US are now employed in the service sector (Spohrer & Maglio, 2010).

We should also recognize that what we increasingly call manufacturing includes a sizeable service component with core products being offered together with supporting services—a website, a customer information or help-line, updates, etc. Indeed for many complex product-service systems—such as aircraft engines—the overall package is likely to have a life in excess of 30 or 40 years and the service and support component may represent a significant part of the purchase. At the limit to which manufacturers of complex product-service systems are recognizing that their users actually want to buy some type of service attribute which is inherent to the product. Thus, aero engine manufacturers are offering ‘power by the hour’ rather than just simply selling engines.

Effective services matter. In a world of limited resources and rising demand it is not sufficient to simply provide services—we also need to look at their productivity. This certainly involves traditional components of doing more with limited resources but it also extends to wider definitions of productivity—for example, the creation of a service experience and the ability to retain customers to consume services on a repeat basis (Vandermerwe, 2004). These lie outside the narrow realm of efficiency and are part of a wider effectiveness agenda—service productivity is about ensuring systems work at an optimal level.

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This is complex because there are situations where the needs for efficiency run up against the need for customer satisfaction—there are trade-offs to be made. For example, hotels could be more efficient if people were treated like goods to be stored and retrieved—but the resulting customer experience would probably be that no-one would want to stay in such a hotel. Striking a balance between these elements makes service productivity hard to define and even harder to achieve.

The challenge of service productivity is also that it involves a moving target. Service delivery is increasingly taking place against a backdrop of growing demand and often ever more limited resources—for example in public sector fields like healthcare or education. The problem is compounded by the globalisation and international tradability of many services so that a failure to be competitive may mean whole sectors are moved offshore. At the same time huge new possibilities are being opened up by technologies—for example changing the face of services like retailing by moving large parts of the service from the physical to the virtual world. And whilst new technologies offer opportunities to improve productivity, finding, evaluating and implementing them is a complex process.

1.1 Service Innovation

Improving service productivity in this context means service *innovation*. Without sustained changes in the nature of the services offered and in the ways they are created and delivered, it is impossible to meet the productivity challenge. And competitive advantage can undoubtedly come from innovation in services. For example, Citibank was the first bank to offer the automated teller machines (ATM) service and developed a strong market position as a technology leader on the back of this process innovation, whilst Bank of America is literally a textbook case of service innovation via experimentation with new technologies and organizational arrangements across its branch network. Benetton is seen as one of the world's most successful retailers, largely due to its sophisticated IT-led production network, which it innovated over a 10-year period and the same model has been extended and developed further to great effect by the Spanish firm Zara. Southwest Airlines achieved an enviable position as the most effective airline in the USA despite being much smaller than its rivals; its success was due to process innovation in areas like reducing airport turnaround times. This model has subsequently become the template for a whole new generation of low cost airlines whose efforts have revolutionized the once-cosy world of air travel (Tidd & Bessant, 2013).

Importantly, we need to remember that the advantages which are gained from these innovative steps gradually get competed away as others imitate. Unless an organization is able to move into further innovation, it risks being left behind as others take the lead in changing their offerings, their operational processes or the underlying models which drive their business. For example, leadership in banking has passed to others, particularly those who were able to capitalize early on the boom in information and communications technologies; in particularly many of the

lucrative financial services like securities and share dealing have been dominated by players with radical new models like Charles Schwab. As retailers all adopt advanced IT, so does the lead shift to those who are able—like Zara and Benetton—to streamline their production operations to respond rapidly to the signals flagged by the IT systems.

With the rise of the Internet the scope for service innovation has grown enormously—not for nothing is it sometimes called ‘a solution looking for problems’. As Evans and Wurster point out, the traditional picture of services being either offered as a standard to a large market (high ‘reach’ in their terms) or else highly specialized and customized to a particular individual able to pay a high price (high ‘richness’) is ‘blown to bits’ by the opportunities of web-based technology (Evans and Wurster, 2000). Now it has become possible to offer both richness and reach at the same time—and thus to create totally new markets and disrupt radically those which exist in any information-related businesses.

The point is clear: innovation matters significantly to service sector players across the economy—if they don’t change their offerings and the ways they create and deliver those (traditionally what we would term ‘product’ and ‘process’ innovation) then their survival and growth are in question. Indeed the pressure to innovate may be stronger than in manufacturing because new ideas in services are often easy to imitate quickly and hard to protect. And at the heart of the drive to innovate is the quest for higher service productivity.

1.2 Types of Service Innovation

Service innovation can take place in a wide variety of ways, each of which offers potential for both incremental improvement (‘doing what we do but better’) and radical change (‘doing something completely new’) We can effectively look at four dimensions along which service innovation can take place (Fig. 1.1):

- ‘*product*’—the service offering
- ‘*process*’—how that offering is created and delivered
- ‘*position*’—the target market segments, the underlying positioning via brand, the story which we tell to position the innovation in the user’s mind
- ‘*paradigm*’—the underlying mental models about what kind of business we are and the rules of the game—business model innovation

For example, a new insurance package for accident-prone babies or the provision of 24 h online banking would be examples of ‘product’ innovation. And change in the ‘back office’ methods used to support the provision of such banking services or the underlying sequencing and information processing behind the insurance package would be examples of process innovation.

Sometimes the dividing line is somewhat blurred—for example, offering online shopping is both a product and a process innovation. Services by their nature are often created and consumed at the same time and so represent a hybrid of product and process change.

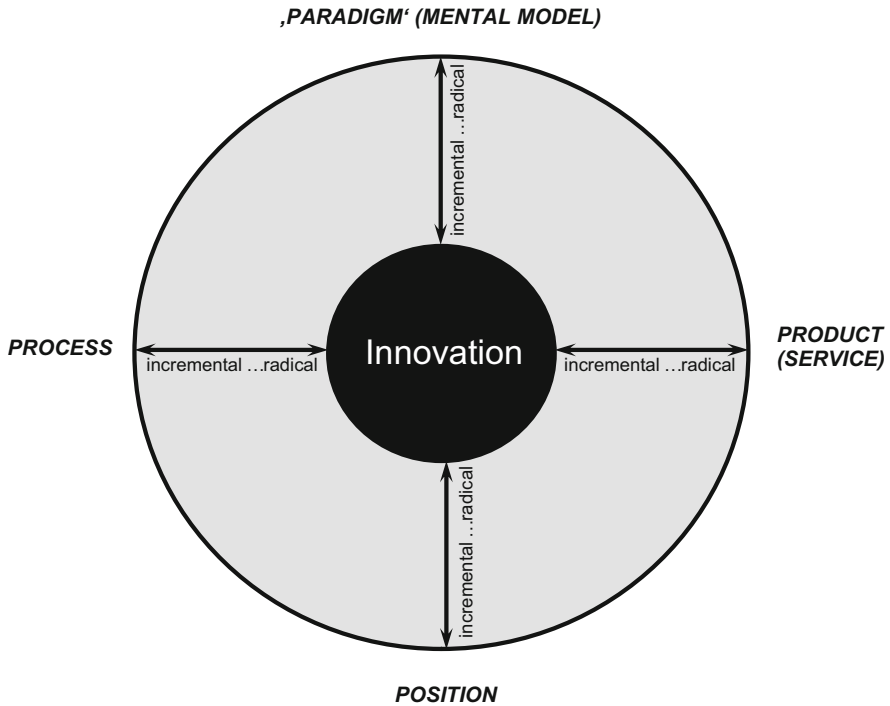


Fig. 1.1 The innovation space

Innovation can also take place by identifying and meeting needs in a particular market segment or geographical region. The move towards customized personal banking as a premium product or of ‘capsule’ hotels for late night city stays would be examples of ‘position’ innovation.

More radical examples of position innovation in services include the creation of a new market segment around low cost flying (essentially the low cost carriers did not begin by challenging established airlines but instead addressed a new market prepared to trade comfort and extra services for low cost) or the delivery of low cost health care to sparsely populated rural areas by telemedicine. In a similar fashion microfinancing has transformed the provision of banking services to low income groups around the world.

Sometimes opportunities for innovation emerge when we simply just change the way we look at something. Henry Ford fundamentally changed the face of transportation, not because he invented the motor car (he was a comparative latecomer to the new industry), nor because he developed the manufacturing process to put one together (as a craft-based specialist industry car-making had already been around for about 20 years). His contribution was to change the underlying model from one which offered a hand-made specialist product to a few wealthy customers to one which offered a car for Everyman at a price he/she could afford. The ensuing shift

Table 1.1 Examples of incremental and radical innovations in services

Type of innovation	‘Do better’—incremental	‘Do different’—radical
‘ Product ’—service offering to end users	Modified/improved version of an established service offering—for example, more customised mortgage or savings ‘products’, add-on features to basic travel experience (e.g. in entertainment system), increased range of features in telecoms service	Radical departure—for example online retailing,
‘ Process ’—ways of creating and delivering the offering	Lower cost delivery through ‘back office’ process optimisation, waste reduction through lean, six sigma, etc. approaches	Radical shift in process route—for example moving online from face to face contact, supermarkets and self-service shopping rather than traditional retailing, hub and spoke delivery systems, etc.
‘ Position ’—target market and the ‘story’ told to those segments	Opening up new market segments—for example, offering specialist insurance products for students	Radical shift in approach—for example, opening up new travel markets via low cost travel innovation, shifting health care provision to communities
‘ Paradigm ’—underlying business model	Rethinking the underlying model—for example, migrating from insurance agents and brokers to direct and on-line systems	Radical shift in mindset—for example, moving from product-based to service-based manufacturing.

from craft to mass production was nothing short of a revolution in the way cars (and later countless other products and services) were produced and supplied.

Service examples of paradigm innovation include the shift (using Ford’s ideas) to fast food (McDonald’s), the move to self-service shopping via the supermarket and the growth in self-service delivery of activities like laundry, enabled by consumer appliances (Gershuny & Miles, 1983). Powerful recent illustrations include the shift of mainstream customers to low cost airlines, the provision of online insurance and other financial services, and the opening up of communications via the telephone, the mobile phone and social networking. Table 1.1 maps some examples of service innovations on to this innovation space model.

1.3 Managing Service Innovation

Of course it is not enough to just simply describe service innovation as an important phenomenon or to highlight particular examples of such. Innovation is about the successful implementation of new ideas and to capture the benefits. We need to understand how the process happens in services. In particular we need to focus on innovation *management*—what might we be able to do to make effective change happen? There has been extensive research around the generic theme of innovation

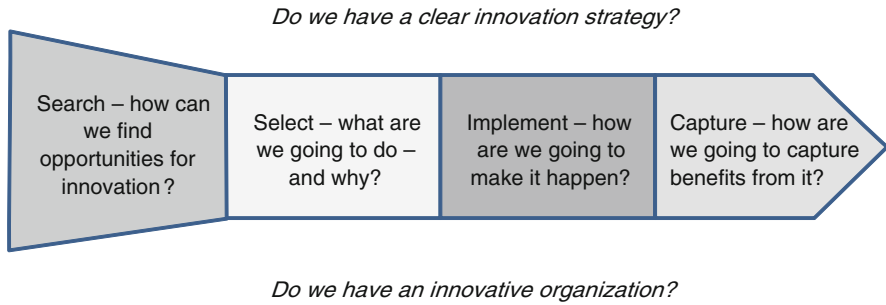


Fig. 1.2 Phases of innovation processes

management and although much of this has focused on the manufacturing sector, we do have some valuable lessons about the nature of service innovation which can help us. In particular it is important to appreciate similarities and differences in innovation management within a service context.

It is *similar* to innovation in other sectors like manufacturing in a number of ways:

- a. A core process model is applicable, one which is concerned with renewing what the organization offers and the ways in which it generates and delivers this. Whether the organization is concerned with bricks, bread, banking or baby care, the underlying challenge is still the same. How to obtain a competitive edge through innovation—and through this survive and grow? (This is as much a challenge for non-profit organizations—in police work, in health care, in education the competition is still there, and the role of innovation is still one of getting a better edge in order to better deal with the problems of crime, illness or illiteracy.).

At this generic level we would suggest that organizations have to manage four phases which make up the innovation process (see Fig. 1.2).

Organizations have to:

- Scan and search their environments (internal and external) to pick up and process signals about potential innovation. These could be needs of various kinds, or opportunities arising from research activities somewhere, or pressures to conform to legislation, or the behaviour of competitors—but they represent the bundle of stimuli to which the organization must respond
- Strategically select from this set of potential triggers for innovation those things which the organization will commit resources to pursuing. Even the best resourced organization cannot do everything, so the challenge lies in selecting those things which offer the best chance of developing a competitive edge
- Implement the innovation, growing it from an idea through various stages of development to final launch—as a new product or service in the external marketplace or a new process or method within the organization
- Capture value—commercial and social—from the realization of ideas. This involves enabling widespread adoption and diffusion whilst also securing

protection against imitators—for example through intellectual property rights (IPR). It is also important here to reflect upon the previous phases and review experiences of success and failure in order to learn about how to manage the process better, and to gain the relevant insights and knowledge from the experience

Of course there are countless variations on this basic theme in terms of how organizations actually carry this out. And much depends on what starting point they begin from with their particular contingencies. For example, large firms may structure the process much more extensively than smaller firms that work on a more informal basis. Non-profit organizations may be more concerned with reducing costs and improving quality, whereas private-sector firms may worry about market share. Networks of firms may have to operate complex co-ordination arrangements to ensure successful completion of joint projects—and to devise careful legal frameworks to ensure that intellectual property rights are respected. But, in essence, the process is the same basic sequence of activity. Innovation management is about learning to find the most appropriate solution to the problem of consistently managing this process, and doing so in the ways best suited to the particular circumstances in which the organization finds itself. Services may emphasize some elements more than manufacturing—for example, the relatively high importance of demand side signals in triggering the process. And innovation in services may involve some particular challenges—for example, the intensity of competition/lack of entry barriers means that continuous innovation is required, whilst co-creation options open up the possibility for some of a relationship ‘lock-in’ to end users.

b. Services make extensive use of research and development (R&D) and its role is becoming more significant. Creating and applying new knowledge is an essential component and whilst there may be fewer white-coated staff working in laboratories, there is still an underlying search process taking place to find relevant new knowledge and apply it. Indeed in some areas like software and computing, services have always played a major role—it is instructive to remember that the world’s first business application of a computer took place in the back office support of a catering services company!

The difference lies in the way in which R&D is carried out in services. ‘R&D’ used in a manufacturing context conjures up images associated with organised research and development. Research involves reviewing established scientific knowledge (in papers, via patent searches, etc.) and identifying interesting lines of enquiry which are followed through via specifically designed experiments in laboratories. Small-scale successes may be further pursued and explored in pilot plants or via the construction of prototypes and there is a gradual convergence around the final product or process involving an increasing commitment of resources and an increasing involvement of wider skills and knowledge sets. Eventually the new product is launched into the marketplace or the new process adopted and diffused across an internal context.

The OECD’s Frascati definition captures much of this, defining R&D as “creative work undertaken on a systematic basis in order to increase the stock of

knowledge . . . and the use of this stock of knowledge to devise new applications. If we look at the challenge of service innovation we can see a similar process taking place—search (albeit with a much stronger demand side emphasis), experiment and prototyping (which may extend the ‘laboratory’ concept to pilots and trials with potential end-users) and a gradual scaling up of commitment and activity leading to launch. Service businesses may not have a formal R&D department, but they do undertake this kind of activity in order to deliver a stream of innovations. Importantly, the knowledge sets with which they work involve a much higher level of user insight and experience.

c. The driving force in innovation is both organized large company innovation and disruptive entrepreneurs; large companies and established organizations have the resources and internal processes to support a continuing stream of incremental improvement innovations and are well placed to exploit existing technology and markets. But they often run into difficulties when it comes to new and radical ideas—“getting out of the box”. Their support structures for innovation can sometimes actively inhibit the search for and adoption of novel alternatives—and it is here that entrepreneurial new entrants can disrupt the game (Augsdorfer, Bessant, Möslein, Stamm, & Piller, 2013). So if we are looking at service innovation patterns we can see the existence of a kind of “ecosystem” in which innovation is driven by both large established players and small risk-taking entrepreneurs working in tandem.

But service innovation is also *different* in that:

a. Users matter far more in the process—they are intimately involved in co-creating or at least in the simultaneous creation and consumption of the service experience. So insights into their behaviour are important and the emerging research around co-creation and user-led innovation is of particular relevance. It is important in the context of service innovation to remind ourselves of the definition of innovation—as expressed, for example, by the DTI: ‘*the successful exploitation of new ideas*’. Whilst this involves invention—the creation of some new or different combination of needs and means, there is much more to getting that invention successfully developed and widely adopted. Central to this is the idea of different kinds of knowledge streams being woven together—about possibilities (for example, opened up by new technology) and needs (whether articulated or latent).

In the context of service innovation the search for and use of demand side knowledge is critical—many services are simultaneously created and consumed and end-user understanding and empathy are essential to success. This is not to say that new knowledge—for example, of technological possibilities—is unimportant but the balance of importance in service innovation may be more in the direction of demand side knowledge.

b. Service innovations are often much easier to imitate and the competitive advantages which they offer can quickly be competed away because there are fewer barriers—for example, intellectual property (IP) protection. The pattern of airline innovation on the transatlantic route provides a good example of this—

there is a fast pace of innovation but as soon as one airline introduces something like a flat bed, others will quickly follow suit.

- c. Services are often repeatedly consumed and therefore long-term relationships with users matter and have a strong influence on the innovation process. The drive to personalization of the service experience is strong because it is only through such customized experiences that a degree of customer ‘lock on’ takes place (Vandermerwe, 2004). Certainly the experience of internet banking and insurance suggests that, despite attempts to customize the experience via sophisticated web technologies there is little customer loyalty and a high rate of churn. However, the lower capital cost of creating and delivering services and their relative simplicity makes co-creation more of an option. There is growing interest in such models involving active users in the design of services—for example in the open source movement around software or in the digital entertainment and communication fields where community and social networking sites like Facebook, Flickr and YouTube have had a major impact.

1.4 Exploring Service Innovation

In this book we hope to improve the understanding of how service productivity in its broadest sense can be enhanced through innovation. We do this by exploring how innovation in services happens, both from a conceptual/theoretical point of view and also from a range of practical experiences in different service contexts.

We begin with some *perspectives* on innovation in services.

We look back and bring in some experience from a team of forecasters who were involved in a major study of the potential impact of information and communications technology on the economy back in the mid-1980s. The work, originally commissioned by a government agency, sought the views of a wide range of experts and stakeholders across multiple sectors in an extended Delphi panel process. We thought it relevant to share here because we have the opportunity to see how far such foresight processes can provide clues about the rate and direction of innovation and its impact. The original authors reflect on the forecasting process itself and on the accuracy—or otherwise!—of these early expert views of the future.

The next chapter looks in detail at the German economy and the patterns of sector productivity change. In the process, the authors raise some wider themes around definitions and measurement and the need for a perspective which links to services becoming a central theme rather than a modification of a manufacturing-based approach.

This chapter is followed by an in-depth review of the phenomenon of “servitisation” with particular reference to the German context. Whilst manufacturing (and its associated innovation processes) have long been the focus of research into productivity, there is now a strong trend towards convergence. Where earlier links might have been cosmetic—improving product sales by providing good service around the purchasing process or even extending into long-term product support, today’s servitising businesses are reframing their entire

business models. In the process, there are significant opportunities to learn new approaches to the innovation challenge and its subsequent impact on productivity.

Finally in the perspectives section we explore the ideas of a developing “service science” approach driven by a different “service dominant logic”.

These perspectives help us to weave several strands together to create a backdrop against which to view the case examples which form the next part of the book. These strands include:

- Innovation is more than technology, although that is a powerful driver;
- Substitution vs. integration as well as system level effects and the time lags linked to that;
- Contingency—different service sectors have different characteristics and contexts for innovation—drivers, enablers, etc.;
- Users as increasingly important and growth of user engagement—but need to understand how patients etc. become involved;
- Leapfrogging from default models of services based on assumptions to very different configurations when starting with blank paper;
- If users matter (and most of the new users are located in emerging countries with low income etc.), how will this shape service design and provision? And what are the possibilities for reverse innovation?

The *case studies* have been selected to reflect the diversity involved and to highlight particular themes in the development and implementation of a wide range of service innovation solutions.

- *Airports* move the focus from the heavily studied airlines (especially the low cost business model) and towards the complex institutions which service that traffic. Increasing access to air travel and massive predicted growth, especially to/from and within the emerging economies has big implications for the efficiency with which processes operate and the quality of the overall service experience. But airports are not simply shops or service stations; they represent the convergence of many stakeholders with different concerns and expectations with respect to service levels and the underlying concepts of productivity. How can these sometimes conflicting expectations be resolved and how does innovation happen in such a contested space?
- *Professional services* are a major segment in the economy, but we have relatively poor understanding of what drives productivity there or how innovation can/does happen. The need is clear—but the reality is often far from the rhetoric. What are the options for innovation and what are the barriers and enablers?
- *Healthcare* is of central importance and is facing a crisis in terms of demand and the availability of resources to pay to meet this demand. Absolute emphasis is set on productivity and the need to do more with less—but how? Part of the solution is incremental innovation, designing out error and waste, improving what already exists. But there is also a need for radical innovation and to challenge underlying business models. One laboratory for learning about options can be found in many emerging economies where the high demand is coupled with very limited resources and has begun driving towards some radical- and possibly transferrable—models.

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- *Hotels* provide an example of growth and segmentation, customizing and configuring services around a variety of different value propositions. These range from the luxury “experience” innovation through to cheap and easily replicable capsule hotel concepts, but in all cases the need to understand the drivers of productivity and to innovate in a focused fashion towards optimal solutions is there.
 - *Service productivity lifecycle management* introduces a new perspective that allows us to deal with increasing outsourcing. There is a need to understand services in context and a particular need to view service provision less as a one-off transaction and more as an experience which needs to be managed throughout its entire life.

Expert's View

Prof. Dr. Christiane Hipp

Brandenburgische Technische Universität Cottbus-Senftenberg

Question: How and where will innovation in services increase productivity?

Christiane Hipp: Innovation in service increases the productivity through different influencing factors. Of main importance for productivity gains in services are well qualified front and back-office employees, a well-structured communication process with the customers and new technologies to facilitate delivery, information access and learning processes. Especially important are all kinds of innovation in data mining, service robotics, simulation and learning.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Christiane Hipp: The rate of change is closely related to

- 1) the ability of the customer and the employees to learn and adopt new service delivery processes and
- 2) the possibilities to collect, analyze and interpret big data from all kinds of sources.

Investment in service design in the front and back office reduces complexity and fosters productivity gains through innovation in services. Moreover, new data mining tools and interfaces are essential to link individual customer needs with the best possible solution. This would increase the innovation adoption rate and the customer satisfaction without overstraining employees and users.

Expert's View

Dr. Ferdinand Buriánek

Giesecke & Devrient GmbH

Question: How and where will innovation in services increase productivity?

Ferdinand Buriánek: Within system maintenance business one key enabler of service innovation is the application of information technology. It does not only bring more efficiency to service delivery like diagnosis and debugging of system errors via remote access. It also opens up new service business potentials like reporting or dashboard functionality as web services.

(continued)

According to this, productivity increase results from two things: improved process efficiency and value added services.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Ferdinand Buriánek: The faster and the radical technological innovation is the higher will be the impact on service innovation. But it is not just about applying new technologies but rather the implementation and integration in the existing processes. That is the key for being successful by striving for service innovation.

Part II
Perspectives

Services Transformation Through New Information Technology: Information Horizons Revisited

2

Ian Miles, Howard Rush, and John Bessant

Setting the Stage – Annotations by the Editors

Forecasting is never an exact science, but the exercise of trying to anticipate emergent trends is important for policy makers. This chapter opens our discussion of service productivity by looking at how services have changed over the past 25 years and particularly how that process has been affected by the increasing use of information technologies—IT. It draws on a major programme of research originally commissioned by the UK government through its National Economic Development Office and describes a Delphi survey involving experts from a wide range of backgrounds who were trying to forecast the future with information technology. The chapter is written by the original researchers, **Ian Miles, Howard Rush, and John Bessant**, who use the opportunity to look back and reflect on what has been changing and how some key secular trends remain and could be used to provide guidance to practitioners and policy-makers involved with issues of service productivity improvement.

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2.1 Why Look Backward (To Look Forward)?

Over 25 years ago we posed the question, “Why write another book about information technology?” After all, information technology (IT) was such a rapidly changing field that any review was likely to be out of date by the time it was published. Efforts to explore the future of new IT were liable to be hubristic, banal, or both. We justified the endeavour as reflecting the need to apply a more systematic contribution to the debate over the future social implications of IT than had thus far been achieved. Though discussions of IT futures were already becoming an overcrowded and diverse field, most of these were expressions of individual viewpoints, with little examination of other perspectives.

Needless to say, over the past quarter of a century, the flow of assessments and prognosis of the impact of IT has continued unabated. Assessments can be more seriously based on empirical analyses of the experience that has been gained, but the qualitative changes that have given rise to discussion of, for example, Web 2.0 and Business 3.0 suggest that past data may not be simply extrapolated to give us future prospects. Seemingly outrageous predictions rub shoulders with complacent proclamations that concerns about threats to employment, privacy and the like are overwrought. It is an opportune time to revisit the subject and review our original analysis against the backdrop of how events have subsequently transpired, to see how far our expectations have been borne out and how far they were misguided. We were also curious to see whether the framework for analysis that we provided has stood the test of time—something that pundits in the field rarely get the opportunity to do (or they lack the incentive to do so). While it is gratifying to chalk up occasions where our forecasts were accurate, and galling to list our failures, examining the reasons *why* forecasts were more or less confirmed or proved to be completely off the mark should take us beyond such a balance sheet. We can hope to see what sorts of dynamics were successfully understood, and what things were overlooked, and why this was this case. This can hopefully improve our understanding and future acuity.

Twenty to twenty-five years is also a good period for looking back. Those who study technological revolutions and similar long-term changes often assert that it takes this long for the broader implications of what were originally emerging technologies to become apparent.¹ Beyond a couple of decades, we are liable to find ourselves “over the horizon”, with new fundamental innovations to deal with. We may be able to spot the seeds of these new fundamental innovations, but knowing which seeds will grow into valuable vegetables and which into wasteful weeds takes some insight. When something is in its very early stages, it can be particularly hard to anticipate future developments: pioneers are rarely representative of the settlers that follow them, let alone the suburbs that eventually occupy what was once a frontier. Emerging products and processes based on biosciences

¹This corresponds to thinking about long waves (cf. Perez (1983) and is taken up entertainingly with reference to world building in science fiction (cf. Barnes (1991).

and nanotechnology may be cases in point: even though the seeds of these can be seen with hindsight to have been evident in the 1980s, these were hard to differentiate at that time from a huge number of other ideas. It has taken decades to accumulate the experiences from which informed speculations can be made about the future growth patterns of these seeds. Who would have anticipated the excitement caused by graphene, for example, which is appearing in its first consumer applications (flexible mobile phones) as we write? The time is probably right for books with titles like *Life Horizons*, *Brain Horizons*, *3-D Horizons*,² and *Nano Horizons*. But for now, let us see what we can learn from *Information Horizons* (Miles, Rush, Turner, & Bessant, 1988).

The present book focuses on services, IT and productivity, and we have accordingly restricted our focus to the service environment. We have been unable to resist occasional mentions of other sectors, not least because of the high interdependency between the service and manufacturing industries. Many authors have noted that boundaries between sectors seem to become fuzzier and more permeable with each passing decade. *Information Horizons* paid a great deal of attention to the service industries. This reflected our own view that Barras (1986, 1990) was correct in arguing that new IT was underpinning an industrial revolution in services. Industries that had been labour-intensive, with human inputs, organised in craft-like fashions, were becoming technology-intensive and restructured along Fordist and post-Fordist lines. The story of services and new IT goes beyond this basic point, but these trajectories were, and in many ways remain, fundamental.

This chapter follows a fairly simple structure. We start with a description of the approach we followed in the original book, the technological trends at the time, and some general issues underpinning the use of IT, before looking at the subsequent developments in the service sector.

Our initial efforts began in the early 1980s, during a time of considerable economic turbulence in the UK (perhaps another reason why a review today is also fitting, with industrial policy no longer being a taboo topic). The study was undertaken in response to requests from the UK National Economic Development Office (NEDO), a quasi-governmental agency (one of the quangos that became particular targets for neoconservatives of that period).³ NEDO was closed down by the Thatcher government, though we do not believe our study played much of a role in this. That particular government had little interest in reaching an industrial consensus (least of all with the trade union apex of the government/industry/workforce triangle), and considered industrial policy as inappropriate meddling in affairs that should be left to the magic of market forces.⁴ Heretically, NEDO had established a Long-Term Perspectives Committee, which may have been a small

² Or 2-D Horizons, when dealing with the extraordinarily thin new materials, like graphene, that are now under development.

³ Rush, Miles, Bessant and Guy (1986); Bessant, Guy, Miles and Rush (1985).

⁴ Thatcher's successors in the Conservative Party are now promoting industrial rebalancing—away from overreliance on financial services in particular—but that is another story!

part of its undoing; the implication was that the market would not automatically sense and deal with long-term problems. This Committee commissioned a series of studies to help inform their deliberations about the impact of various factors on social and economic development, including the role of new IT. We were asked to prepare a review of the long-term forecasting literature (*IT Futures*) and then to undertake a forecasting exercise (*IT Futures Surveyed*) which canvassed expert opinion on critical topics. Drawing on the work and ideas involved in these two publications and other interactions with NEDO as well as other UK and international agencies, we produced the book *Information Horizons*, on which we can now bring hindsight to bear.

The NEDO studies provided the opportunity to review an enormous quantity of material, within which we found some real gems. Over 500 annotated references were published as a companion volume to *Information Horizons*; the *Bibliography of Information Technology*. In *Information Horizons*, we set out to explicate different views of the future, and to identify the key issues and choices facing society as a result of the emergence of new IT. We could also draw on earlier forecasting studies with which we had been involved (Freeman & Jahoda, 1978; Whiston, 1979) This led us to a methodology of scenario development based on contrasting different worldviews. Such an approach can be a useful means of comparing and contrasting different views that are held by significant commentators. It allows us to identify salient issues associated with these worldviews, which merit consideration by all stakeholders. It prevents us from promoting a most-likely or most-desirable future, which is liable to be incorrect and/or opposed by key stakeholders. Instead, it presumes that many features of the long-term future remain uncertain and are intrinsically open to some degree of social shaping. Even if social groups cannot choose between a portfolio of futures they may be able to influence some trajectories of change and making more informed choices on the basis of a better awareness of the range of possibilities than is usually afforded by the grand pronouncements and predictions of futurological gurus.

Given the accelerating pace and the increasing investment in IT research, it was difficult to anticipate many developments, especially those involving competition between several technological solutions for the same basic problems (optical media? magnetic storage? solid-state devices? etc.), and those involving user adoption and reinvention of products. But we did manage to recognise and capture some of the key underlying trends which would shape the future. At the time we saw these as including:

- major improvements in the power and reductions in the cost of microelectronics and intelligent processors;
- growing roll-out of fibre optical cable enabling high bandwidth applications;
- increasing use of satellite-linked communications;
- improvements in data storage and manipulation capabilities;
- increasing range of software to support sector-specific applications.

In general, these trends did follow the trajectories we anticipated, although in some cases the rates of change were faster than we might have expected (leading to

a leapfrogging over some of the short-term horizon developments); and the drivers of change often came from unexpected sectors—for example, the growth of communications satellite use being driven by entertainment (and particularly sport) channels. There was also another interesting leapfrog effect: some countries with less developed infrastructures (like South Korea) took advantage of the emerging technologies to roll out new fibre optic networks, which then supported new volumes of traffic and proliferation of applications, which in turn fuelled further technological development. In that country, and in many others, policy also played a key role as governments continued to get a better grasp on the considerable potential of ‘the wired society’.

Our literature review had immediately demonstrated that there were many viewpoints about the long-term implications of IT developments. We began to see different aspects of commentators’ expectations about the pace and nature of change—how much change can we expect, how soon? Are the outcomes more or less positive or negative in terms of evaluations of quality of life (and working life), social equality and exclusion, liberty and privacy, and so on? The statistical analysis of our expert sample confirmed this general conclusion: we found that the survey responses systematically varied in terms of (a) the pace and depth of change anticipated and (b) whether on balance these changes were seen as largely positive or undesirable (for example, in terms of creating job opportunities or unemployment, better quality work or deskilling, threats to civil liberties or emancipatory opportunities, and so on). We found it useful to organise the perspectives into three groups, which we christened the *Continuist*, the *Transformist*, and the *Structuralist* schools of thought. The distinctions go beyond just varying expectations of the pace of change or the degree of ‘impact’ of the new technologies. More fundamental differences in approach are involved.

2.2 Three Views of the Information Horizon

The *Continuist* and the *Transformist* views were pronounced viewpoints with one thing in common: they postulate that there could be a wholesale rejection of new IT. The commentators, on the other hand, were mostly concerned about what such a future with IT might look like. We found little debate on whether IT would generally be widely employed—a few specific applications might be rejected or highly regulated. The assumption was that IT would generally continue to develop and diffuse, with debate about how far this might need to be regulated in terms of media content. The big arguments were more a question of rates of change and about substitution versus augmentation of established ways of doing things.

The *Transformist* school expected a major metamorphosis of society. IT was seen as a revolutionary technology, with which the synergistic and unprecedented progress in computers and telecommunications was enabling huge changes in just about all information-related processes (data capture, storage, processing, communication, use in controlling devices, etc.). The new potentials that this enabled were expected to provoke rapid diffusion of the new technologies, and rapid

organisational adaptation to make effective use of them. The resulting shift in society was seen as being as great as that from an agrarian to an industrial society—with corresponding changes to political power bases and social classes. It was expected that ‘seeds of the future’ could be detected in early adopters, whose ‘leading edge’ experiences would be taken up rapidly by imitators as they jumped on the bandwagon.

By contrast, the *Continuist* school saw IT as a means of ‘doing better’ as opposed to ‘doing different’. ‘Revolutionary’ claims were dismissed as being overblown. Social and political initiatives were more often, and to a greater extent, drivers of change. Vested interests are liable to resist what have now come to be known as *disruptive innovations*. Organisational change is typically slow; lengthy learning about new opportunities is required. Mistakes are made in adoption of over-hyped technologies; discouraging experiences are encountered as efforts are made to realise the promises of suppliers and consultants; outright systems failures are frequent consequences of efforts to introduce major changes. Evolution, rather than revolution, was likely to come in incremental steps. New IT is liable to be adopted so as to increase competitiveness of firms, and convenience for customers. Forecasts from this school were usually based upon cautious trend extrapolation, with a good dose of scepticism about the likely magnitude and pace of the change to be expected.

We made the case for a third school, which was something of a dialectical synthesis of the first two perspectives, and which we labelled *Structuralism*. As such, it has aspects of a distinctive approach and is more than just an averaged out compromise. It shared with the Transformists the expectation that IT did, in many respects, resemble a revolutionary technology. But, unlike that school of thought, Structuralists did not see this as inexorably driving a radical shift towards a new social order. For example, IT was seen as contributing to the further development of industrialisation⁵ and of new varieties of industrial society, as opposed to replacing it through an ‘information society’ featuring a completely new logic, class structure, and dominant groups. IT has its own specific characteristics but, as was suggested by the economic literature on ‘long-wave’ theory, the advent of another set of new technologies can be viewed in terms of further shifts in the direction of industrial society.

Following Perez (1983), we saw (and continue to see) technological revolutions as taking place when new heartland technologies are available, which have low costs and few significant constraints on supply, and which can be productively employed across many or all sectors of the economy so as to significantly lower the costs of labour and/or capital, and that enable qualitative change in physical products and/or services. IT was being studied precisely because the changes associated with its use were likely to be profound; Structuralists argue that technological development is deeply intertwined with and determined by social factors—on both the supply and demand sides of the equation. New technologies offer

⁵The industrialisation of services is, of course, one aspect of this relevant to the present chapter.

opportunities for new ways of doing things, and make it possible for new things to be done; but *which* opportunities are seen and grasped depends to a large extent on the knowledge and resources of the stakeholders concerned. Existing social structures can often be quite resilient, as Continuists assert.

Major changes are, of course, achieved in social and political life, as well as in economic affairs. They are brought about by human agency, and the individuals and groups involved necessarily use technology in the course of their activity, as we do throughout our lives. Long-established technologies can be used in dramatic new ways with huge consequences (consider 9/11); new technologies provide new opportunities, about which the development of knowledge is uneven and partial. The Arab Spring of 2013 demonstrates, for example, that new social media can indeed be used to undermine established authority structures. It has also demonstrated the resilience of some established structures and that where there is major change its outcomes are not inevitably as progressive and liberatory as many Transformists might have anticipated. The complexity of such changes is a major source of uncertainty, as discussed in the literature on ‘wicked problems’ (cf. Ackoff, 1974; Rittel & Webber, 1973). To provide insights into the dynamics of change and the potential variety of outcomes is one reason for the use of scenario analysis within a Structuralist perspective.

2.3 Using IT

Personal Computers started to be widely used in the early 1980s, and it was not long before a proportion of users were connecting them via telecommunication networks to access email, bulletin boards, and (a few) databases. Videotex had been introduced as a way of connecting screens, keyboards, and communications, though the new medium (described in some circles as “Web 0.1”) was only widely used in France, where the Minitel service was heavily subsidised by the state as a matter of industrial policy. By the mid-1980s, when we were preparing our book, new IT was already used in a remarkable range of applications apparent across the economy. Cash machines were appearing outside banks, TV services were augmented by teletext, and electronic watches were fashionable.

Along with most Continuists and all Transformists, Structuralists expect on-going development and diffusion of the underlying capabilities of new IT. They also expect proliferation of goods and services using these technologies. New IT offered unprecedented capabilities for the capture, processing, storage and communication of information, and all production, regardless of economic sector, requires a great deal of information activity. We discussed ‘information intensity’, i.e., the extent to which information-related activities made up a major part of the overall activity within a sector.

It might have been possible to use indicators (such as the share of white-collar occupations, levels of use of post and telecommunications, etc.) to differentiate between sectors as to where they might be placed on an intensity scale. Porat (1977), of course, had sought to define information sectors and occupations on

this basis. But rather than undertake such a statistical analysis, we wanted to explore how different service sectors might make use of the new capabilities associated with IT. Some sectors (e.g., financial services, office services, entertainment, broadcasting) have products (services) that are almost entirely informational in nature. These are services where the uptake of new IT should be most rapid, with new services and methods of service delivery becoming important.

Services that are more physical (e.g., catering, transport, retail, storage and repair, and laundry) are ones where energy and motor technologies have historically been the focus of much innovation. In some cases there has been the growth of consumer self-services (e.g., using cars and washing machines instead of trains and laundries). While their information intensity might be much lower than in the previous set of services, new IT would still be used to augment the existing goods and services with better controls, communication capabilities, IT-enhanced coordination and transactional processes, and the like.

A third set of services are more personal and human-oriented: health and education services (often organised as public services), and some personal services like hairdressing. These employ diverse technologies; while education makes much use of IT; within health services we also see specialised products such as surgical instruments, pharmaceuticals, prosthetics, and many more. Their innovation histories are similarly diverse and complicated, with different supply chains, standards, and underpinning knowledge. The information that most of these services process includes complex and often personal data relating to the individual specificities of a wide range of people in a wide range of contexts. This made it hard to apply the sorts of large-scale standardised data processing that can be used for broadcasting, telephony, financial transactions, and the like. Cheap microcomputer systems (including learning technologies and new medical instruments) and advanced software (such as decision support systems and more personalised interfaces) can enable wider use of IT in the core service activities, as opposed to the sorts of back-office applications of computer systems in functions like payroll that proliferate across all sectors.

The view of IT applications to service industries and activities is thus far from uniform. The variations in the speed and extent of change are such that while some services might be closer to the Transformist vision, others would be more aligned with that of the Continuist. We would argue that both across the economy, and within most service industries, we could expect the sort of melange that Structuralism implies.

The application of IT could be expected to raise productivity, and we would thus anticipate productivity variations related to the variations in IT uptake mentioned above. Productivity gains should follow from substituting IT-enabled devices for more conventional ones (e.g., word processors for typewriters, electronic cash registers for mechanical tills, electronic document storage for paper files). This would follow from reduction in delays associated with more rapid information-processing, better matching of supply and demand (and of products to user requirements), and so on. Continuists anticipated such substitution to be a gradual process, and one whose impacts are less muted than they actually could be in

principle (because there would be long learning processes, mismatches between skills and systems, or simply mistakes). In contrast, Transformists foresaw rapid jumps to large scale productivity increases, where the example of leading users would stimulate uptake by followers. Beyond simple substitution of new technologies for old, we could anticipate wider change, an integration of previously discrete activities into new processes—as was already starting to become apparent in manufacturing. Design and physical production, and production and distribution, were being brought within the same IT-enhanced systems—even in some cases in sectors whose capital intensity was fairly low and which were not normally seen as high-tech or innovative ones (e.g., garments).

A similar pattern was possible for office-based services, where we could see more integrated office automation: document processing, email, databases and online information services could all be more or less readily brought together. Transformists would see this opening as the way to developments such as teleworking, which might rapidly become standard. The office might even disappear as a physical environment in which to carry out information work (along with paper as a medium for information storage and sharing). *Information Horizons* expected such integration to happen, if more slowly than many Transformists believed—especially where it came to the emergence of substantially new ways of carrying out service work and delivering service products.

Teleworking (in the USA the term “telecommuting” was often preferred) was one of the most common ideas of Transformism. In many ways it shows the difficulty that we face in anticipating the implications of new technologies. The idea was that many people would work from home, and if there were problems associated with social isolation and/or poor telecommunications, then we would see community ‘telecottages’ organised by public services or other local organisations. Traditional offices would substantially decrease, and new boundaries would need to be erected between work and leisure spheres.

A wave of research studies around the turn of the century showed that the Transformist approach featured considerable overstatement. For example, a report for the EMERGENCE project (Huws, 2003)—using the term ‘eWork’ to escape connotations of telework—reported that while almost half of all establishments with 50 or more employees in the 18 European countries surveyed were practising some form of eWork, only 12 % involved their own direct employees in eWorking, and less than 2 % employed people to work exclusively from home. Much more common was multi-locational eWorking by employees; for example, mobile workers taking the office with them, in effect, as they visited clients or met with business partners. More common still was outsourcing, a very important trend that had hardly been mentioned in the literature we had reviewed in the 1980s—an organisational strategy that was facilitated by new IT, but which went well beyond the offshoring of basic office services. Many firms established back offices in regions and countries where there were cost advantages. Many used remote call centre facilities; but very few reported using third party premises such as telecottages or telecentres for their own remote employees.

Information Horizons may have agreed that the office of 2010 could end up being based upon integrated workshops connected to each other via local area networks, but we didn't get quite as far as foreseeing the replacement of cables with Wi-Fi and the rise of Starbucks and other internet cafes. One of the main problems here was the failure to be sufficiently radical in Transformism—to see people as equipped with mobile computers, able to work in all manner of locations, and in many cases spending long periods on the road. While some people have shifted to working mainly from home (often because they have become outsourced workers on contract to their old downsized employers) a common pattern is for people to spend more time working at home, but still to use office venues for sizeable chunks of time. A diversity of patterns has arisen, and we can expect new forms of work to continue to evolve. But the drivers here are more often than not management fashions (e.g., focusing on core competences, outsourcing peripheral or routine activities, contracting out public services, relocating in cheaper locations in the course of globalisation, and so on); usually IT enables these to be undertaken more rapidly and thoroughly, but that is not the same as IT driving the change.

Change is also often shaped, and sometimes slowed, by social issues. In the case of office work, these issues include the desires of workers to mingle and share information on a face-to-face basis, the desire of some managers to be able to see their underlings and the fear on the part of many managers of being incompetent with, and perhaps ceding authority to, new IT.⁶ The standards wars around different models of PC (and many other devices) also highlighted the problems of choice-overload in conditions of uncertainty. A plurality of options were becoming available, and even when it was not so hard to imagine what the end-state might be like, it was often difficult to anticipate what steps were needed to get there and what the pace of change would be. Informally we called this the 'fog' that lay between the 1980s and the information society of the twenty-first century.

The majority of forecasts we considered had relatively short time horizons, and few of those that anticipated profound change went far in speculating on what a shift in paradigm might end up looking like. Visions tended to be dramatic, with many phenomena that we are now witnessing (e.g., downsizing of office work, flattening of some hierarchies, on-demand entertainment programmes, the death of established sectors on the high street, and so on) being seen as taking place almost instantaneously.

As events have transpired, change has been slow and partial. The multi-volume paper encyclopaedia may be no more, and newspapers are under increasing stress, but we are far from a paperless society. Structuralists—like us—suspected that something approaching full integration would be delayed by the inability of organisations to adapt to new challenges that IT posed. Such challenges would include resulting changes in industrial structures (with a blurring of conventional boundaries between sectors), in the mix of factors of production, changes in skill

⁶ We were well aware of such phenomena, having encountered them personally in the course of the first introduction of PCs into our own offices.

structures, and in the linkages between users, suppliers and the market. As mentioned above, it often takes wide alignment around an attractive new platform to provoke broad change, and this is liable to be highly uneven in pace and impact.

We did not make the point at the time, but there is also the issue—well known in innovation studies—of fight-back by established products and their producers. The challenge of an alternative product that satisfies consumer requirements may catalyse much faster change in the threatened product, as its suppliers strive to better the new competition. Bookshops introduce coffee shops to make visits more attractive; cinemas introduce 3-D and surround sound, and so on.

One of the major gaps in our study was in not conceptualising the need for new platforms in order for many of the functionalities of new IT to be realised. We were confident that people would be using online information services of many sorts for information access, for interpersonal communication, for e-commerce and other e-services. We recognised that this required substantial steps forward. What we did not foresee was that the trigger for such services to be widely used was the creation and consolidation of platforms such as the Internet, the Web, and the design of browsers. We recognised the importance of standards, and placed probably too much emphasis on ISDN (around which there was much effort in developing international standards) and more aptly, though more vaguely, on broadband communications, seen as a successor to ISDN. But we had a narrow view of what these standards were about, and did not elaborate on the phenomena whereby dominant designs could achieve critical mass and support the large-scale take-off of new services.

Of perhaps greater significance than the developments in the technologies themselves was the way in which these trajectories were increasingly shaped by new players. For example, the music industry was disrupted by the growth of online file-sharing on a peer-to-peer basis—essentially a subversive bottom-up approach in which much of the necessary software was generated by communities of (technically illegal) users. On a darker note, the emergence of ‘cybercrime’ has pushed the limits of cryptography and security in a cat-and-mouse game between increasingly sophisticated and technologically aware criminals and the law enforcement agencies. In this sense, the Continuitist view in our forecast was overturned by an increasing democratization of the levers of technological change—a trend which is gathering momentum as we move into a world of co-creation of goods and services across internet-enabled platforms.

Our figurative representations of different models of innovation were limited to describing technology-push and demand-pull. While this was in line with thinking at the time, it now appears to be over-simplistic given our current interests in co-production of knowledge, open and user-led innovation. While we did notice some of these trends, perhaps we were blinkered by our focus on the technology and should have given more time to forecasting changing models of innovation as well. We did, however, suggest that it was a mistake to view the household sector as merely passive consumers of technology and final products and argued that they were responsible for a considerable, if unquantified amount of actual productions. We hope, however, that we can be forgiven for not anticipating the advent of 3D

printing; we are hardly alone in this, of course, and while basic printers are now on sale on the high street, this has not, as yet, become a ubiquitous household item.

While *Information Horizons* was generally fairly accurate in the paths of change it did discuss, there were some issues that were more or less overlooked. Of these the most outstanding one was mobile communications—cellphones and instant messaging—and the increased availability of data communications ‘anytime, anywhere’ enabled by the wide access to Wi-Fi. This meant that work and leisure activities could be conducted just about anywhere the user wished. We had stressed—alongside integration—the process of convergence (combining of computing and communication hardware and software). What we had not seen was the attractiveness of SMS and other facilities offered by this convergence, and the ease with which people (young people in particular) would adapt their lives to make use of text messaging, mobile voice communications, and social media. Such rapid development is more or less what the Transformist approach expected, though the negative aspects of these phenomena (e.g., cyberbullying, globally distributed child pornography) were not widely foreseen.

The massive change that IT applications have wrought upon financial services, in which we now have 24-hour banking and world-wide stock transactions, demonstrates the tenacity of established institutions in ways that the Structuralist approach would expect, with the big banks generally adapting (not always without pain) to new methods of service delivery and exploiting new trading opportunities (with results with which we are now only too familiar). Many large organisations have been able to change and adapt, and a number of the world’s biggest and most iconic firms have clearly mushroomed as a result of the IT revolution.

Technological convergence has given some of the formulations in our book a rather archaic sound. Terminology that was new in the 1980s, such as ‘mechatronics’ (the convergence of mechanical and electronic elements), ‘systemafacture’ (the increasing convergence of individual activities into ‘total’ systems, or ‘telematics’ (the convergence of information activities and technologies), now seems terribly dated.

As Structuralists, we anticipated that the augmentation stage would see an increase in competition between different ways of doing things. By this we did not just mean the competition between different technical standards (e.g., Betamax versus VHS) or solutions (e.g., hard-drives versus solid state memory). Lack of clear standards and obviously better technical solutions were expected to slow down the diffusion of some information technologies until dominant designs were achieved either by negotiation or default.

So, what does this account of a book written decades ago have to tell us now about services, productivity, and new technology?

There are two major clusters of issues with huge implications for the future of this topic. We begin with the topic of service transformation before moving on to the knotty problem of assessing productivity in an age of rapid change.

2.4 Transforming Services

Innovation research has mushroomed since we wrote our book, and many concepts are now available to frame, and give more depth to themes that were taken up in the book. We have already noted that while the sorts of things that people might be doing with new IT (and especially the new configurations of service production and delivery that might be expected) were quite often plausibly articulated (notably by Transformists), there was often a failure to appreciate the complexity of the change taking place. The need to establish platforms has already been mentioned, but there is more to this than just the formulation of technical standards and creation of effective designs. It is here that the results of innovation studies can be particularly helpful, and the picture that emerges is one with high relevance for how we think about the future of services now.

For many of the new applications of IT to really take off, it was necessary for what one author has termed a “sociotechnical constituency” to be formed, drawing in key stakeholders; for instance, suppliers of the products, their components, complementary innovations (such as software to accompany hardware), sources of finance, policymakers, regulators, trade services (wholesalers and retailers), users and intermediary associations, and the like (Molina, 1997). Enough of the main actors in this constituency need to be aligned around a feasible version of the innovation for it to succeed.

Mobilising the constituency can take a long time, and one reason that the pioneer developers of new products often fail to be the ones to capture most value from it, is that they may lack the complementary assets required to do this (Teece, 1986). When what is involved is not a single innovation, but a whole complex of interlinked new goods and services, the challenge can be even greater. If there is not a powerful ‘focal actor’ to effect change, (Conway & Steward, 1998) development may be delayed for such long periods that social and technological evolution may create completely new sets of ground rules. An example of an innovation on which great store was placed in the 1980s, but which continues to be elusive, is the ‘smart house’. Despite repeated efforts to promote home automation, the range of industries necessary to get on board, and the absence of a compelling multifunctional design, has meant that uptake of even partial versions of the idea is still relatively low (Ciesiekka & Li, 2011).

Some service innovations take this form. For example, one of the main challenges faced by health systems is the cluster of problems associated with the ageing society, and a reconfiguration of health services so as to enable more people to enjoy longer periods of active independent living which would both benefit quality of life and help limit costs associated with hospitalisation, etc. New personal health devices, using sensors and computer-communication systems, can play a large role here. But there are many possible devices and as yet no widely accepted platforms for integrating them. There are problems establishing the business models for the providers of new services associated with analysing and responding to the huge volumes of data that could potentially become available; and meanwhile,

important elements in current health systems have revenue streams directly based on, for example, hospital admissions.

Experiments with system design are underway, but it is evident that there are many ill-defined organisational issues here, in addition to business models, the sorts of public-private partnerships required, the associated skills and occupational restructuring, the issues of safety, security, privacy, social exclusion, social isolation, and so on. As a consequence, even though there are liable to be dramatic changes in health services as a result of the use of new IT systems, the pace at which this develops, and the platforms, configurations, and dominant designs that emerge remain obscure.

Reforming health services to take account of demographic change is just one of the so-called Grand Challenges that confronts society as we move through the first quarter of the twenty first century. We face ‘wicked problems’ associated with climate change, security threats, global and local inequalities, and much else. The responses to these challenges cannot be solely a matter of technical fixes that magically solve physical and biological problems. The ideas of service systems or product-service systems (e.g. Baines et al., 2007) point to the need to examine the whole range of actions needed to respond to problems, ranging from R&D and design to project management, provision of construction and engineering services, remediation and recruitment.

Service systems bring together people, technologies, and organisations, in the complex value networks that are required to provide functions essential to society—transport, energy and other utilities, physical infrastructure, education, and much more besides. The major functions of our societies (i.e., provision of health, welfare, sustenance, etc.) whether private or public sector activities, are ultimately primarily about providing services for citizens, customers and clients. These services may be provided directly or be provided by end-users applying goods and intangible assets that they have acquired through the use of services. Slogans like “customer service”, “service orientation”, and even “service dominant logic” (Lusch, Vargo, & Wessels, 2008) reflect the growing prominence of this perspective on economic activities; it is an approach that needs to be applied to the framing of great responses to Grand Challenges.

Service systems can take a long time to build up, and a long time to systematically rebuild.⁷ Other lines of innovation studies have been developing tools for thinking about system transitions and systemic innovation, and can helpfully inform practical efforts to establish new configurations—for example by embedding experience in emerging niche markets from which we can learn about user requirements and the interrelations of various actors (Geels, 2005).

⁷ Unfortunately, degrading them may be rather less time-consuming—it would only take a major solar storm to wipe out most of our communications infrastructure and electronics, and many large systems are dangerously vulnerable to accidents or attacks on their key nodes. Dealing with these fragilities is surely another grand challenge we need to confront urgently.

In other works, we have contrasted different perspectives on services and service research in a way that is similar to that developed for contrasting different perspectives on the future with IT. Three perspectives were used to group different commentators' viewpoints, initially in the context of studies of service innovation, though the classification has been extended to approaches to services, trade, productivity, etc. The approaches to IT and to service innovation have one feature in common. Both group some points of view together in the belief that the topic of interest can largely be understood in familiar ways. The future of IT can be seen as largely a continuation of what has been done in the past, the behaviour of services can be largely grasped in terms used for manufacturing and tangible goods. Again, other points of view propose that there is dramatic discontinuity: we will see a transformation of life through new IT, we need to treat services as dramatically distinct from manufacturing. Finally, we argue for approaches that span these extremes, recognising that each set of views has something to contribute.

The three perspectives⁸ are:

Assimilation: this views service industries as being essentially like manufacturing. Services can be seen as “intangible goods”, and service innovation is similar to manufacturing innovation, not least in that technological innovation is central to both.

Demarcation: this emphasises the peculiarities of service firms and their products. Intangible services are seen as more than just mere goods; they often involve relationships between suppliers and users which may require close involvement, to the point that some services are clearly co-produced with customers. Service innovation may concern intangible elements of the product, or be more organisational than technological. This helps to explain the low levels of R&D, patenting, and formal innovation management reported for many service firms.

Synthesis: this argues that the peculiar features of services are important beyond the service sectors as such—a point that has gained strength with the rise of the idea of ‘servitisation’ (Lay, Copani, Jäger, & Biege, 2010). Integrative analytical frameworks and tools that can apply to all sectors (tertiary and manufacturing), products (services and goods) and types of innovation (technological, organisational, social, etc.) are required.

So, just as we argued that Continuumism and Transformism were one-sided perspectives, and in Structuralism we seek to take account of the valuable contributions of each, so assimilation and demarcation are incomplete, though analyses based on each perspective can have things to offer. A synthesis approach is appropriate for considering IT innovation in services—and to the productivity issues raised by such innovation.

⁸ Coombs and Miles (2000) introduced the terms used here, though they were following in the footsteps of Gallouj and Weinstein (1997). See also Droege, Hildebrand, Forcada and Heras (2009). In contrast to the analysis of the IT futures literature, this approach has been emulated quite widely.

2.5 Assessing Productivity

It is beyond argument that the application of new IT has changed the speed and the quality of many service tasks. The ease of preparing documents and designs, contacting remote colleagues and controlling remote devices, accessing and analysing data resources, and making many sorts of transactions, has increased vastly in our own lifetimes. Of course, we are not always efficient in our use of the new capabilities, simply doing more of what we were always doing, just more rapidly. Time may be wasted endlessly redrafting texts, personalising the layout of the computer desktop, and dealing with information overload. But—with the exception of needing to introduce new routines to deal with the burden of widely-circulated emails and the like—there are few signs that we will choose en masse to sacrifice these gains.⁹

So we recognise that we are experiencing gains in service productivity. But measuring the extent of productivity improvements is another matter completely. New IT has led to some rethinking by official statisticians about dealing with technological change within growth and productivity analysis. There have been many efforts to take into account changes in the quality of goods, especially computer-related goods, so that we do not assume that the price of a computer accurately reflects the ‘bangs per buck’ it conveys. These efforts at hedonic pricing involve heroic assumptions and have huge impacts on statistical assessments. One problem is that different countries are adopting slightly different ways of dealing with the measurement problems. But this is just for goods; the issue of valuing services and service quality is one that vexes statisticians even more.

Sweeping statements are often made about the lack of productivity (or more often, what is precisely meant is productivity growth) in service industries, especially in public services. But statisticians recognise the persistence of long-standing problems in services productivity measurement. We may be able to take account of factors on the input side, such as the frequency of part-time work in service industries, though even here there are difficulties. Problems associated with the output of many services are another matter.

Some problems stem from the intangibility of services: it is often harder to determine the quantity of services provided than the quantity of manufactured goods produced. Some concern the high variety of services outputs, with products being closely tailored to the requirements of specific clients on specific occasions. There is also the matter of interactivity, meaning that services, clients, or consumers frequently have to contribute some of their own labour or knowledge to the service (co)production process. These factors contribute to problems in assessing the productivity improvements associated with IT use in services.

⁹ More serious issues are raised by online pornography and stalking, cyber-surveillance and fraud, problems which may well lead to some restrictions on the ways in which new IT is used. But this is far from rolling back on this use.

One response is to take a *Demarcationist approach* to services productivity. It stresses the point that production and consumption are not always clearly separate processes in services (Grönroos & Ojasalo, 2004). In the standard view of economic activity, clients do not participate in the production process; but they patently do so in many services. Does this not imply that the time put in by the customer also needs to be taken into account—especially when innovations involve more work on the part of the service users? This argument may well apply to the more interactive, client-intensive services; in more standardised services, or those (like telecommunications) based on a standardised infrastructure, the approaches to productivity measurement derived from manufacturing may provide a reasonable framework.

In contrast, much public debate and many quantitative research studies take an *Assimilationist perspective*. They do not pay much attention to whether service sectors require specific approaches to productivity measurement. Where the comparisons essentially involve monetary data, contrasting levels and trends in value-added per employee (or, better, per hour worked); it may be relatively straightforward to do this. Services are just intangible goods. There is a problem with this sort of approach, in particular in the case of many professional services, where a large component of the price of these services is the day rates paid to professional staff. Contracts are often issued in terms of days of effort allocated. Thus, apparent increases in value-added and increased productivity measured in these terms may reflect increased salaries rather than a substantive change in outputs.

When it comes to outputs, though, conventional measurement faces many problems. In the context of the present discussion, it may well be that we are missing innovation-related achievements, especially those involving increased service quality. We have limited ways of assessing whether, for example, consultancy studies are better now than they were in the past.

The intangibility of many services may make it difficult to observe just what product, and what volume of product, is being delivered. The high degree of customisation or specialisation of much service output can make it very difficult to compare service outputs.¹⁰ This affects the assessment of quality improvements and other changes in services that might affect the unit of “physical”/“volume” output being assessed, which are often what is associated with IT application to services. Some services may pose less acute problems since they are providing largely tangible and/or standardised services, for example, railway journeys and income tax returns. Other services are much more problematic.

In the early 1990s, Gadrey compared US and French firms at a time when the former had introduced many new technologies (Gadrey, 2002). He found that the US service firms were applying advanced technologies to their informational and material/logistical functions, and here they were achieving higher levels of efficiency than their French counterparts. But they employed relatively more people to

¹⁰ How do we assess the value of the succession of services within such sectors as legal, medical, consultancy, design services, for example?

provide direct services to customers, and delivered a greater volume of such functions (face-to-face contact, customer care, assistance and advice, etc.). The output statistics overlooked the direct service functions being produced.¹¹ The conclusion that the overall labour efficiency of US services was relatively poor was largely based on a failure to take these important features of the service relationship and whole service product into account.

Gadrey thereby concluded that during the 1980s, despite productivity indicators portraying a poor performance, US supermarkets (for example) were actually increasing the quality and quantity of services delivered. In contrast, French supermarkets were reducing many of their service components by focusing on strategies involving self-services and large scale stores (approaches that had been pursued, of course, in the US in earlier decades). Variations in service quality were being neglected by conventional measurement techniques—a point that probably applies to many other service industries.

Gadrey argues forcefully that much conventional thinking about productivity and output is misconceived when it comes to services. A wider view of the value produced by at least those services helping “to maintain technical, economic or social systems, or even human beings” (2003, p. 20)—means going beyond measuring “trouble-shooting interventions or repairs” (2003, p. 20). Attention needs to be given to the services’ ability “to reduce the number and gravity of the dysfunctions” (2003, p. 20).

This is reminiscent of an argument that has sometimes been raised in connection with public services and their performance. The issue is that success in dealing with some sorts of problems may induce a higher level of demand for the service: for example, saving the lives of premature babies, extending the life of elderly patients may result in an apparent increase in the prevalence of the problem which the service is supposed to be addressing. The implication is that many public services—with health care as a prime example, would do better to emphasise prevention rather than cure. This may not look great statistically—at least in terms of standard measurements. For example, if performance measures are designed around throughputs such as the numbers of patients being treated for a particular (avoidable) condition, then it may look as if performance were declining.

This is clearly important for the productivity assessment of the sorts of IT-related personal health systems discussed above. Demarcation arguments thus imply that new modes of thinking are needed in order to complement traditional approaches to economic analysis and statistical measurement. We would need approaches that have more in common with studies evaluating the impacts of policies and programmes, than with more routine sorts of monitoring and analysis. This means long-term efforts at developing not just new indicators—and new measurement and monitoring systems more generally.

¹¹ Gadrey cites indicators such as the volume of goods sold in retailing, the number of people admitted to hospitals, tons of goods carried so many kilometres in air transport, premiums or losses in insurance, amongst others.

A *Synthesis approach* to service productivity would suggest that the features of services are not completely distinctive. Actually, the study of services has brought to the fore features that are relatively uncommon (or neglected) when considering manufacturing sectors' innovation and productivity. In some cases it can now be seen that services are becoming more manufacturing-like¹² and manufacturing more service-like.¹³ Examination of services can bring to the fore neglected features of economic activity; and these are ones that may be becoming more prevalent and widely distributed across the economy. The important questions that Demarcationists raised about examining services activities are not unique to services. Though measurement problems may be particularly intense in service sectors, they are encountered right across the economy.

Across the economy, a web of intertwined functions are being produced and consumed. For largely historical reasons, some of these are labelled services (a very large category) and some of which are labelled manufacturing (mainly the production of material artefacts on the basis of processing of raw materials and products of extractive industries). Most of the 'service' functions are produced widely across the economy; in fact, practically all Business Services have their in-house equivalents within most firms.¹⁴ The proportions of the activities conducted in different sectors of course vary greatly; otherwise we would have long since torn up our received sectoral classifications. This means that productivity analysis has to cope with service-like issues across the whole economy.

Thus the question of IT's impact on service productivity opens up challenging questions about how we assess productivity in general. While new IT may allow us to capture data on more of the interactions within, and outputs of, economic activity, the changes in this activity that the technology enables lead to many difficulties when it comes to productivity assessment. At a time when the success of large-scale IT projects is often questioned vociferously and where the need to take user inputs into account in system design and in the assessment of system effectiveness, these difficulties are ones that strategists and policymakers would like to evaporate. But in reality we will have to learn to live with the difficulties, and hopefully they will provoke much more profound analyses of how we do—and could—make better use of new IT. This use of IT will certainly continue to reshape service industries, and quite possibly help product-service systems evolve so as to help us cope with the immense challenges confronting us. This conclusion underlines the importance of understanding how technological opportunities can be implemented so as to mesh with social and organisational requirements.

¹² For example, use of IT and standardisation of products—sometimes through IT use.

¹³ Through an emphasis on intangible elements of the product, customisation of products, closer contact with customers, again enhanced by IT use.

¹⁴ Consider the major classes of business services: computer services, R&D and testing services, professional and operational services. All are commonplace activities conducted within firms in practically every economic sector.

New configurations of public and private actors, business models and value networks, and ways in which IT is embedded into everyday life, will be the consequence.

2.6 Technological Trends and the Future

Information Horizons did not grapple with these complex questions concerning the nature of services. We focused on technological trends, especially the key trend towards convergence and the likely availability of integrated services which that would enable, and we made some (as it turned out, rather conservative) assumptions about the power and price of intelligent devices which would enable new applications. We did note that early applications of emerging technologies tend to be simple substitution: replacing what went before with a similar but improved product which makes use of some of the functionality of the new technology. Only later does the full potential start to be explored and significantly augmented, and radically different applications emerge. While recognising this, and while discussing the broad classes of service activity noted above, we were probably not sufficiently attuned to the features that characterise the service economy. Issues such as co-production, intangibility and interactivity really have huge significance when it comes to online and social media, for example.

Given the lessons that we can draw from this, it is perhaps worth briefly speculating about likely future trends along the technological trajectory and what that might mean for services. Three key areas of development are becoming increasingly apparent and in our view will provide the backbone for significant expansion in the range of applications:

- Increasing mobility, decoupling physical connectivity as technologies enable high speed, high capacity networks to be accessed from just about anywhere. This is at a price though, but one that many people consider worth paying.
- Increasing core capability within networks—the ‘Cloud’ model, in which large amounts of data can be stored and powerful programs accessed from mobile devices which act as terminals. Incidentally, part of the model is labelled “software as a service”.
- Increasing embedding of intelligent functionality in everyday artefacts—the so-called ‘internet of things’, or world of ‘ambient intelligence’. Home automation, as discussed above, may become a reality as health and security systems become part of everyday life, accessible through mobile phones as well as computers and meters; and allowing for communication with external service providers of health, social and emergency support—and quite probably with less formal social and community networks.

It seems likely that as well as accelerating the trends already visible (our ‘substitution’ mode) there will be increasingly radical solutions emerging to exploit these technological shifts. New business models or product-service systems need to be forged if the multiplicity of new devices and capabilities are to work together, and fit into people’s lives and the wide industrial ecology.

Alongside this, we would anticipate an ongoing shift in economic power towards regions of the world with faster growth rates and high populations. This will create challenges for established powers, but in terms of IT and services, we can forecast significant co-evolution of novel applications and associated services. An early example might be the changes in the way that mobile communications are providing platforms for new models of financial services and healthcare. Local conditions in emergent economies (including the lack of a prior fixed line telephone infrastructure) have meant that many radically different options are already emerging and some of these are diffusing back to the 'developed' world via a process of 'reverse innovation'. Future service models may be as influenced by the experiences of the emerging economies as they are by developments in the West.

2.7 Concluding Words

Intellectually, we are still struggling to come to terms with the move into service economies, with all of the challenges that this poses to statistical tools and economic theories based on the dominant characteristics of (Fordist) manufacturing industries. What is increasingly widely recognised, however, is that material goods and service activities are intertwined to a huge extent, and often in highly complicated ways, in the provision of the final services on which human life and social progress depend. This recognition is just the starting point for the major task to which this chapter hopes to have contributed.

This task has several components, all of which involve both practical action (and experimentation) and intellectual analysis (conceptual development and empirical research of many forms). One concerns new IT (and other technologies too, such as those liable to emerge from the new neuroscience). It is important to examine how 'product-service systems' can be reconfigured so as to take account of new opportunities that are presented by the technological trajectories discussed above (not least, increasing mobility, network-centrality, and embeddedness). Purely on a technological level, things that are done now can be done in very different ways, and it is a safe bet that many of them will be in the coming decade, and many more into the longer-term future. Beyond the technical issues, though, there is a major set of questions about the organisational forms and business models that may emerge to make use of, and capture value from, these opportunities. In other words, strategies of numerous actors are going to be critical, and while it is not a simple affair to anticipate and assess these strategic alternatives, this task also has to be taken up. There is scope for intervening into these choices, and not merely by exhortation or by regulation. The framework conditions within which innovations are pursued in product-service systems will play important roles in determining how far these strategies are contributing to, or detracting from, different social objectives. In other words, policies are important.

Another set of components thus comes into play. These concern the long-term objectives of societies in a globalised world. We confront 'grand challenges', and they are 'grand' precisely because they represent threats to survival—to ecological

sustainability most obviously, but also to health (e.g. the threat of infectious diseases in a post-antibiotic era), social cohesion and exclusion (for example, the consequences of huge numbers of people living in acute poverty, and of the effective disenfranchisement of many citizens—even in affluent countries—as inequalities in income and social power increase ever further), and security (of access to energy, food, water, and of security *from* criminal and terrorist attacks and natural and technological disasters). If we accept that product-service systems have to be re-engineered so as to effectively address these challenges, then the task of understanding the implications of technological changes for these systems needs to be seen in a new light. Now the task has to be one of seeing how far various options for innovation and implementation of innovations can contribute to—or impede—the transitions in social organisation and economic arrangements that are associated with the creation of great responses to grand challenges. In this context, we will stress two specific lines of attack. First is ‘*green innovation*’, and the need to integrate the body of work undertaken in this context on ‘transition management’ into the analysis. Second is ‘*inclusive innovation*’, and the integration of work on topics like goods, services, and economic opportunities for the ‘bottom of the pyramid’ into the analysis.

Finally, another set of components also requires attention: the political processes that are necessarily part of the activities discussed above. Again, this is a matter for practical action and intellectual analysis—which may of course include action research! Large-scale change in product-service systems involves huge numbers of people, and any efforts to shape this change (and direct it towards specific social outcomes—such as meeting grand challenges) requires policy measures which are also liable to involve large numbers of people. This is for several reasons. Political legitimacy is required to implement policies, especially in pluralistic societies. Policy formation also requires inputs from many quarters of society—policymakers are rarely, if ever, well-informed about the on-the-ground conditions facing various levels of government and various communities among the governed; nor are they well-informed about the knowledge and capabilities that they possess. These stakeholders are not just vital sources of social knowledge (and technological, environmental, and other intelligence). Their engagement is often required in order for policies to have the intended effects. Thus they need not just to accept the legitimacy of policies, but are also required to help shape them and to understand the goals and mechanisms that are involved. This implies movement towards more consultative, deliberative and participatory modes of politics; and this in turn can be supported by experimentation and research around, for example, foresight, responsible innovation, constructive technology assessment, and the like. The insights from these areas, too, need to be integrated into the analysis.

This is a massive agenda, and will require engaged and interdisciplinary research, together with new approaches in education, professional affairs, and many more areas. In other words, we have to rethink some of our ‘intellectual’ product-service systems in order to contribute to the vital re-engineering of product-service systems more generally. This takes us way beyond discussions of service productivity as currently understood in their narrow framework. But it takes us in directions that should be both productive and of service.

Expert's View

Dr. Michael Bartl

HYVE AG

Question: How and where will innovation in services increase productivity?

Michael Bartl: The WWW changed the way we produce and access information and therefore transformed the way we work, shop, communicate, travel, learn or even find partners for life. All this was accompanied by countless service innovations and new businesses models. However, we have to be aware that we are only at the halfway point in the world's digital transformation process.

Digital data is now everywhere, in every sector, in every economy and every organisation. Devices such as mobile phones, energy meters, automobiles or industrial machines sense, create and communicate data embedded in an emerging internet of things. Additionally, social networks will continue to produce massive amounts of consumer data.

These large pools of data—or BIG DATA—is the raw material to improve service productivity of existing services or the starting point for the development of new and revolutionary services. We are right in the middle of a pioneering age of value creation through data-based services. At the same time we have to be aware that we will be confronted with a set of policy issues such as privacy, security, intellectual property or liability which have to be addressed in the service design.

Expert's View

Dr. Helmut Schönenberger

UnternehmerTUM GmbH

Question: How and where will innovation in services increase productivity?

Helmut Schönenberger: One important impulse for new service innovations is the deregulation of markets. An interesting example is the recent liberalization of the German long-distance transportation market which has created disruptive business opportunity for inter-city bus services. FlixBus GmbH, a startup and portfolio company of UnternehmerTUM, is building up a new scalable service company as a so called "virtual bus operator". The company runs with their Internet platform a partnership with selected large and mid-sized bus operators for inter-city services in Germany.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Helmut Schönenberger: New driving forces are universities and their entrepreneurship centres. By professionalizing the incubation activities, more and more innovative service companies emerge within the ecosystem.

Stephan Klingner, Stephanie Pravemann, Michael Becker,
and Klaus-Peter Fähnrich

Setting the Stage – Annotations by the Editors

Productivity research is concerned with two questions around business operations—how efficient are they (in terms of using as few resources as needed), and how effective are they (in terms of meeting customer requirements) (Markland, Vickery, & Davis, 1995). It is concerned with managing the process that converts inputs (in the form of materials, labour and energy) into outputs (in the form of goods and services).

This dual target—productivity as an umbrella concept including efficiency and effectiveness—makes its study somewhat problematic. Blois (1984) argued that increasing productivity is not a sufficient condition for enhancing an organization’s effectiveness. In fact, productivity may be increased at the cost of effectiveness in meeting the goals set for the organization. And the problems of using a traditional manufacturing based productivity concept in services have been a regular subject. Lehmann and Koelling state: “Managing productivity should be seen as a mutual learning experience, where the service provider and the customer are aligning their resources, production and consumption processes to each other. In summary, it can be said that measuring productivity as an efficiency issue may be less appropriate in services [than] to see service productivity as a profitability concept” (2010, p.4).

So what does the management of service productivity look these days? The following chapter addresses this question. The contribution by **Stephan Klingner, Stephanie Pravemann, Michael Becker and Klaus-Peter Fähnrich** is an empirical study conducted in 1,990 German service companies from February to November in 2012. The main focus of this study was to analyse the state of the art in managing service productivity within these companies and

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to show the correlation between managing service productivity and economic success. It examines the methods and tools actually used in practice for measuring and improving service productivity and highlights existing challenges for managing service productivity as well as the current needs and trends of companies.

The chapter provides a deep insight into business practices of German service productivity management. Its results can be used to identify trends for other industrialized and service intensive countries. Perhaps of concern is the finding that on the one hand 99 % of all participants of the study expect a constant or growing relevance of service productivity but on the other hand, one third (33 %) of the surveyed companies do not conduct any productivity management. Part of this challenge facing managing service productivity is the lack of appropriate methods and tools. Although several academic approaches exist, such as Data Envelope Analysis (DEA), they can often not be used in business practice due to their complexity.

3.1 Managing Service Productivity in Business Practice

Though the scientific output of the field of service productivity has increased recently (Grönroos & Ojasalo, 2004; Gummesson, 1998; Lehmann, Neyer, & Möslin, 2011), only a few studies analysing heterogeneity and practical application of productivity management of services in business practice exist, e.g. (Amir, Ahmad, & Mohamad, 2010). According to academic research, a main challenge for managing service productivity is the lack of a commonly shared theoretical foundation (Spohrer, Maglio, Bailey, & Gruhl, 2007). Though nowadays several research approaches have been conducted, there is still no common understanding of the concept of service productivity (Lehmann & Koelling, 2010). This results from the fact that contrary to measuring and managing productivity in the manufacturing domain, the field of service productivity has been neglected for quite some time (Vuorinen, Järvinen, & Lehtinen, 1998).

Managing service productivity, i.e. measuring and improving productivity, is seen as more challenging than managing productivity in manufacturing. Main reasons for existing challenges are seen in the specific characteristics of services, for example, the immateriality (Sahay, 2005) and the simultaneity of production and consumption (Johnston & Jones, 2004; McLaughlin & Coffey, 1990). In addition, it is often not straightforward to measure the results of a service provision (Klassen, Russell, & Chrisman, 1998; Li & Prescott, 2009). A huge challenge for managing service productivity is the involvement of customers (Harmon, Hensel, & Lukes, 2006). Due to the mentioned challenges, it is worthwhile to investigate to what extent managing service productivity plays a relevant role in general business practice.

In the course of this chapter, an empirical study analysing the state of the art in managing service productivity in German companies is presented. The focus of the study is to identify methods and tools for measuring and improving service productivity that are used in practice. Furthermore, the study should reveal existing challenges for managing service productivity and current needs and trends of companies.

The remainder of this chapter is structured as follows. First, the methodical background and the preliminary work of the study are presented in the following Sect. 3.2. For a better understanding of the organisational context, Sect. 3.3 gives an overview of the characteristics of the surveyed companies. The results of the study regarding the state of the art in measuring and improving productivity are presented in Sect. 3.4. Besides only identifying the state of the art, the survey also aimed at identifying needs and trends of companies (Sect. 3.5). Based on the results of the survey, a statistical model for analysing the correlation between productivity management and economic success of a company was established and is presented in Sect. 3.6. The paper is concluded by discussing the results and by pointing out the survey limitations (Sect. 3.7). Finally, managerial implications of the findings are presented in Sect. 3.8.

3.2 Methodical Approach

To align future research topics with actual business needs, the capturing of the current situation of productivity management in the domain of services is to be examined in a quantitative study. Although various aspects of the topic of service productivity have already been analysed from a scientific perspective, current challenges and needs in business practice remain unknown.

To close the gap between scientific research and business practice in an initial approximation, two qualitative preliminary studies were conducted. For the first study, 15 service providing companies from different industries were interviewed using a semi-structured questionnaire. Based on the concept of modularisation as a method to provide customer-individual configurations of services in an efficient way (Böttcher & Klingner, 2011), current challenges and used methods and tools for managing service productivity were collected. It was shown that many companies have difficulties finding a structured approach for modularising their portfolios and managing its productivity. Likewise, there was a lack of specific software supporting these tasks. The collected anecdotal insights and theses can be found in (Böttcher & Meiren, 2012).

Broadening the horizon as regards content and participants, a working group was established consecutively, comprising about 30 participants from various scientific and business related institutions. The aim was to explore, discuss and develop the basics of productivity in complex service systems integrating both the scientific and the business view point. As a result, future scenarios, best practices regarding methods and tools and a collection of recommendation for actions concerning

science, business and politics were compiled. The study is published in (Böttcher, Klingner, Becker, & Schumann, 2012).

As the preliminary studies have only limited explanatory power, a quantitative study was conducted to provide robust and reliable insights. Based on the issues which emerged in the preliminary studies, the following questions were focused on:

- Which methods and tools are used in business practice to measure and improve productivity of services?
- What are the current needs and challenges?
- Is the managing of service productivity of any economical relevance?

The study was planned, designed and conducted during the period from April 2012 until November 2012. The population of the study was defined precisely and included the following, service-providing industries: ICT, EDP, telecommunications, architecture, advertising, metal working, machine building industry, tax and business consultancy, accounting as well as research and development. The companies were taken from the database 'Hoppenstedt', thus including only German corporations. The stratified sample was selected randomly from a data sheet of 54,756 companies using IBM SPSS. By using stratification, the weighting of stronger represented companies in the population is increased and vice versa for lesser represented. This means, probabilities are allocated proportionally to the size of the categories of each criterion (Kauermann & Küchenhoff, 2011). Industry affiliation and headquarters location (West or East Germany) were used as stratification criteria. Due to the limited sample size and the chosen population, the results are only meaningful for certain German service companies. Nevertheless, the insights provided might be valuable for a wider range of corporations as well.

The questionnaire was sent by regular mail. To provide a convenient way of responding, a reply-paid envelope was included. In addition, it was also possible to send the completed questionnaire by fax or answer it online. 120 of the 1990 companies which were contacted returned evaluable questionnaires. This corresponds to a response rate of 6.44 %.

3.3 The Interviewed Companies

To gain insights about the characteristics of the questioned companies, various common attributes were surveyed. Furthermore, this additional data allows for a further classification of the respondents.

Regarding size, the companies can be divided into three different groups. Almost a quarter of the questioned companies have up to 9 employees. More than half of the companies employ between 10 and 49 people, whereas almost another quarter has more than 50 employees. This offers a broad range of different corporate structures.

To be able to classify the services provided, the companies were asked to describe their service portfolio using the characteristics *high degree of standardisation*, *customer-individual offers*, *product relatedness*, *person relatedness* and *high degree of customer-interaction*. Nearly all responding companies implement an intense customer orientation, resulting in 95 % of them characterising

Table 3.1 Distribution of respondents among service sectors

Service sector	Number of companies
Metal working and machine building	21
EDP, ICT, telecommunications	30
Tax consultancy, accounting, business consulting, research and development	37
Architecture firm	19
Advertising	13

their services as customer-individual offers. This customisation has the goal of fully satisfying customer requirements. This is especially important as differentiation criteria in highly competitive economical environments. Furthermore, almost 90 % of the companies state that their services are provided with a high degree of customer-interaction. Therefore, customers play a crucial role in the provision of a service due to their high impact on productivity and economic success as co-creator of a service.

Since it can be assumed that services in different industries vary widely in many of their characteristics, the companies were assigned to different industries. Due to the limited number of responses, only five different options for industries were used by consolidating companies with similar service portfolios. The companies were assigned to the sectors afterwards based on the offered services as stated by the participants. Table 3.1 shows the distribution of the respondents among these service sectors.

One of the most important criteria when comparing business activity is economic success. Since success can be multifaceted and is a highly subjective and abstract criterion, it has to be measured indirectly. Therefore, the companies were asked to specify how the three operational figures profit, total revenue and number of employees have evolved over the last 3 years. The performance indicators were captured using a scale of five possible categories (highly decreased, decreased, unchanged, increased, and highly increased). This scale was operationalised, i.e. a number (1–5) was assigned to each category. Afterwards, the three scales were summarised and averaged to form an index representing the overall success of a company. Thus, a numeric index value of “3” represents consistent success, whereas higher and lower values indicate a growing respectively diminishing success. Applying this approach, two thirds of the companies can be assessed as successful companies (i.e. with a constant or growing success).

3.4 Measuring and Improving Productivity

The management of service productivity consists mainly of three steps. First, the actual productivity of a service needs to be measured and somehow quantified. In a second step, the results have to be analysed and corresponding actions are to be

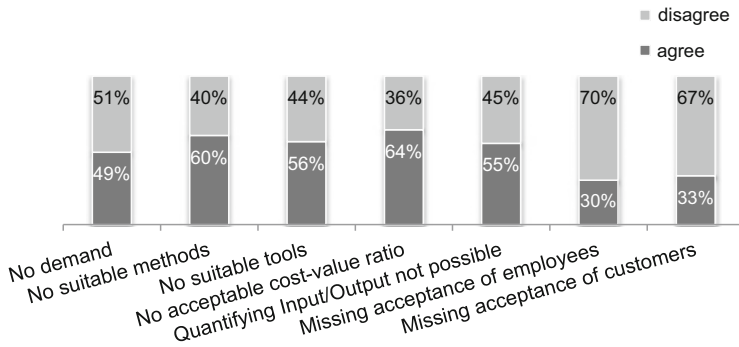


Fig. 3.1 Reasons for not implementing productivity management

Table 3.2 Duration of productivity analysis/responsible department for productivity analysis

Analysing productivity for ...	in %	Responsible department for productivity analysis	in %
<5 years	34.6	Specialist department	62.5
6–10 years	33.3	Controlling	60.9
11–15 years	13.6	Management	93.9
16–20 years	12.3	Quality management	42.9
>20 years	6.2	Human resources management	29.0

deduced. By implementing these actions, the productivity of a service can be improved in a third step. This tripartite approach forms the theoretical basis of the questionnaire.

Although the economic importance of services is growing, around a third of all participating companies do not conduct any management of productivity, with no significant difference between industries (Klingner, Pravemann, & Becker, 2015). Asking these companies for reasons reveals the lack of tools and methods as well as a not acceptable cost-value ratio of productivity management as main obstacles (see Fig. 3.1). Likewise, problems with the identification and quantification of input and output factors are a reason for not conducting productivity management, which more than half of the companies stated. Since the acceptance of both employees and customers is required to effectively conduct productivity increasing measures (McLaughlin & Coffey, 1990), these crucial stakeholders also have to be taken into account. Thus, almost a third of the respondents name the missing acceptance for productivity measures as reason for not conducting any productivity management. Remarkably enough, half of the companies cite the absence of demand as the reason for not conducting productivity management.

In contrast, two thirds of the questioned companies analyse the productivity of their services in various ways. In order to gain additional insights into the ways productivity management is conducted, some general information was surveyed. First, the date of implementation of the productivity measures was queried. As the left-hand side of Table 3.2 shows, almost 70 % of the companies have implemented

productivity measures in the last 10 years. Only a minority has more than 10 years of experience.

As the second information source, the department responsible for productivity management was surveyed (see right-hand side of Table 3.2). Although management is responsible for productivity management in the majority of companies, specialist departments, controlling, quality management or human resources also have partial responsibilities. It is important to note that the high proportion of management representatives as survey participants might have favoured an over-representation of management responsibility. Independent thereof, productivity management is not conducted in a single, specialised department.

Corresponding to the tripartite approach introduced above, the participants were asked to specify the tools and methods used for each productivity measurement and productivity improvement. Since the deduction of adequate actions is mainly an intellectual and individual process which can hardly be supported by tools or methods, the study focused the steps of measurement and improvement only. The selection of the given tools and methods was based on findings gathered in various workshops conducted for the pre-studies (Böttcher et al., 2012).

3.4.1 Measuring Productivity

As Fig. 3.2 shows, the two dominating methods used for measuring productivity are the direct measurement of key performance indicators (KPI) as well as the calculation of indicators based on the relation of input and output factors. These are mainly methods originating from the industrial domain, which were adapted for the domain of services. In contrast, service-specific approaches like Simulation (Silberholz, Golden, & Baker, 1991; Swart & Donno, 1981), Balanced Scorecards (BSC) (Kaplan & Norton, 1992) or Data Envelopment Analysis (Charnes, A. (2001): Data Envelopment Analysis, 6. ed., Boston.) are rarely used.

Looking at the reasons why the mentioned methods are not used in business practice (Fig. 3.3) only a small proportion of companies refer to high costs as a reason. Though Balanced Scorecards, Simulation and Input/Output-Analysis are known by the majority, these methods are predominantly seen as inappropriate, e.g. due to the specific requirements of the analysed service. In contrast, more than half of the companies not applying DEA are not aware of this method. The introduction of one of the mentioned methods is planned in few cases only.

3.4.2 Improving Productivity

Regarding methods to support the improvement of productivity, standardisation and modularisation are among the most widely used approaches (see Fig. 3.4). At the same time, these methods are the core components of the concept of mass customisation, an approach to allow for the use of economies of scale and customer individual configurable offers at the same time (Da Silveira, Borenstein, & Fogliatto,

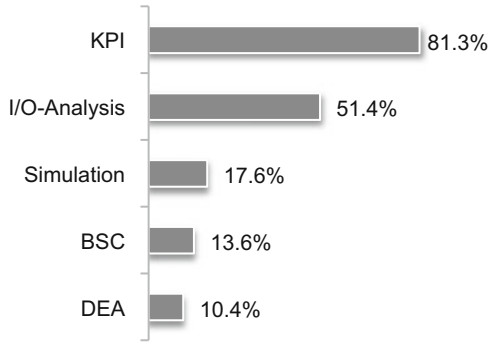


Fig. 3.2 Methods and tools used for measuring service productivity

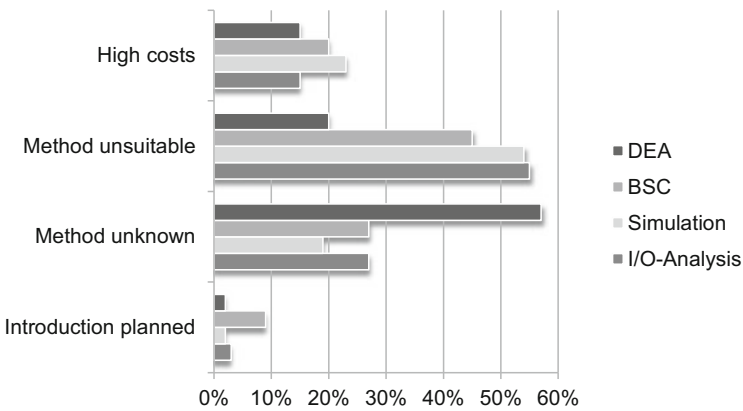


Fig. 3.3 Reasons for not using productivity measurement methods

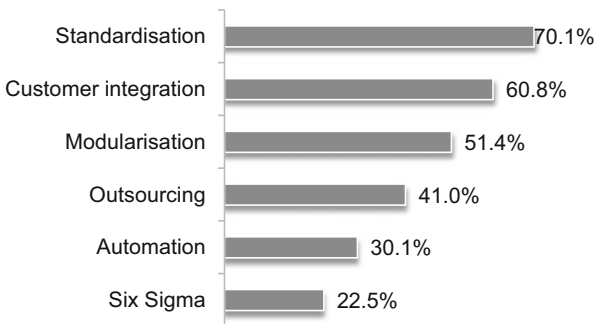
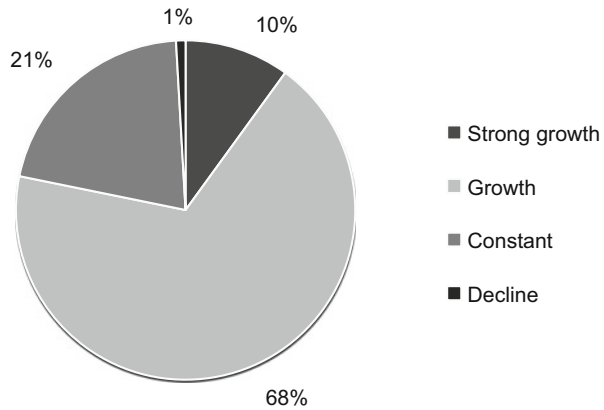


Fig. 3.4 Methods and tools used for improving service productivity

2001; Pine & Davis, 1999). Although originating from industrial or software engineering, this approach can also be used for services (Fogliatto, da Silveira, Giovani & Borenstein, 2012). An increasing integration of customers in the process of service

Fig. 3.5 Expected change in relevance of service productivity management within the next 3 years



provision is another method to increase the productivity of services by substituting employee labour with customer labour (Bendapudi & Leone, 2003). Almost two thirds of the questioned companies apply this concept. Other approaches to productivity improvement like outsourcing, automation, or Six Sigma are increasingly specific and, therefore, only used in a smaller portion of the questioned companies.

Similar to reasons why specific methods for measuring productivity are not used, only a small proportion of companies mentioned high costs for not using one of the productivity improvement methods. Furthermore, only a minority of companies actually plans to use one of the methods. However, the main impediment to using an improvement method according to the questioned companies is the lack of suitability.

3.5 Needs and Trends

The relevance of productivity management of services is beyond contradiction. On the one hand, 78 % of the questioned companies expect a growth in the relevance of this topic and 21 % assume at least an unchanged, constant relevance (Fig. 3.5). These numbers add up to 99 % of all participants expecting an constant or growing relevance of service productivity. On the other hand, relating this number to the 33 % of the questioned companies, which do not conduct any productivity management, reveals great potential for a more extensive application. In order to realise this potential, it is important to overcome hesitancy and close the gaps between scientific research and business needs. Therefore, the identification of requirements and trends is essential.

Looking at the current problems of productivity management in business application reveals various demands regarding supporting method and tools. A mandatory precondition of many methods for measuring productivity is the ability to quantify facts that need to be measured. This applies, for example, to the usage of KPIs or the Input/Output-Analysis. Service specifics like the intangibility of the

Table 3.3 Trends and demands for productivity management

Reasons for an increasing relevance of productivity analyses	in %	Demand for methods or tools regarding. . .	in %
Growing competition	85	Identification of adequate KPI	68
Better technical possibilities	71	Quantification of KPI	65
Growing economic relevance of services	78	Interpretation of KPI	61
Growing complexity	88	Deducing recommendations	72

service results or a high degree of customer contact during service provision make a quantitative description of many characteristics substantially more difficult. Thus, it is important to integrate and quantify those so called “soft factors”, an area which is challenging for 65 % of the participating companies, as illustrated in Table 3.3. In addition to the quantification, the well-known service specifics intangibility, heterogeneity, inseparability and perishability (Edvardsson, Gustafsson, & Roos, 2005) also complicate the identification of suitable and meaningful KPI. More than 68 % of the companies see the need for supporting tools and methods. One approach to counteracting this problem could be the use of categorised KPI-libraries, as suggested by (Freitag, Lamberth, Klingner, & Böttcher, 2011). Likewise, the interpretation of the measured values for KPI is an issue for more than 61 % of the companies, which, they wish, should be better supported by tools or methods. A very simple solution would be the publication of industry-wide reference values for certain KPI. However, this is opposed by the common nondisclosure of company-intern information.

The measurement and quantification of performance indicators are both necessary but insufficient steps for a holistic productivity management. Thus, the deduction of actions based on the measurements is required as last step. 72 % of the participating companies see a need for methods and tools better supporting this aspect.

Since a majority of the companies expect the relevance of productivity management of services to grow, the motives behind such assumption are worthwhile analysing. Providing services in a growing competitive environment leads to the two main drivers for service productivity management. First, in a competitive market it is of growing relevance to provide services in the most efficient way. Therefore, 85 % of the participants assess competition as important driver for conducting productivity management. Second, the offering of a customer-oriented service portfolio is of utmost importance for a company to be economically successful in a competitive environment. This results in an increasing complexity, a development that 88 % of the respondents consider as driver for a growing relevance of productivity management.

In summary, market-related aspects such as competition and a growing economic importance of services are the main drivers for an expected gain in relevance of productivity management of services. A further reason mentioned by many companies is better technical possibilities.

3.6 Economic Success and Productivity

The decision for conducting productivity management is often based on the intuitive expectation of positive economic effects. However, it is possible to derive general statements based on the results of this survey, which support the anecdotal and subjective experiences. Since the direct surveying of financial numbers to describe the results and quantify the effects of productivity management is not possible, the abstract concept of success is used to create a model. Based on that model, the effects of conducting productivity management of services can be estimated. This is done using linear regression analysis. Even if it is an exploratory study, there are some basic assumptions for the regression model.

1. *Measuring productivity.* Based on existing literature (Grönroos & Ojasalo, 2004) it can be supposed that companies are more successful, if they are measuring and managing productivity.
2. *Companies' location.* There are external factors which influence the success of a company. It can be assumed that the location (i.e. West or East Germany) affects companies' success.
3. *Industry affiliation.* Economic crises have different effects on different industries. Consequently some industries are more affected and have been less successful than others in the last 3 years.

The model includes only significant effect sizes respectively those with explanatory power in evidence. Thus, the model quality is rather small, i.e. only 18 % of the variability of company success can be explained. The analysis shows an index value of 2.854 for West German advertising companies, neither measuring nor managing productivity. During the last 3 years, these companies have recorded no relevant changes, but tend to lean toward declining performance indicators. If companies consider productivity the index value increases by 0.451. This coefficient is highly significant and leads to the conclusion that companies conducting productivity measurement and management are more successful on average than those which don't do it. The assumed effect of companies' location is clearly identifiable and also highly significant. East German companies are less successful than companies from West Germany by an average index value of 0.473. The regression analysis also shows that advertising agencies are the least successful. Over the last 3 years the performance indicators of this industry have deteriorated considerably.

3.7 Discussion

This chapter presented the findings of an empirical study with the goal of identifying the state of the art and future needs and trends in managing service productivity. Therefore, 1990 German companies were surveyed with a response rate of 6.44 % (120 respondents). Besides qualitative analysis, another aim of the study was to find evidence for the correlation between managing service productivity and economic success of a company using a statistical analysis.

In terms of the qualitative analysis, it can be stated that the study findings are beneficial for both the academic world and business practice. First of all, it is possible for companies to classify themselves in comparison with survey participants. For example, an East German company conducting productivity management can compare its success with other companies. Furthermore, the survey gives an implication about used methods and tools that are relevant in business practice.

Due to the heterogeneity of service characteristics between different industries, it can be assumed that used methods and tools vary significantly between industries. However, a fine-grained analysis of the results in regards to industrial differences could not be conducted due to the limited sample size. Instead, an analysis of aggregated service fields can be found in (Klingner, Pravemann, & Becker, 2015), comparing industrial vs. non-industrial services in more detail.

The survey also has several implications for the academic research into service productivity. A frequently mentioned challenge for managing service productivity is the lack of appropriate methods and tools. Though several academic approaches exist, they often cannot be used in business practice. This is often caused due to their complexity, e.g. respondents stated that DEA is way too complex for a practical application. This finding can be supported by other studies, e.g. (Kutsch, Bertram, & von Kortzfleisch, 2013) for the domain of B2B software services.

The survey revealed that a lack of methods and tools exists along the entire productivity management lifecycle, i.e. beginning with the identification and quantification of relevant performance indicators and ending with the deduction of recommendations for action. Since productivity management is gaining in importance, it is necessary for the academic research to develop holistic approaches. In particular, due to customer influence on service productivity, it is challenging to adapt existing approaches from industrial engineering (Vuorinen et al., 1998). In contradiction, the study revealed that specific methods and tools developed for managing service productivity are used pretty rarely. This problem might even intensify in future, since most of the surveyed companies expect growing customer integration in the service process and thus, the impact of customers on service productivity will also increase (Bettencourt, 1997).

There are some limitations regarding the study. Due to the low response rate and partly small numbers of cases it is not possible to make generalisable statements for German service companies or for single industries at least. The majority of the presumed correlations were not significant respectively not existent. It possibly results from the low variability within certain characteristics because of the low number of cases. To increase the response rate and to prevent Item-Nonresponse more activities should be conducted. For example, a prior notification or a personal call may cause that the willingness to participate rises. Furthermore, certainly helpful are small well-considered courtesies as an incentive to answer the questionnaire (Häder, 2010).

As pointed out in the previous sections, the study findings presented in this chapter are a first result that should be used as a basis for additional investigations. Follow-up studies can be conducted in order answer several specific questions.

For example, an in-depth analysis of challenges using existing approaches for measuring and improving productivity for businesses might seem relevant. In addition, the findings show a clear mission for academic research to establish appropriate methods and tools for productivity management.

3.8 Managerial Implications

From a managerial point of view, the following aspects seem to be relevant for service productivity management.

- Managing service productivity is important. The study findings revealed that managing productivity has a significant influence on company success independent of any other considered influence factors in the model.
- Standardisation of services is relevant for company success. Although the data of the survey does not allow for a theoretical underpinning, a tendency towards this correlation can be identified. Thus, it is necessary to follow up on this assumption and to develop a respective statistical model.
- Customer integration is of increasing importance. Both academic sources and the study findings anticipate growing demand for customer-specific services. Besides the ability to identify customer requirements, customer integration is also valuable for other reasons. As a majority of organisations state, customers can have a great influence on effective and efficient service provision, e.g. by direct feedback and by incorporating customer contact employees.
- Customers influence service productivity. Due to increasing customer integration, their influence on service productivity also increases. In order to cope with this situation, companies need to implement methods and tools for supporting customer integration.

Expert's View

Dr. Christoph Krois

Siemens AG

Question: How and where will innovation in services increase productivity?

Christoph Krois: Services bear a tremendous business opportunity for corporations' business development and their own as well as their customers' productivity. To achieve this productivity growth, customer insights and the expertise of internal employees who are involved into customer interaction of any kind (from products AND services), have to interact. Services experts need to be involved in the services efforts of a company because the services business requires different competences in addition to products business. Therefore, constant and continuous customer involvement and collaboration and thus a better understanding for the specific demands enable the organization to "walk in customers' shoes" and furthermore to understand and develop specific value adding services on the spot. This ability is essential in order to be able to offer the right answers to the complex demands customers have to solve in their day-to-day business.

The application of state of the art toolsets, such as open innovation approaches help to develop customer tailored solutions.

- Internally: through collaborative cross-organizational crowd sourcing approaches the diverse experience, know-how and creativity of employees are facilitated to develop, discuss and mature new business ideas and/or service innovations.
- Externally: by e.g. cross company collaborations in order to gain further insights and understanding by directly discussing ideas and demands that will accelerate capturing direct insights at the point of pain and will help to overcome sales or purchasing filtered bottleneck communication.

Productivity can be increased through services innovation by facilitating customer insights and employee experience and creativity at the right spots and where it is needed. Using these insights a company is capable to increase or decrease services density or is able to install completely new services and place the services where they really create impact for the customer. Thus, the company can consciously make the decision to reduce overheads or even stop unnecessary efforts and expenses, so investments can be focused on the real value adding services for both the customer and the company itself.

Besides the mentioned learning's gained by the customer involvement, especially the product business and other corporate functions within the value chain will profit by this progression, such as:

(continued)

- Time2market of new products can be reduced through immediate feedback and learning's through customer collaborations within the development phase of product and services (not afterwards through trial and error)
- the risk of market refusal or non conformance cost is reduced by customer integration and lower cost through reduced overheads
- reduced security buffer and bullwhip effect risk through increased in depth understanding of the customers business.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Christoph Krois: The commoditization in almost every product business in the globalized world is creating a tremendous pressure on industries. Therefore, it is essential for an organization to understand and assimilate the necessity to provide solutions in the field of services and to initialize innovation for a successful change. All stakeholders (entrepreneurs and management) need to understand that products and services need to go hand in hand to be successful. The future value creation is going to be hybrid. Further, a common big entrepreneurial picture demands holistic and wise acting and motivation to commonly develop these two "opponents".

Experience has shown that an organization needs profound experts to develop a sustainable service business, because product experts often start to think about services when the product is already completely developed. However, services need to be designed. The commoditization in almost every product business in the globalized world is creating a tremendous pressure on industries. Therefore, it is essential for an organization to understand and assimilate the necessity to provide solutions in the field of services and to initialize innovation for a successful change.

All stakeholders (entrepreneurs and management) need to understand that products and services need to go hand in hand to be successful. The future value creation is going to be hybrid. Furthermore, a common big entrepreneurial picture demands holistic and wise acting as well as motivation to commonly develop these two "opponents".

Experience has shown that an organization needs profound experts to develop a sustainable service business, because product experts often start to think about services when the product is already completely developed. However, services need to be designed simultaneously to products to provide the right solution to customer demands before, during and after product sales. Walking in customers (services) shoes right from the get-go will help to reduce risks of non conformance and increase customer acceptance.

By using the right methodologies (e.g. Open Innovation, crowd sourcing, design thinking, lead user involvement, etc.) modification can be supported

(continued)

and barriers within the organizational can be overcome. These barriers can be:

- “Not invented here” syndrome (overcome by early customer involvement or crowd sourcing/co-creation approach internally)
- “Chinese Whisper” problematic (overcome through co-creation with direct and diverse broad involvement of customer and/or employees into the process)
- Sales refusal (higher acceptance can be realized through collaboration at early stage development or product lifecycle management)
- Customer acceptance of new approaches can be increased to the greatest extent through inclusive discussions and a deeper understanding of the customers’ needs
- Activation of an organization’s “immune system” through missing or ineffective change management (defreeze—move—refreeze). The authors experience is, that through extensive involvement (e.g. cross-organizational collaboration developments on a common platform) increases the develop its services business

Andy Neely

Setting the Stage – Annotations by the Editors

Whilst the service sector itself has been the focus of increasing attention we should also note a parallel trend in the area of manufacturing. In order to survive in a global marketplace, manufacturing firms in the older industrialised countries are now recognizing that they have to move up the value chain, innovating and creating ever more sophisticated products and services, so they do not find themselves in the position of having to compete on the basis of cost alone.

The former dichotomy between product and service has been replaced by a service-product continuum. Many products are being transformed into services. To give one example: The software manufacturer IBM treats its business as a service business. Even if they still manufacture computers, IBM sees all physical goods as an element of the “business solutions” industry. One reason for that development is that the price elasticity of demand for “business solutions” is much less than for hardware. So there has been a corresponding shift to a subscription pricing model. As a result, IBM is now receiving a steady stream of revenue for ongoing contracts, rather than receiving a single payment for a piece of manufactured hardware.

While this strategy is proving increasingly popular with policy makers and academics, there is limited empirical evidence to explore the extent to which it is being adopted in practice. To help fill this gap in the literature, Andy Neely tackled this topic in a study (Neely, 2008) with an overall perspective on servitisation and this chapter presents some of the findings. Data from 10,028 firms incorporated in 25 different countries formed the basis on which to explore the experience of ‘servitisation’. Some of the key findings are: “... manufacturing firms in developed economies are adopting a range of servitisation strategies ...while the manufacturing firms that have servitised

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are larger than traditional manufacturing firms in terms of sales revenues, at the aggregate level they also generate lower profits as a % of sales . . . In smaller firms servitisation appears to pay off, while in larger firms it proves more problematic . . .” (Neely, 2008, p. 103).

In particular the chapter looks at the German experience using a data sample of 4,080 firms located in Germany. The chapter looks at the reasons why firms servitise, and the range and extent of services offered by German firms. The data on the German firms are contrasted with data from other European countries and are also compared to data from the BRIC countries. The chapter offers a glimpse into the future and asks what role services might play in the future of German manufacturing success.

4.1 Servitisation in Germany: An International Comparison

Manufacturing is undergoing a revolution. Across many industries and in many countries we see manufacturing firms shifting their focus to services and solutions. Instead of selling products, they are seeking to sell the outcomes their products deliver. Apposite examples include “power by the hour”—selling thrust rather than airline engines in the aerospace industry; “yield by the field”—selling data on equipment positioning and harvesting rates in the agricultural industry and “data on demand”—selling access to movies and music in the entertainment industry.

The purpose of this chapter is to explore the phenomenon of servitisation in Germany. Using secondary data we explore the extent and range of servitisation, contrasting “pure” manufacturing firms with “servitised” manufacturing firms. This analysis is performed using data drawn from the CapitalIQ database. The master sample is constructed using three criteria. First, all firms included are classified as manufacturing firms, according to their SIC codes. Second, all firms included employ over 100 people. Third, all firms included are incorporated in either one of the traditional developed economies—France, Germany, UK and USA—or one of the emerging BRIC economies—Brazil, Russia, India and China. The complete sample includes 43,044 firms. 539 of these have declared bankruptcy, so the usable sample is 42,505 firms. Of these 67.30 % are primarily located in the United States (28,606 firms), 9.60 % in Germany (4,080 firms), 8.16 % in the UK (3,467 firms), 5.20 % in China (2,210 firms), 5.06 % in France (2,149 firms), 3.23 % in India (1,375 firms), 0.90 % in Brazil (384 firms) and 0.55 % in Russia (234 firms). The data are analysed at both the international and, for Germany specifically, the regional level.

The chapter consists of five main sections. The first explores the reasons why firms are servitising, categorizing these drivers in terms of: (i) strategic; (ii) economic; (iii) technological and (iv) the environment. The second section presents data on the German economy, illustrating the range and extent of services offered by German firms. In the third section, the data on the German firms are

contrasted with data from other European countries—the UK and France, as well as data on the US economy in order to enable international comparison. The fourth section introduces data from the BRIC countries to illustrate emerging competitive challenges. Finally, in the fifth section the article turns to the question of the future and asking what role services might play in the future of German manufacturing success.

4.2 Factors Driving the Shift to Services

At the outset it is worth considering the reasons why manufacturing firms are said to be servitising. Typically these are categorised under three main headings—economic, strategic and environmental—although a fourth heading, “technology”, is also worth including.

4.2.1 The Economic Reasons for Servitising

In terms of the economic rationale for servitisation, the first reason people offer is the challenge of competing on cost, a rationale often cited by Governments in developed economies. The challenge is simple—there are many sources of low cost products around the world and so manufacturers in developed economies, with their high labour costs, have to seek new and innovative ways of competing. One option is to shift the focus of competition away from the product towards new, valuable and innovative solutions—including services. Hence servitisation is proposed as a way for manufacturers in developed economies to compete.

The second economic rationale for servitisation is the installed base argument. This is particularly important in capital goods industries, where products have long-life cycles, for here the installed base can be significant. In 2010, for example, Boeing had 19,410 commercial planes in operation and delivered 462 new planes, giving a ratio of 42 operational planes for every new plane delivered. Given that planes have an operating life of 30–40 years, providing maintenance and support service through the entire product life for the installed base is a significant market opportunity. Indeed generally, people quote a ratio of 4:1 in terms of lifetime product value. If a piece of capital equipment sells for €1 million then typically it will consume around €4 million in spares and consumables through its working life. To ignore this market opportunity would be very short sighted indeed for any manufacturer.

The third economic rationale—and one that has been particularly important in recent years given the relatively sluggish European economy—is stability of revenue. In many capital goods industries, product revenues can be lumpy. Significant revenue is gained when products are sold and delivered, but this doesn't happen every day. Ongoing service and support activities provide a more stable revenue stream, which can smooth the effect of lumpy product sale revenues.

The fourth economic rationale is service as a pre-sale activity. Most organisations see service as a post-sale activity—we service and maintain assets once they have been purchased—but some recognize service is a pre-sale opportunity. Indeed Caterpillar talk about the first sales being made by the sales department and every subsequent sale being made by the service department. Likewise Volvo Cars runs an active programme with their dealers where they seek to persuade them that every service encounter is also an opportunity to build customer loyalty and hence secure a repeat purchase—hence service as a pre-sale. The data from Volvo are illuminating: they clearly show that, at least for Volvo Cars, repeat business is a function both of product quality and service quality. Even when a customer rates the product quality highly, the likelihood of them purchasing from the company again is significantly adversely affected by poor service quality.

4.2.2 The Strategic Reasons for Servitising

In strategic terms there are four key reasons for servitisation. The first is to lock in your customers. In many ways this is a traditional business model that has been used for years. Products are sold at or slightly above cost, but money is made on the provision of spares and consumables: think of razors and razor blades; printers and ink cartridges; even cars and the spares used when serviced. A related rationale is locking out competitors. This is especially important in industries with a high installed base. As demand for high margin service and support grows, new entrants are attracted to the services market. Many original equipment manufacturers are choosing to undertake a strategic shift to become a partner to their customers, and in doing so, seek to lock out potential new entrants to the services market.

The third strategic rationale is increasing differentiation—some customers value the stability that service and support contracts offer. A fixed price can mean predictable maintenance costs and a transfer of risk from the customer to the service provider. These benefits provide a differentiation advantage to original equipment manufacturers. And the final strategic rationale is customer demand—in the sense that customers demand that their providers offer service based contracts. In public procurement, particularly the defence sector, this is becoming an increasingly important trend. Government Departments are asking original equipment manufacturers to contract for capability. The Government Departments are willing to buy the right to use the assets (ships, ground vehicles and planes), rather than taking ownership of them. An interesting by-product of this is that the incentives of the original equipment manufacturers are now aligned with their customers. It is in everyone's interest for the asset to be available and working as the provider of the asset only gets paid when the asset is being used.

4.2.3 The Environmental Reasons for Servitising

A potentially increasingly important, rationale for servitisation is the environmental rationale. Here the idea is to question whether transfer of asset ownership is necessary. Think of car sharing schemes, such as StreetCar and ZipCar, or DVD sharing schemes, such as Netflix. Do consumers really need to take physical ownership of assets or can we share access to them, thereby reducing the environmental impact in terms of production. Indeed one can argue that—especially for assets that can be digitized, there is no need to produce a physical asset anymore. We don't need to print books, create DVDs, or manufacturer CDs. Instead the data that enables people to access to content can be shared electronically, thereby eliminating the need for production and the costs of physical distribution.

4.2.4 The Technological Reasons for Servitisation

A final set of reasons for servitisation lie in technology. On the one level, technology is simply an enabler of servitisation, but as with many technological innovations—the mere existence of the technology means that people will seek to exploit it. As the world becomes more instrumented and ever greater volumes of data are collected on assets remotely, the potential for new and innovative services grows. Construction equipment is remotely monitored and the data used to make predictions about engine wear and the need for service and support. GE has models that allow it to recommend to the customer the routes their airplanes should fly so as to extend their engine life. When planes fly over deserts the sand causes pitching in the engine, but a different form of wear and tear occurs when planes fly over oceans. So GE now recommends to its customers how long their planes should fly to the Middle East and when they should switch routes and start flying over the ocean to the US. These predictive analytic models are becoming more and more widespread in industrial circles, as well as in healthcare, insurance and finance. The technology—and particularly the ability to capture and analyse “big data” opens up some new opportunities for service innovation.

4.3 What Do We Know About Servitisation in Germany?

So let us turn to Germany and ask what we know about servitisation in the German economy. The CapitalIQ database contains data on registered companies around the world. For the purpose of this study we selected companies with manufacturing SIC codes, employing over 100 staff, with both their country of incorporation and their primary location identified as Germany. This sampling strategy yielded 4,067 separate German manufacturing firms. For each of these firms we downloaded and analysed the “business description”, a short textual summary of the main activities of the firm. We searched for keywords that related to services and when these were found in the business description we categorised the firms as servitised,

Table 4.1 Overall sample of firms broken down by state

Primary state	Freq.	Percent	Cum.
N/A	327	8.04	8.04
Baden-Württemberg	812	19.97	28.01
Bavaria	682	16.77	44.78
Berlin	74	1.82	46.59
Brandenburg	35	0.86	47.46
Bremen	38	0.93	48.39
Hamburg	89	2.19	50.58
Hessen	296	7.28	57.86
Lower Saxony	309	7.60	65.45
Mecklenburg-Wester Pomerania	31	0.76	66.22
North Rhine-Westphalia	890	21.88	88.10
Rhineland-Palatinate	146	3.59	91.69
Saarland	27	0.66	92.35
Saxony	108	2.66	95.01
Saxony-Anhalt	56	1.38	96.39
Schleswig-Holstein	76	1.87	98.25
Thuringia	71	1.75	100
Total	4,067	100	

as long as there was also evidence that the firms were still involved in manufacturing. In those cases where there was no evidence of manufacturing activity, we classified the firms as “pure service” and in those cases where there was no evidence of service activity we classified the firms as “pure manufacturing”.

This analysis revealed that of the 4,067 German firms, 71.23 % (2,897 firms) were identified as pure manufacturing firms; 25.35 % (1,031 firms) as servitised firms; and 3.42 % (139 firms) as service firms. Table 4.1 breaks down the data by state/region, with Fig. 4.1 highlighting the proportion of servitised firms in each region.

Given the strength of Germany’s small and medium sized businesses, it is worth looking at the relative size of these servitised firms. The total sample includes firms employing between 100 and 552,425 people, with an average number of employees of 1,585. As expected, the distribution of the firm sizes is heavily skewed towards smaller firms, with less than 2.5 % of firms employing over 10,000 people and 64 % employing 500 people or less. To explore the relationship between firm size and the extent of servitisation, the sample was split into 10 segments, each containing around 10 % of the total number of firms. Table 4.2 summarises the results of this analysis, clearly showing a spike in levels of servitisation amongst the largest 10 % of German firms.

As well as firm size it is interesting to explore which manufacturing subsectors are most prone to servitisation (Table 4.3).

Unsurprisingly, we see the highest levels of servitisation in the industrials sector. This sector consists of 1,424 firms, spread across 21 separate primary industries. Seven of these primary industries have over 50 firms in their respective

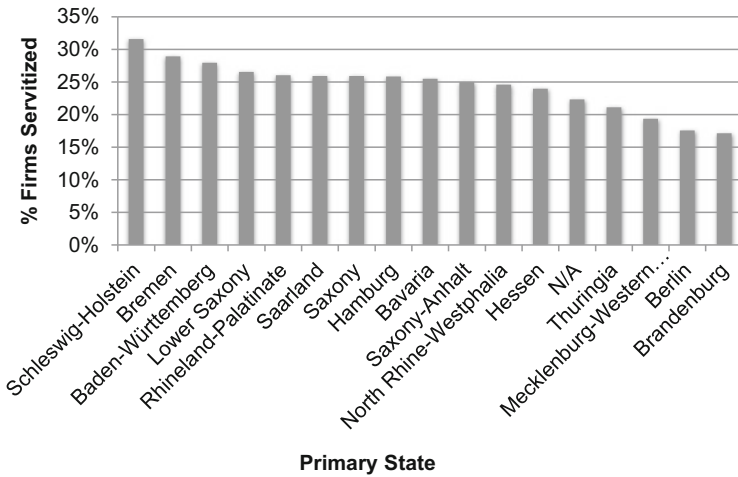


Fig. 4.1 Percentage servitized German manufacturing firms by state

Table 4.2 Percentage servitized German manufacturing firms by size

Number of employees	Number of firms	Servitized (%)
100–133	409	21.76
134–170	447	17.23
171–205	366	19.40
206–260	405	23.21
261–340	411	24.33
341–447	402	26.12
448–607	408	24.75
608–1,000	420	27.86
1,001–2,074	393	28.50
2,075–552,425	406	40.64

sub-samples. The data suggest that levels of servitisation are highest in: (i) construction and engineering (56.30 % servitisation, sample size = 135 firms); (ii) construction and farm machinery (50.88 %, sample size = 114); (iii) heavy electrical equipment (49.25 % servitised, sample size = 67 firms); (iv) aerospace and defence (49.09 % servitised, 55 firms in sample); and (v) industrial machinery (42.37 % servitised, 668 firms in sample).

4.4 How Does This Contrast with France, the UK and the US?

To contrast the levels of servitisation in Germany with other countries, we created a second sample using the CapitalIQ database. This sample included all firms with manufacturing SIC codes employing 100 or more staff, with a primary country of incorporation being Brazil, China, France, Germany, India, Russia, UK or USA.

Table 4.3 Overall sample of firms broken down by sector^a

Primary sector	Freq.	Percent	Cum.	Servitized (%)
N/A	215	5.29	5.29	0.00
Consumer discretionary	726	17.85	23.14	12.95
Consumer staples	294	7.23	30.37	9.52
Energy	22	0.54	30.91	13.64
Financials	17	0.42	31.33	23.53
Healthcare	269	6.61	37.94	25.65
Industrials	1,424	35.01	72.95	40.03
Information technology	416	10.23	83.18	37.74
Materials	676	16.62	99.80	15.68
Telecommunication services	3	0.07	99.88	
Utilities	5	0.12	100	
Total	4,067	100		

^aNote small sample size for telecommunication services and utilities, so % servitization figure not included for these sectors

This sampling strategy produced a database of 42,505 firms. The database is dominated by US and Western firms—US firms form 67.30 % of the total sample and Western firms 90.11 % of the total sample. So this section compares the levels of servitisation seen in Germany with those seen in France, the UK and the USA. Table 4.4 provides summary statistics for the sample.

As Table 4.4 shows, the levels of servitisation are slightly lower than the UK and the USA, although significantly higher than in France.

An interesting question is whether the level of servitisation varies in terms of company size within countries. In order to explore this issue, the sample was split into ten equal sized segments, based on the numbers of employees. Figure 4.2 shows the percentage of servitised firms in each size category by country.

As might be expected the levels of servitisation increase with firm size. 49.79 % of the largest US manufacturing firms, for example, have servitised. The comparable figures for the UK and Germany are 48.45 % and 40.17 % respectively. Interestingly, the levels of servitisation amongst the largest German firms (40.17 %) are lower than amongst the largest French firms (43.04 %). A reversal of the pattern observed at all other levels of firm size.

The other way of looking at the data is to contrast levels of servitisation within different sectors within countries. As Table 4.5 shows, the highest level of servitisation occurs in the information technology sector in the US (where 53.41 % of manufacturing firms have servitised). The lowest levels of servitisation occur in the French consumer staples and discretionary sectors—5.56 % and 8.78 % of firms respectively. Within Germany the highest levels of servitisation occur in the industrials sector (39.99 % of firms having servitised) and the information technology sector (37.80 % of firms having servitised).

Table 4.4 Overall sample of firms broken down by country

Primary country of incorporation	Manufacturing firms (%)	Servitized firms (%)	Service firms (%)	Total firms
France	1,638 (76.22)	387 (18.01)	124 (5.77)	2,149
Germany	2,907 (71.25)	1,034 (25.34)	139 (3.41)	4,080 ^a
UK	2,189 (63.14)	986 (28.44)	292 (8.42)	3,467
USA	18,436 (64.45)	8,765 (30.64)	1,405 (4.91)	28,606
Total	25,170	11,172	1,960	38,302

^aWhen the primary country of operations is included this figure drops to 4,067 firms as 13 firms are incorporated in Germany, but have their primary country of operation elsewhere

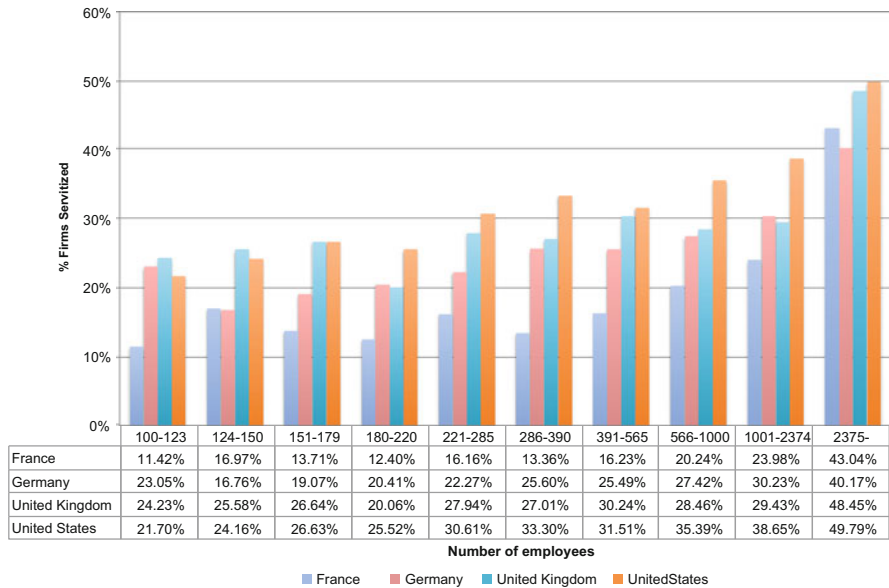


Fig. 4.2 Percentage servitized firms by size by country

Table 4.5 Percentage servitized firms by primary sector by country

Primary sector	Country			
	France	Germany	UK	USA
Consumer discretionary	8.78 %	12.89 %	20.10 %	16.60 %
Consumer staples	5.56 %	9.52 %	19.95 %	29.47 %
Energy	38.46 %	13.64 %	32.06 %	36.74 %
Healthcare	17.27 %	25.65 %	30.94 %	33.68 %
Industrials	32.81 %	39.99 %	41.89 %	35.93 %
Information technology	31.76 %	37.80 %	37.97 %	53.41 %
Materials	12.14 %	15.76 %	20.45 %	27.01 %

Table 4.6 Overall sample of firms broken down by country

Primary country of incorporation	Manufacturing firms (%)	Servitized firms (%)	Service firms (%)	Total firms
Brazil	331 (86.20)	42 (10.94)	11 (2.86)	384
China	1,875 (84.84)	316 (14.30)	19 (0.86)	2,210
Germany	2,907 (71.25)	1,034 (25.34)	139 (3.41)	4,080 ^a
India	1,026 (74.62)	333 (24.22)	16 (1.16)	1,375
Russia	182 (77.78)	45 (19.23)	7 (2.99)	234
Total	6,321	1,770	192	8,283

^aWhen the primary country of operations is included this figure drops to 4,067 firms as 13 firms are incorporated in Germany, but have their primary country of operation elsewhere

4.5 How Does Germany Compare with the BRIC Countries?

As mentioned previously, data were also gathered on the BRIC countries—Brazil, Russia, India and China. While the sample size is smaller here it is still interesting to contrast the German position with the BRIC countries. Table 4.6 provides summary data for the overall sample, highlighting that.

Consistent with arguments that servitisation might offer a route for manufacturing firms in developed economies to compete, levels of servitisation are higher in Germany than the BRIC countries, with the closest being India (24.22 % of firms servitised) versus 25.34 % in Germany.

Figure 4.3 repeats the analysis, but this time controls for firm size. It is interesting to note the relatively high levels of servitisation for Russian firms with between 124 and 179 employees, although it is worth noting this may be a function of the sample size of Russian firms (as there are only 45 servitised Russian firms from a total sample of 234 firms). As with the developed economies, the levels of servitisation tend to increase with firm size, although the pattern is not as pronounced.

When looking at servitisation on a sector-by-sector basis, it is again the information technology sector where we see the highest levels of servitisation—particularly the Indian information technology sector, where 66.67 % of firms have servitised. Again, the lowest levels of servitisation are seen in the consumer discretionary and staples sectors, with 4.08 % and 5.77 % of Brazilian firms in these sectors servitising (Table 4.7).

4.6 What Are the Implications for Germany?

So what are the implications of these data for Germany? Several points emerge from the analysis. First, the levels of servitisation in Germany are higher than in the BRIC countries, but lower than comparator countries, especially the UK and the US. 25 % of German manufacturers have servitised, compared with 28 % of UK

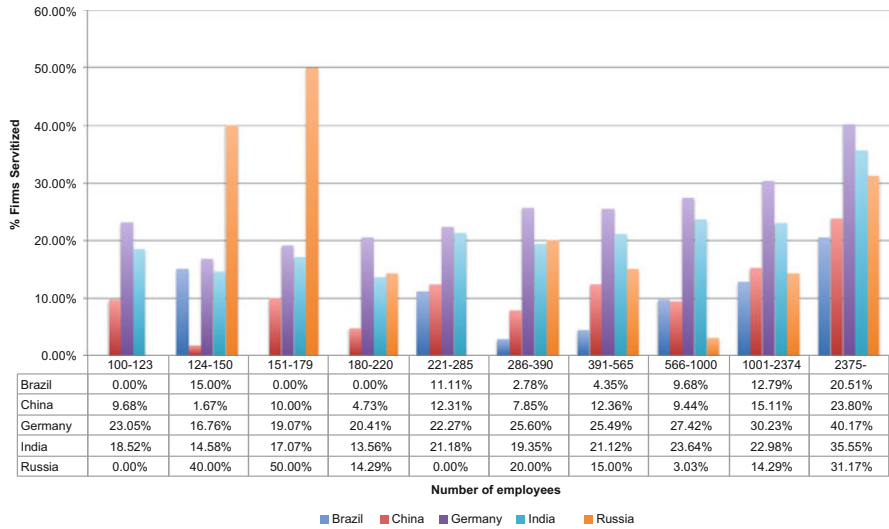


Fig. 4.3 Percentage servitised firms by size by BRIC country

Table 4.7 Percentage of servitised firms by primary sector by country

Primary Sector	Country				
	Brazil	China	Germany	India	Russia
Consumer discretionary	4.08 %	13.25 %	12.89 %	11.95 %	5.26 %
Consumer staples	5.77 %	8.19 %	9.52 %	11.35 %	9.52 %
Energy	45.45 %	28.57 %	13.64 %	45.16 %	26.67 %
Healthcare	3.33 %	18.12 %	25.65 %	34.51 %	20.00 %
Industrials	28.36 %	18.38 %	39.99 %	43.77 %	38.64 %
Information technology	13.33 %	25.08 %	37.80 %	66.67 %	25.00 %
Materials	10.99 %	9.72 %	15.76 %	13.37 %	16.42 %

manufacturers and 31 % of US manufacturers. This disparity is especially marked amongst the largest decile of firms. While 40 % of the largest German manufacturers have servitised, the comparable figures for the UK and the US are 48 % and 50 % respectively. In fact, Germany lies below France in terms of servitisation levels amongst the largest firms, as 43 % of large French manufacturers have servitised.

The first question that these observations raise is why is the level of servitisation in Germany is lower, especially amongst the largest manufacturing firms. A related question is how sustainable is the German position as levels of servitisation increase amongst the BRIC countries. For while levels of servitisation here are currently lower, data suggests that the BRIC countries—especially—China, are making significant efforts to boost their service economies.

At the level of individual sectors, we see the highest level of servitisation in Germany in the industrials (40 %) and IT (37 %) sectors. In the IT sector specifically, the levels of servitisation observed in Germany are lower than the US (53 %) and India (67 %). Again this observation raises the question of how sustainable the German position is if IT firms elsewhere in the world are seeking to sell outcomes and solutions, rather than individual products.

The industrial heritage of Germany raises an interesting question. For years German manufacturers have been seen as high quality, prestige manufacturers. The machine tool, electronics and automotive sectors are all excellent examples where German firms have a reputation for product quality and engineering. As consumer attitudes change, however, and their emphasis shifts towards buying the solution or outcome, rather than owning the product, the question must be asked: does the traditional German heritage become a hindrance to business model innovation? One could argue that organizations honed and configured to deliver excellent products are not necessarily best placed to design and supply world-class services and customer solutions. It will be interesting to see how German firms rise to this challenge and whether they decide to innovate their businesses towards services or continue to compete through excellence in product quality.

Expert's View

Prof. Anne Sigismund Huff

NUI Maynooth

Question: How and where will innovation in services increase productivity?

Anne Sigismund Huff: HOW: Service innovations that successfully increase productivity will often be about increasing the productivity of the customer. That means a change in mind-set for the producer. Companies are likely to underestimate the many ways 'ease of use' is interpreted by customers, for example. Customers may feel they are more productive if they can be more creative (as THEY define it).

WHERE: Customers are likely to use a service in ways that were not anticipated (I recently rented an airbnb in San Francisco, not to be a tourist, but to have good place to work for a few days—that increased my productivity, but there was little relevant information for making that choice in either the renter's description or on the airbnb site.).

Increased productivity is likely to be among new, lean producers. A lot can be learned from services offered in Africa and other places. A growth area does not involve consumerism, but doing good. Companies try to create the impression they are doing this—too few are credible. It is interesting to think of opting out (bombarded less by service) as a needed service. Similarly with transparency. Firefox now makes it possible to track who is tracing you, for example.

OTHER HOW & WHERE: Big data, driven in part by large companies with solutions to sell, is changing the face of service productivity. New services and productivity is being provided, but new costs are accruing which diminish productivity from a system wide perspective. This is not just about money, but quality of life, values, etc. both plus and minus.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Anne Sigismund Huff: Changing technology typically increases the rate of change, inhibiting rates of some companies, partnerships and industry sectors, while accelerating others, and morphs the overall landscape.

Similarly economic change: the recent downturn as inhibited productivity in some areas while accelerating it in others. I worry here that the benefits are accruing primarily for those who already have, and too often further disadvantaging those who are most pressed by economic pressures.

We are also seeing the increasing impact of social trends (e.g. Facebook has to admit that the number of 14 year olds and younger that use their site is shrinking.).

(continued)

Invention and innovation is certainly a fourth important factor, often driven by new participants/competitors. Newcomers are unlikely to operate in ways that incumbents understand (think of growth in Chinese social media sites). That inhibits reaction and slows change among incumbents but alerts other players to new opportunities.

A final thought for now (& fifth factor): current customers often are not thinking about what is new either. Their continued use and satisfaction with existing services inhibit the rate of change.

Bo Edvardsson

Setting the Stage – Annotations by the Editors

As previously shown, understanding what value means to customers and consumers (not just producers and suppliers), developing the capability to design and to deliver services rather than products and creating a service culture are essential for competitive service organizations (Neely, 2008). But how can this goal be achieved in practice? The good news is that significant progress has been made over the last 15 years. For instance, business schools started offering courses in service management, service operation and marketing and ‘services’ are now a recognised and discrete subjects in textbooks, journals, television and conferences. And in engineering schools, operations research and systems engineering are shifting their focus from manufacturing towards service operation and service value chains (Bitner & Brown, 2008; Spohrer & Maglio, 2009).

One subject which has emerged in this context is the establishment of a ‘service science’. Despite the remarkable rise in service-relevant research, manifested by an increasing number of monographs, journal articles and academic as well as practitioner conferences (Stauss, Engelmann, Kremer, & Luhn, 2008), no independent research discipline has yet been established (Satzger et al., 2010). There have been extensive discussions over the last decade regarding the necessity of such a science and some academics argue that the establishment of service science could be the emerging discipline that unites the many stakeholders and help to produce useful answers to “why companies and industries vary in their productivity,” or “why value migrates to different parts of the stack” (Chesbrough & Spohrer, 2006).

The next chapter, written by **Bo Edvardsson**, contributes to that discussion, arguing that productivity, as it has traditionally been defined, is a concept that belongs to an old school of thought on value and value creation in which value is

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linked to units of output described in terms such as goods, services, products, process material etc. The new school of thought suggests that value is not embedded in units of output but is rather co-created with customers and other actors. Goods, services, products, information, knowledge and processed material are understood as resources or enablers for actors' integration of and operation of these resources, in a specific context with a specific intention in mind. Value is assessed by these actors on the basis of value-in-use in their contexts. This will have major implications for how we understand and conceptualize the productivity concept in the future.

The chapter sheds light on service productivity from service-dominant (S-D) logic, service system and service innovation points of view and argues the need for a science of service.

5.1 Is Service Productivity in Need of Service-Dominant Logic and Service Science?¹

My take is that work on service productivity in general should focus more on increasing outcomes of co-created, contextual service (effectiveness) rather than reducing cost of (standardized) service (efficiency). That is not to say that efficiency is unimportant but much of our thinking seems to revolve around this. **Professor Tilo Böhman**, University of Hamburg, Department of Informatics Research Group IT Management & Consulting.

Service productivity involves tradeoffs with customer satisfaction, which means productivity improvement, is not necessarily good. Many firms improving service productivity today are focusing solely on cost reduction, while ignoring the damage to customer satisfaction and future revenues. The key to effectively managing service productivity is figuring out how to employ cost-cutting technology in such a way that customer satisfaction and service quality are improved, or at least maintained. **Roland Rust**, Distinguished University Professor and David Bruce Smith Chair in Marketing, Executive Director, Center for Excellence in Service and Executive Director, Center for Complexity in Business. Department of Marketing Robert H. Smith School of Business, University of Maryland.

5.2 Introduction and Aim

Productivity is commonly defined as the ratio between the output volume and the volume of input. In other words, it measures how efficiently resource inputs in production processes, such as capital, raw material, processed materials and components but also related services, are being used in an economy or a company

¹ I would like to express my gratitude for most valuable feed-back and suggestions on earlier versions of this manuscript to professors Evert Gummesson, Stockholm University Sweden, Thorsten Gruber, Loughborough University UK and Anders Gustafsson, Service Research Center-CTF, Karlstad University Sweden.

to produce a given level of output. Productivity is considered a key source of competitiveness and financial success over time.

Since the late 1990s, service productivity and innovation have attracted management attention in all OECD countries and not only in the service industry, but also traditional manufacturing companies have become dependent on services and service productivity. In most western societies, services today account for more than 70 % of the gross national product (GDP) according to the official statistics. However, services in manufacturing companies most often are included in the goods production which of course is wrong. “An unsolved problem that has been swept under the carpet is the fact that goods and services always appear together” (Gummeson, 2007, p. 113). Thus services are even more important than is shown in the statistics. It is not physical products that drive productivity in the economy but services and service systems. This will be even clearer in the future since we have entered a service-driven economy. Companies must improve their processes, including productivity or to differentiate their services to outperform their competitors, measured in terms of market share, profitability, growth and market capitalization (Tidd, 2001). Moreover, increased focus on service productivity is related to service innovation, renewal and growth in many companies and political ambitions to strengthen the competitiveness in the future.

In a working paper on Service productivity strategies 2009 from Marketing Science Institute (MSI) in the U.S. Rust and Huang argue that since “service becomes an ever-larger part of every developed economy; service productivity has increasingly become the focus of attention” (2009, p. 2). Many companies are using information and communication technology (ICT) to utilize automation more extensively, reduce the use of labour, create new distribution channels and increase service productivity. However, they put forward that the risk of cutting cost by introducing technology to the expense of customer satisfaction which might hurt profitability and has a negative impact on long term productivity.

The need for more attention to be paid to service productivity management has during the last 10 years resulted in a growing body of literature dealing with the phenomenon. Lehmann et al. “systematic analysis of the publications revealed that research on service productivity is embracing a multitude of strands and theories, including knowledge management, resource-based management, operation management, and capacity and relationship theories” (2011, p. 5). They suggest that future research on service productivity should focus on service innovation.

Since productivity becomes more and more important, issues related to conceptualisation, understanding and measurement of service productivity drivers and pre-requisites need to receive adequate attention. This was already put forward by Gummeson in 1987 who argued, with reference to the telecom equipment provider Ericsson, that “it is necessary to consider servicing at the design stage in order to eliminate as much of the repair and maintenance as possible and make the product easy and economical to service” (p. 161). In 1998 Gummeson argued: Unless an organization is able to continuously improve service productivity and innovate, it risks being left behind as others take the lead in changing their offerings, their operational processes or the underlying service excellence models

which drive their business. “Quality, productivity and profitability are triplets; separating one from the other creates an unhappy family” (Gummesson, 1998, p. 6). The “triplets” all serve the purpose of making operations efficient, both for the supplier and the customer. Goods and services are not two distinct categories (Gummesson, 2012). Instead goods as well as services are resources enabling the co-creation of value with customers. Service is what products and services do for people and organizations. Service productivity with this view is focused on value in use for the engaged beneficiaries, not least customers.

The perspective of value creation during the last 10 years or so has switched focus from a value-in-exchange view where value for customers is embedded in units of output (products and services) to a value-in-use view where value is co-created with customers and other actors in value-generating processes (Edvardsson, Tronvoll, & Gruber, 2011; Grönroos, 2008). This is referred to as a shift from traditional goods-dominant (G-D) logic with the focus on the exchange of goods to a service-dominant (S-D) logic focusing on the co-creation of value (Vargo & Lusch, 2004, 2006). Value, and also productivity, has to do with using products and services in a specific context (Gustafsson, Kristensson, & Witell, 2012), guided by a value proposition and with actors having specific intentions or outcomes in mind. The result is a broadened role and engagement on the part of the customer in value creation (Prahalad & Ramaswamy, 2004). Customers become part of the value creation system and not exogenous (Edvardsson et al., 2011; Spohrer et al., 2007) and are able to tailor the process and outcome to their needs, which results in an enhanced value creation (Kristensson, Matthing, & Johansson, 2008).

The service economies are in a transformation, shaped by service infusion in manufacturing, technology infusion in service and a focus on customer experiences and personalization. The digital society and Internet create the connected global village and smarter use of resources with implications for service productivity. How to successfully lead and manage for service productivity and innovation is a burning, strategic question in many companies and governments. Understanding service productivity becomes a critical issue and a management challenge. According to S-D logic, service involves applying actors’ resources for the benefit of others or oneself. S-D logic focuses on using resources in new and smart ways which is a cornerstone in service productivity development. This mind-set is applicable to business organisations, government organisations, non-profit organisations, households, and individuals. It is also particularly consistent with service concepts from IT, such as service-oriented architecture, software as a service, and, more broadly, services computing (Zhao, Tanniru, & Zhang, 2007).

In this chapter I will argue that productivity, as it has traditionally been defined is a concept that belongs to the old school of thought on value and value creation in which value is linked to units of output described in terms such as goods, services, products, process material etc. The new school of thought suggests that value is not embedded in units of output but rather co-created together with customers and other actors. Goods, services, products, information, knowledge and processed material are understood as resources or enablers for actors’ integration of and operation on

these resources, in a specific context with a specific intention in mind. Value is assessed by these actors on the basis of value-in-use in their contexts. This will have major implications for how we understand and conceptualize the productivity concept in the future. In this new school of thought, actors (customers, employees and other involved actors in a network or value-creating eco-system) will have a major influence on resource utilization in value co-creation processes—and thus influence productivity—with their knowledge, skills and motivation as well as the norms and rules shaping all economic and social actors. Productivity thus becomes actor centric, systemic, interactive and relational in nature and outcome related rather than output related. It is not about products or resources as such but about the use of these resources in practices and the resulting outcomes, not outputs. Furthermore, service productivity has more to do with customers' and other actors' resource utilization in service eco-systems rather than output per work hours among employees. In the new school of thought, service productivity has also to do with sustainable innovation and how a company's offerings enable the customer to improve his/her productivity in life or business.

The traditional view on productivity is not fruitful or even applicable if we want to understand the drivers and prerequisites of service productivity through the S-D lens as a basis for strategic decisions for the future. Zolnowski, A., Semmann, M., Amrou, S., Böhmman, T. argue that “Traditional goods-dominant productivity concepts assume that an increased productivity can be achieved by minimizing the inputs with constant outputs and a given quality. These concepts are not applicable to services, because, on the one hand, the definition of a single service unit is not trivial. On the other hand, the assumption of a given quality is not applicable for services, because a variation of input factors leads to a changed perceived quality (Grönroos & Ojasalo, 2004)” (2013, p. 412).

Grönroos and Ojasalo (2004) developed a service productivity model based on three pillars; internal efficiency, external efficiency and capacity efficiency. In their model which I will build on, the focus is on the integration, transformation and use of resources to create attractive outcomes. Service productivity is a measure related to the utilization of input resources in a transformation process to create value in cooperation with the customer (Grönroos & Ojasalo, 2004; Parasuraman, 2010) and we may add other actors that are engaged.

We may assume that 20 years from now, service will be the norm and goods a special case. Service will be a concept that denotes what goods, services and systems do for customers. Service will be a widely accepted perspective on value creation and customers and other engaged actors integrate and use different resources such as goods, services, information and knowledge to co-create value for themselves and others. Value is assessed on the basis of value in use in specific contexts. Thus, value in use for the involved customers and other beneficiaries will be focused on. The meaning of service productivity will most likely be related to smart resource integration, utilization and outcomes rather than the relations between input and output. We will have a shift in focus from providers and output to customers and users and their realization of value.

The aim of this chapter is *firstly*, to discuss service productivity from S-D logic, service system and service innovation points of view. *Secondly*, I will discuss the need for a science of service and *thirdly* provide some managerial implications and suggestions for future research. The rest of the chapter is structured as follows: (1) Service productivity, (2) Service-dominant logic and service eco-systems, (3) A framework for analyzing service systems, (4) Service innovation and service productivity, (5) S-D logic and a science of service and (6) Managerial implications and suggestions for future research.

5.3 Service Productivity

To illustrate the interest in and focus on service productivity for the future development of countries and economies, one study from Japan and one from Canada will be briefly presented. A study in Japan carried out by Kyoji at The Research Institute of Economy, Trade and Industry examined three issues: how bad the productivity performance in Japan's service sector has been; why it is important to accelerate productivity growth in the service sector; and why productivity has stagnated in Japan's service sector. The main findings are: "First, productivity growth in the manufacturing sector is much higher than that in other sectors, although the manufacturing sector's share is declining rapidly. For Japan, whose population is declining, productivity growth in the service sector is an important driver of economic growth. Second, productivity growth in ICT-using sectors declined substantially after 1995. Third, accumulation of ICT assets in Japan was very slow in comparison with other developed countries. Forth, the low level of intangible investment is probably one important cause of the stagnation of TFP; another is that Japan's service sector has fallen behind with regard to investment in ICT. Fifth, it seems that Japan's low metabolism also impedes productivity growth. Sixth, firms invest little in on-the-job training and off-the-job training for part-time workers, and the increase in part-time workers may have slowed down human-capital accumulation. Seventh, it appears that Japanese firms have fallen behind in terms of internationalization and economies of scale." (2010, p. 2).

Deloitte in their study "The future of productivity 2013" argues that "despite 30 years of government policy reforms and new incentives, Canadian productivity still isn't growing as fast as it is in the U.S. and many other countries. Canada's output per worker was 78 % that of the U.S. in 2011. Canada's 0.7 % annualized labour productivity growth (2001–2009) puts the country in the bottom quartile when compared with other OECD countries. An average U.S. worker generates \$13 more per hour than an average Canadian worker. An average Norwegian worker generates \$29 more per hour. Yet Canadian companies, especially service organizations, aren't making the innovation and productivity investments they need" (p. 10).

There are different measures of productivity and the choice between them depends either on the purpose of the productivity measurement and/or data availability. One of the most widely used measures of productivity is Gross Domestic

Product (GDP) per hour worked. This measure captures the use of labour inputs better than just output per employee. In principle, the measurement of labour inputs should also take into account differences in workers' education, knowledge, skills and experience. Furthermore, this way of defining productivity does not include customers' input which is so important since service is understood as being co-created with customers.

In the case of a company, 'output' can be taken as the number of products manufactured per hour, week or year, whilst 'input' refers to the machinery, materials and other resources required, creating those products within a given time frame. The key to cost effective improvements in output is to ensure that the relationship between input and output is properly balanced, including the price that can be charged. To conclude; productivity can be measured by dividing average output per period e.g. hour, day, month or year by the total costs incurred or resources such as capital, material, energy, labour cost, services used in that period. This is the way service productivity also has been defined and measured. However, this is now outdated and irrelevant! More important and relevant is to focus on the productivity in the world and contexts of customers and their use-practices.

Johnston (2005) found it surprising that so little empirical research has been conducted in the area of service productivity given its impact on organizational costs and he provided a structure for analyzing productivity in service organizations by distinguishing between operational and customer productivity. Grönroos and Ojasalo (2004) argue that it is meaningless to develop a service productivity concept based on the management of internal efficiency and quantity of output only: "Because of the characteristics of services and the service process, the management of external efficiency of the output (how service quality is perceived) has to be an integral part of a service productivity concept" (Grönroos & Ojasalo, 2004, p. 417). Service productivity is understood mainly from the point of view of the service provider; however, customer satisfaction as well as customers' knowledge, skills, role understanding and motivation also play a central role. The way customers are integrating and using resources to co-create value is of critical importance when analyzing service productivity. A new and customer centric approach to service productivity is needed and suggested in a model by Lasshof (2006). It illustrates the relationship between efficiency and productivity on the one hand, and, on the other hand, the relationship between productivity and the customer's influence. Because the customers' knowledge, skills and motivation are critical successful factors for service productivity, concurrent pursuing of the effectiveness and the efficiency must be guaranteed.

Rust and Huang built a rigorous theory of service productivity and used it to derive empirical propositions. The propositions are tested using data from more than 700 service companies in two time periods. The empirical analysis largely supports the theory. "Many important managerial implications emerge from the research, including (1) for a given level of technology, firms should seek an optimal level of productivity rather than try to maximize productivity; (2) as technology advances and automation costs decrease over time, the optimal level of productivity increases; (3) as price increases, the optimal level of productivity decreases; (4) as

the future is given more weight, the optimal productivity level decreases; (5) as customer retention is more sensitive to the level of service, the optimal level of productivity decreases; (6) as wages rise, the optimal level of productivity increases; and (7) for firms with higher sales and market share, the optimal productivity level increases.

The authors show that too myopic a viewpoint and/or pursuit of too high a level of productivity boost current sales at the cost of reducing the service level and future sales. Specifically, large service companies tend to be too productive, relative to the optimal level, and should place less emphasis on cost reduction through automation and more emphasis on providing good service. The authors also show that in a recession, relative use of labour should be greater and automation should be used relatively less” (2009, p. 1).

Research on the satisfaction-productivity trade-off in service companies shows that the use of technology, often in self-service contexts (Meuter, Ostrom, Roundtree, & Bitner, 2000) is used to reduce the cost of labour and to transfer activities from employees to customers which creates both uncertainties and opportunities. Identifying potential productivity improvements represents a special challenge in highly co-created services such as executive education, consulting or healthcare. Sometimes avatars or virtual agents are used (Köhler, Fueller, Matzler, & Stieger, 2011). The improved productivity as a result of self-service technologies and other technological methods of service delivery may depend on the tendency of the customer to accept or adopt new technology (Parasuraman, 2002). In a recent dissertation, Viitama (2012), based on an extensive literature review and case studies of two major banks concludes that through the inter-linkages between technology, resources and strategy, the determinants of service productivity can be identified and understood. These links can also be very different, even within the same industry.

Rust and Huang (2012) in their analysis of hundreds of U.S. companies show that there is an optimal level of productivity that depends on the level of technology. Factors that encourage the company to provide good service motivate the company to provide higher customer satisfaction and lower productivity, whereas factors that discourage the company from providing good service (e.g., fewer competitors, high employee wages) motivate the company to provide worse customer satisfaction and higher productivity. Zolnowski, Semmann, Amrou, and Böhmann (2013) focus on identifying opportunities for service productivity improvements and argue that in the context of highly co-created service such as higher education productivity has so far not been focused on. Thus, it is necessary and in the future even more so to consider education services and many other knowledge intensive services regarding their productivity. The productivity of these services is measured related to the utilization of input resources in a transformation process to co-create value with and for the customer and other involved beneficiaries (Grönroos & Ojasalo, 2004; Parasuraman, 2010). Thus, it is necessary to take a more comprehensive point of view and not just focus on internal resources and activities and widen the scope to include engaged actors beyond customers and employees of a service provider.

To sum up, service productivity has mainly been conceptualized and defined in the same way as physical products. Services have been treated as a special category of market offerings and with a goods-dominant (G-D) logic. This has been much criticized however. Balci, Hollmann, and Rosenkranz (2011) argue that: “Service productivity . . . requires both measures of efficiency—how effectively input resources are transformed to outputs in the form of services—and measures of effectiveness—how well the quality of the service process is perceived—because a service process will not be productive if it is only efficient but not effective” (p. 10). They conceptualize service productivity as a function of efficiency, effectiveness, and demand and conclude that service productivity and service quality should not be managed in separate processes. In services, quality and productivity are truly two sides of the same coin (Gummesson, 1998). We may conclude that service productivity so far has been conceptualized from a G-D logic school of thought. This is not scientifically correct if service is understood as a perspective on value creation and does not refer to units of output but outcomes of a value co-creation process—in which customers, employees and other actors contribute—in the context of a service system. I will argue for a shift in focus from output in terms of services to outcomes and thus realized value for the actors or beneficiaries involved.

5.4 Service-Dominant Logic and Service Eco-Systems

Peter Drucker said as far back as 1934 “It is the customer who determines what a business is. . . . What the customer thinks he is buying, what he considers value, is decisive—it determines what a business is, what it produces, and whether it will prosper. And what the customer buys and considers value is never a product. It is always utility, that is, what a product or service does for him” (p. 61). This is very much in line with an S-D logic mindset and value-in-use.

Gummesson (2007) claimed that the goods-services division represents a myopic production view, while the service economy is an expression of customer-oriented and citizen-oriented, value-enhancing offerings. A new era of research and management practice is now under way that will fight the battle for economic survival and hopefully and my belief is that 20 years from now, service logic will be the norm. Physical products are understood as enablers and resources in customers’ co-creation of value. Productivity has mainly to do with how customers and other engaged actors integrate and use resources and realized value, not potential value linked to products and services.

The concept service has often been defined in relation to physical products or goods; what goods are not (Edvardsson et al., 2005). Most definitions use activities, interactions and processes to describe the empirical phenomena service and specific characteristics have been put forward: intangibility, heterogeneity, inseparability and perishability or IHIP. According to S-D logic, a service is ‘the application of specialized competences (knowledge and skills), through deeds, processes, and performances for the benefit of another entity or the entity itself’ (Lusch, Vargo, & O’Brien, 2007, p. 15). S-D logic suggests that actors operate on or use resources

to co-create value for themselves and others and value is assessed in context. Products and services are understood as resources or enablers for co-creation of value (Vargo & Morgan, 2005; Vargo & Lusch, 2004, 2008, 2011). The distinction between goods and services thus becomes irrelevant. Value creation and productivity results from how customers, employees, and other actors integrate and operate on available resources, in line with value propositions (Lusch et al., 2007). It is a systemic and actor centric approach.

S-D logic suggests that products, services and other resources do not have value as such, but value is emerging in a co-creation process and will always be evaluated in-use (Vargo & Lusch, 2004) or in a social context (Edvardsson et al., 2011). Edvardsson et al. (2011) argue that service value co-creation and service exchange takes place between two main actors (“customer” and “provider”), who both are resource integrators and beneficiaries of the exchange. This service exchange takes place in a wider value-configuration space because both parties are also involved in wider networks, including other engaged resources and actors. These networks, and the beneficiaries themselves, can be understood as service systems that “survive, adapt, and evolve through exchange and application of resources—particularly knowledge and skills—with other systems” (Vargo et al., 2008, p. 146).

Service in the future will be understood as the outcome of a value co-creation process in which customers and other engaged actors are resource integrators. This integration is driven by activities and interactions as well as various resources which enable and facilitate value co-creation resulting in outcomes for the company and the customer(s) that is value-in-use labelled service. Service is input *and* outcome. Party A’s input (his/her service) is an outcome (service) for party B and vice versa. Service is exchanged for service. So by definition it has to be both input and outcome. The relevant outcome for both parties is “value” (different types of value for customers and companies; value is regarded to be idiosyncratic, experiential, contextual and meaning-laden (Vargo, 2009; Vargo & Lusch, 2008). It should be understood as a social construction (Edvardsson et al., 2011), customer or actor centric and as a function of local practices (Echeverri & Skålén, 2011).

Grönroos (2008) claims that value creation is best understood as a process that leads to the customer being better off in some way. Mele and Polese (2011) emphasize that the core mechanism of value creation is the integration of resources from several actors in accordance with their expectations, needs, and capabilities. The crux of value creation and service productivity is the often important interactions among actors, the interactions between actors and technology (e.g. self-service kiosks) and the range of interdependencies between resources, technology and the context related differences between use practices. Actors are resource integrators and resource integration requires process(es) and forms of collaboration. S-D logic makes a distinction between operand and operand resources. Operand resources are the elements on which ‘an operation or act is performed’, such as a car or a smart phone whereas operand resources are the ‘skills and knowledge’ employed by actors to act on both operand and other operand resources, to co-create value and thus realize value propositions for involved beneficiaries (Vargo & Lusch, 2004, p. 2). Thus, resources have no inherent value

in themselves but instead possess important potential value, depending on how they are operated on or used which has major implications for service productivity. S-D logic puts forward that resource integration encourages actors, including ordinary employees, to integrate multiple resources, for their own benefit and the benefit of others (Vargo & Lusch, 2008). Customer and other engaged actors thus have a major impact on service productivity.

Moreover, since S-D logic views goods as being merely vehicles for the provision of service, the company cannot unilaterally create value but rather can only offer value propositions that provide the prerequisites for customer value (Flint & Mentzer, 2006). In making the customer intrinsic to value creation (Merz, He, & Vargo, 2009), S-D logic adopts a process and outcome orientation rather than an output orientation (goods and services). It goes beyond using the company's output, such as products, services or information, to include resources in the customer's network as well (Moeller, 2008; Vargo & Lusch, 2008). This has major implications for how service productivity is understood and defined.

G-D logic has always emphasized the efficient production and distribution of goods (Vargo & Lusch, 2008). It has therefore failed to pay sufficient attention to the knowledge and skills applied by the customer when goods and services are used; which has major implications for understanding productivity. Moreover, G-D logic has failed to recognize that customers actually seek value by buying goods for the services they render, and not only for their attributes. In technical terms, there has been a shift in focus from operand resources to the application of knowledge and skills linked to operant resources. The differences between G-D logic and S-D logic have profound implications for both service productivity conceptualization and management practice.

The concepts resource integration, value co-creation and service for service exchange are almost impossible to understand without having a deep understanding of service systems (Vargo, Maglio, & Akaka, 2008). In fact, value co-creation and service exchange are embedded in service systems and Maglio, Vargo, Caswell, and Spohrer (2009) claim that service systems are the foundation for value co-creation. Service systems can be defined as value-co-creation configurations of people, technology, value propositions connecting internal and external service systems, and shared information (language, laws, measures, and methods) (Spohrer et al., 2007) or as "a composite of agents, technology, environment, and/or organization units of agents and/or technology, functioning in space-time and cyberspace for a given period of time" (Staniček & Winkler, 2010, p. 113). In the value co-creation process, which relies on actors' integration of and use of available resources, the basic function (or purpose) of a service system is to enable and direct actors to create and capture value (Spohrer et al., 2007).

Vargo and Lusch argue that "a system orientation is important to both academics and practitioners because it has different implications for understanding and applying principles of value co-creation, as is particularly essential in an increasingly interconnected, and thus increasingly dynamic, world." (2011, p. 3). Companies design and communicate value propositions, develop and manage service systems capable of realizing the new value propositions, and ensure that value co-creation

results in favourable, memorable customer experiences and for the providers profitability through service productivity and thus form the basis for a sustainable business. Vargo, Lusch, and Akaka (2010) call value creation configurations “service systems,” which Edvardsson et al. (2011) argue are always embedded in social systems, such that social forces in terms of norms, rules and habits shape actors, their value co-creation, and service systems in action.

During recent years the notion of service eco-system has been put forward. “One apparently quite viable framework is centered on ecosystems and ecological thinking and its application to organizations and business. The implication is that an organizational ecosystem functions much as a biological ecosystem does, and exhibits desirable properties that are similar to what one would see in nature” (Mars, Bronstein, & Lusch, 2012). Lusch and Nambisan describe a service ecosystem as “a spontaneously sensing and responding spatial and temporal structure of largely loosely coupled value proposing social and economic actors interacting through institutions and technology, to: (1) co-produce service offerings, (2) exchange service offerings and (3) co-create value. . . . The service ecosystem concept views actors as making value propositions to each other versus delivering or adding value. It also puts emphasis on the co-production and co-creation that occurs between actors in the service ecosystem and hence has a strong focus on collaborative processes. Institutions and technology are also central. Institutions can include such things as property rights, norms, and monetary systems. A variety of technologies hold service ecosystems together, but of foremost importance is information technology” (2012, p. 16).

Steve Vargo in a presentation in April 2013 defined service eco-systems as “relatively self-contained, self-adjusting systems of resource integrating actors connected by shared institutional logics and mutual value creation through service exchange”. Service eco-systems puts forward that service systems in action are no isolated islands but connected to and dependent on other systems that both enables and inhibit indented value co-creation. Eco-systems can (and should) be studied on a micro, meso or macro level and we should pay attention to the interdependencies between systems, including system levels in our analysis.

To conclude, using an S-D logic lens, service denotes a perspective on value creation and value is understood as co-created and actor-centric. Customers and other actors integrate and operate on or use products, services and other resources during co-creation processes in which potential value is being realized. Products and services are what they do for customers when being operated on. Value creation takes place in the context of service systems embedded in social systems. The role of a service system is to enable and direct value co-creation and innovation.

5.5 Service Innovation and Service Productivity

Schumpeter (1934) argued that economic development is driven by the discontinuous emergence of new combinations of resources (innovations) that are economically more viable than the old way of doing things. Innovation is about smart

integration and use of products, services, technology, knowledge and information and thus how they are becoming resources, enabling value creation in new and smarter ways. It may be argued that this will be a most important basis for service productivity research and management practice in the future.

Ostrom et al. (2010) argue that what makes a service innovative is often not the service per se, but the changing roles of customers, service companies, and partners in the value network, including how they interact. This is also the case with service productivity from a S-D logic point of view. Gallouj (2002) views service innovation as any change that affects one or more terms of one or more service characteristics or enabling resources. This view is based on a Lancasterian approach to the definition of a service. The characteristics are the company's direct competencies, clients' competencies, material and immaterial technical characteristics, and final users' value or service characteristics. The emphasis is on customers' and other actors' competencies and capabilities which also are important drivers of service productivity.

Service innovation is viewed by Gallouj and Savona (2009) as the fundamental basis for service productivity and can thus also be linked to new business models to capture value. A service innovation can consist of new services but also new technology, new organizational models, new ways in leadership, new procedures, customer experiences or business models. Service innovations can be radical or incremental, utilitarian, or experience-based. Due to the complex character of service and service innovation, many actors and trajectories can be involved such as: (1) users as a source of innovative ideas, (2) employees as a source of innovative ideas and acting as corporate entrepreneurs, (3) technological trajectories e.g. new technology and technology suppliers, (4) management trajectories—new management ideas and (5) new values and priorities in society.

It is often the case that service innovation and productivity improvements are a question of changing or extending the customer's role and capabilities or to combine existing resource configurations in new ways. The challenge is to mobilize existing resources (linked to the customer, the provider or other resources in the service system), such as knowledge, skills and motivation into co-creation of value.

The service innovation process refers to the various phases from an idea, through the development of a service, market launch and at least some acceptance of the new service in the market. The model presented below in Fig. 5.1, as a basis for discussing service innovation and productivity, has three main parts; stimulating innovations, realizing innovations and value capture including service business models. All these three dimensions of service innovation have implications for understanding service productivity from an S-D logic point of view. This forms the long-term and fundamental basis for service productivity and sustainable service excellence.

Through the lens of S-D logic, individual service innovations can be analyzed in order to unfold the generic resource constellations and value co-creation mechanisms that constitute successful service innovations. Three main dimensions are focused on; *stimulation*, *realization*, and *value capture*, see Fig. 5.1. These three

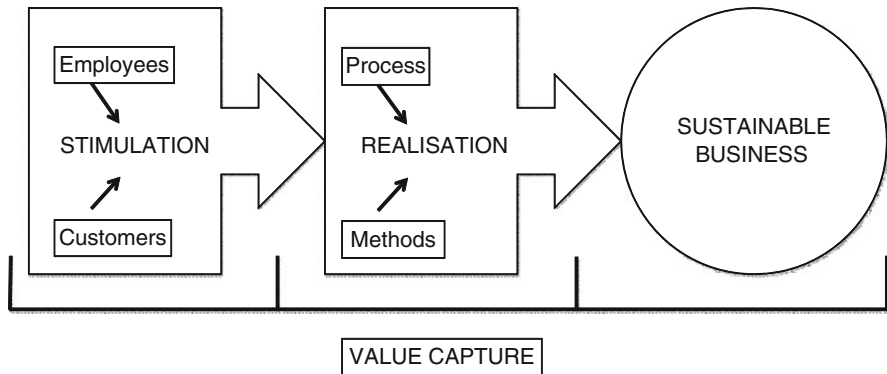


Fig. 5.1 A model over the relation between stimulating and realising service innovation and value capturing. Source: CTFs research application “The DNA of service innovation”

dimensions cover important issues related to the creation of sustainable business based on service innovation.

Stimulation: this first dimension concerns issues related to how to stimulate service innovations and thus improve productivity. This includes issues related to leadership, structure including knowledge and capabilities, culture and processes to stimulate innovations. Important issues are idea generation and idea management that occur in a specific service system or customer relationship. These activities often take place in what is described as the fuzzy front end (FFE) of innovation (Khurana & Rosenthal, 1997; Kim & Wilemon, 2002). From a managerial perspective it is important to induce creativity as well as to understand the potential business opportunities (Edvardsson, Gustafsson, Kristensson, & Witell, 2010). Focus is mainly on (a) how service ideas can and should be generated, developed and selected, (b) identifying the role of the service concept, (c) the role of customers, employees and other actors. In short: how to best increase the number of ideas for potential innovations and how to capture/filter out the ideas with highest commercial success.

Realization: this dimension concerns the realization phase of service innovation and focus on the innovation content and the activities and processes as well as resources needed to realize the new resource configuration to improve productivity. The focus on a better understanding of the specific challenges with developing and implementing services, in the literature normally referred to as New Service Development (NSD). Also within the scope for this theme is the service system change needed to realize service innovations in which products, services, technology and other resources are embedded in the new resource constellations forming the basis for the service innovation and related value proposition.

Value capture: in this third dimension, the focus is on how to capture value throughout the service innovation process resulting in improved productivity. Value capture refers to how to create a revenue stream to the provider, which is related not only to the value being created, the competitive situation in the market

but also to the internal strategies and business models. How to capture value is a multi-faceted phenomenon and concerns issues on both the strategic, tactic and operational level. One of the more important steps in value capturing is to understand how customers view a company's value proposition in relation to other companies' propositions. In this process, companies create a measurement and management system that helps in the process of managing customer value (Johnson & Gustafsson, 2000). Osterwalder and Pigneur (2010) argue based on a literature review that there is a lack of attention on and knowledge about the role of business models in service innovation. Business models are defined in many ways (e.g. Osterwalder, 2004; Zott & Amit, 2007), but the definitions seem to converge along dimensions such as revenue model, governance form, value propositions and market strategy (Methlie & Pedersen, 2007). Much of the research has discussed concepts and taxonomies of business models and descriptions of specific companies' business models, fewer studies have investigated factors influencing the adaptation of business models which is necessary when focusing on service productivity improvement. Research on effects of business model choices is also limited, and only a few contributions have focused systematically on potential effects of business model choices (Methlie & Pedersen, 2007; Zott & Amit, 2007).

To conclude, using S-D logic to understand innovation and productivity put forward the processes of using resources and the realized value for customers and other stakeholders rather than on the output in the form of goods or services offered and exchanged. Research shows that collaborative competences, dynamic capability of customer orientation, and knowledge interfaces influence innovation outcomes and firm productivity and performance.

5.6 Service-Dominant Logic and Service Science

Smarter service systems serve customers better and create more opportunities for win-win, improved productivity, interactions that result in value co-creation for both service providers and customers (Spohrer & Maglio, 2010). This pushes the focus on service science as an emerging discipline of high relevance for service productivity onto scholarly theoretical conceptualizations, definitions and empirical research and management practice. It fosters a cross-disciplinary approach to the study of service ecosystems (Chesbrough & Spohrer, 2006) which forms a basis for understanding service productivity. One major issue in the context of service science is how *service productivity* can be conceptualized, defined, measured and assessed (Grönroos & Ojasalo, 2004).

Why and how can service science, including service ecosystem, value co-creation and innovation be viewed as the basis for service productivity analysis and management? Service refers to the outcome such as transportation with a car or a truck, productivity with industrial robots, communication or connecting people via telephones and experiences when going to the movies. Service productivity on the other hand refers to how this outcome, the service was achieved or the value or cost of the resources needed. *We can define service productivity as service input in*

relation to service outcomes for the involved customers and other beneficiaries. Service productivity improvements are grounded in novel and smart integration and use of resources by the involved actors during value co-creation processes in a service system, resulting in attractive outcomes. New resources and technology are developed over time but service productivity has not so much to do with the resources as such but rather about how they are being integrated with existing resources and used by customers and other actors to achieve certain goals and objectives or arrive at intended and attractive value-in-use.

Service productivity often stems from a novel or improved way to use existing resources, including actors' knowledge, skills and motivation to co-create value in service ecosystems. These service ecosystems constitute the basic context and enabler for service productivity development. Studying these systems in actions makes possible the identification of important productivity drivers; both inhibitors and enablers.

In the title of this chapter, the question is raised if taking an S-D logic approach help us understand service productivity better. In short the answer would be yes! This chapter shows that service productivity in the future is in need of S-D logic and a science for service forming the basis for a service system and value co-creation based understanding of service productivity. This would create a fruitful and maybe necessary platform for studying service productivity in order to understand the drivers—both enablers and inhibitors—for service productivity management and development. Service productivity is about actors' using resources in a novel and smart way and S-D logic shifts the focus from resources as such and the relation between input and output to a focus on actor's integration of and operation on or use of resources, in specific situations with a specific service outcome in mind. The focus is on value co-creation for the customer and other involved actors and beneficiaries.

The core concept in service science is the service system and the role of the service system is to enable and direct actors' co-creation of value in a productive and smart way. Long term success requires service eco-systems that initiate, direct and realize innovations in line with the value proposition. Service productivity is one of the cornerstones for sustainable success. Combining value creation and value capturing in service business models supported by viable service systems represent a special management and leadership challenge in the future. Sustainable smart service systems must be based on a service business model.

5.7 Managerial Implications and Future Research

Peter F. Drucker many years ago warned that the most dangerous thing in times of turbulence and change—and that is what we can expect to have even more of in the future—is not the change itself, but to manage with yesterday's logic. What can managers and business leaders 20 years from now hope to learn from the discussion in this chapter? What should be focused on to understand and manage service productivity development? I have argued for the need to shift away from a G-D

logic management mindset and to adopt an S-D logic lens and way of thinking proactively on service productivity development. What can and should executives and managers do to successfully manage and improve service productivity?

1. Engage and train both employees and customers and other involved actors and clarify their role(s) and responsibilities in resource integration and value co-creation;
2. Empower and motivate customers and other actors to unleash their creativity and make sure that their knowledge, skills and motivation are being used in smart ways;
3. Create a culture in which norms and rules, including recognition and rewards focus on the development of pre-requisites for value co-creation and innovation in service eco-systems based on authentic leadership, the open sharing of experiences and best practices and helping each other to achieve best performance.
4. Focus on outcomes for all involved actors or beneficiaries and emphasise favourable customers' experiences through the creative use of information and communication technology (ICT) including social media.
5. Standardise and modularise value co-creation processes, activities and interactions. Develop KPIs that focus on value creating drivers and measure value in context.
6. Develop ways to learn how to develop service productivity by comparing with other companies; not copying but bench learning.
7. Introduce new ICT to develop new service platforms or using existing service platforms for smarter resource utilization and capacity management.

5.7.1 What Should Future Research Focus On?

So far, most research on service productivity has been carried out using a G-D logic lens. An S-D lens and service system understanding is needed and different service eco-systems should be studied using practice theory tools. These contexts could include ICT based service such as social media and telecom, highly person-centric service such as executive training, counselling and healthcare, service directed towards possessions such as car repair and cleaning service, transportation such as taxi, airline and train service, service in manufacturing companies such the manufacturing of cars or mobile phones. Future research should focus on developing theoretical sound and relevant models, measures and instruments for managers to be used when assessing and evaluating service productivity from an S-D logic point of view and a service ecosystem foundation.

To conclude, future research should build a theoretical customer centric framework for understanding and analyzing service productivity drivers and pre-requisites from an S-D logic, service eco-systems and service innovation point of view. Empirical studies in various service eco-systems focusing on how service productivity is described measured and managed to identify best practice.

Expert's View

Walter Ganz

Fraunhofer IAO

Question: How and where will innovation in services increase productivity?

Walter Ganz: The concept of productivity as ratio of output to input will change the more economic activity moves towards collaboration in value creation networks. Beyond the traditional internal productivity factors the contribution to productivity of external factors—be it customers, or partners, or the interaction between entities including technology, algorithms and machines—must be considered. In this regard it seems wise to work on conceptualisations that enable us to differentiate thoroughly and at the same moment reconcile the effective and the efficient side of strategic productivity (i.e. possible value propositions in context, innovation of service products) and operational productivity (i.e. organisation of internal processes, interfaces and interaction, innovation of service delivery process and business models).

We expect the most interesting potential to increase productivity in service innovations that are targeted towards pushing high-technology innovations into every day use, in B2B and B2C constellations alike. Most important aspects are context sensitivity with a deep understanding of customer needs and technological possibilities, interaction design and knowledge integration.

New technology in the application fields of manufacturing and demographic change will be pushing Service Innovation in the future. In the former we see service innovation as a source for productivity improvement in ever more networked settings of production including internet of things and generative manufacturing by allowing more flexibility in former rigid systems. In the latter we hope on service innovation in two regards: the first, at least for the early industrialized economies, is every possible service to support productivity of an aging workforce; the other are service innovations that enhance productivity in every aspect of personal care and attendance to allow an aging in dignity of an upside-down age structure in the population pyramid.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Walter Ganz: The rate of change will be affected by the willingness to understand material products, technology and service as equal parts of value creation systems. The most severely inhibiting factor is the problem of bridging the gaps—in perception, terminology and reward or incentive systems—between domains, disciplines, functions that must be involved if

(continued)

you are heading for effectiveness and efficiency advances by service innovation. We must therefore work on the professionalization of knowledge integration, which, if achieved, will be a top accelerator for service innovation and—if provided in a smart way—is a service innovation itself. We will witness further progress in automatization in manufacturing as well as in knowledge work with algorithms as robots for ever larger parts of brain work.

We will see the rise of digital and automated support in care. Therefore we will need conceptualisations for human-machine-computer-collaboration, which is far beyond the tradition human-computer interaction and includes normative questions of human autonomy and dignity.

Without changes of modes of macroeconomic and microeconomic accounting and corresponding management information systems and tools it will be difficult to move faster on the road to estimate the potential and advance the design of service productivity due to a lack of visibility of the contribution of service and service innovation to overall success. Therefore some progress in the development of a kind of ServCad is crucial to visualize, model and simulate the benefit of service innovation and the improvement of service productivity.

The funding of R&D for service innovation is today disproportionate and difficult than funding for high-tech activities. Discrete budgets—be it on business, organisational or political levels—can accelerate change.

No technology and no service innovation will flourish without the creativity of new business models to enfold the potential of value propositions in context.

Part III

Cases

Claudia Lehmann and Kathrin M. Möslein

Setting the Stage – Annotations by the Editors

Since deregulation of the air transport industry the measurement of productivity, performance and profitability has attracted significant attention, many studies have been undertaken on the financial and economic productivity of airlines. However, few have concentrated on the productivity or performance of airports, and how changes in the industry may have affected them. Airports have been quite traditional in their approach to assessing their performance. Most measure it strictly in accounting terms by looking only at their total costs and revenue levels and at the resulting surpluses or deficits. Few utilize any type of productivity measures or performance indicators.

As the industry body IATA comments, at many airports a mismatch between profitability and efficiency exists and together with many researchers they argue for improvements to productivity measurement techniques and tools (Francis, Humphreys, & Fry, 2002; International Air Transport Association, 2004; Jahns, Hartmann, & St. Schmidberger, 2007). In this next chapter *Claudia Lehmann and Kathrin M. Möslein* examine the state of the art in determining airport productivity by academics on the one hand and on the other hand they empirically investigate how airport managers capture it in practice.

Different airports differ strongly in their characteristics. Due to different ownership and regulatory structures, a diverse set of services and operating characteristics, the range of different locations close or remote to competing airports and areas of high population density, there is a high degree of quality differentiation and external constraints. All in all, the airport industry is very

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heterogeneous and diverse. In order to increase productivity and to stay competitive, airports need to be able to measure and to compare their performance with others as well as define and understand the best industry practices (Oum & Yu, 2004). The special characteristics of airports, however, lead to difficulties in measuring and comparing their performance.

6.1 Airports of the Future

Airports are an essential part of the air transport system. They provide the entire infrastructure needed to enable passengers and freight to transfer from surface to air mode and to allow airlines to take off and land. Airports bring together a wide range of facilities and services in order to fulfil their role within the air transport industry.

This is in sharp contrast to the early days—now about a century ago—when airports were still simple grassy fields for takeoff and landing. The classical role of an airport as “just” providing infrastructure for takeoff and landing has radically shifted. Modern airports are service organizations that offer a vast range of solutions for different target groups. The International Air Transport Association (IATA) proclaims: “An airport is more than a large paved area; a set of plans or an architectural concept, an airport should be seen and planned as a dynamic system that handles the flow of pedestrians, vehicles, aircraft, baggage, cargo and mail. The passengers, baggage, greeters & well-wishers, vehicles and aircrafts must pass through inter-related systems to be queued, processed and circulated on various links . . .” (International Air Transport Association, 2004, p. 162).

Due to this development the requirements for the airport managers have shifted as well. Around the world, there is an increasing trend towards commercialization and privatization of airports. The rapid growth of air traffic, the formations of global airport groups, airline market de-regulation and airline alliances have create a dynamic and challenging market for airports and their managers (Francis et al., 2002). Rather than being viewed as public service providers, airports are today seen as enterprises which are expected to constantly find solutions, deliver better and more efficient services, operations, and customer satisfaction in a competitive global environment (Pathomsiri, 2007).

As IATA states at many airports exists a mismatch between profitability and efficiency. Researchers and airport related organizations furthermore proclaim a gap in research and the need for suitable performance as well as productivity measurement techniques and tools respectively (Francis et al., 2002; International Air Transport Association, 2004, p. 112; Jahns et al., 2007).

There are several reasons why airport managers and government agencies measure the overall performance of airports: ranging from measuring efficiency from a financial and an operational perspective (Doganis, 1992), to evaluate alternative investment strategies, to monitor airport activity from a safety perspective, as well as to monitor the environmental impact. Management requires information to identify areas of high performance and areas where corrective action has

to take place. Governments typically require information to regulate airport activity. Other airport stakeholder will also be interested in assessing information on its productivity. But different stakeholders expect different types of productivity and value different performance criteria. To show how diverse these expectations are and how the productivity data may be used, the following examples may be illustrative (Humphreys & Francis, 2002):

- Government: for economic and environmental regulation
- Airlines: for comparison of costs/performance across airports
- Airport managers: to ensure efficient business operations
- Passengers: to assess how well they are served as customers
- Shareholders: to assess the business performance and their return on investment

The purpose of this chapter is to examine what the state of the art in airport productivity measurement is and how airport managers capture it in practice as a means of international performance comparison and enact continual improvement. The focus lies on German airports. Here, evidence has been gathered from a number of German airport managers under the strict condition that they remain anonymous. Data were collected through a series of face to face interviews in 2012 and 2013.

To sum up, this chapter will give an overview and discuss the nature, prevalence and consequences of current productivity measurement practices of German airports and state-of-the-art airport research. The chapter is divided into four sections: first, an overview of the general characteristics of airports as modern service organizations will be given; second, weaknesses and drawbacks in current productivity measurements at airports will be highlighted; third, findings of the interviews with airport professionals will be presented before, finally, potential innovations and improvements for the future development of airports will be discussed.

6.2 Characteristics of Airports

Airports are an essential part of the air transport system. They provide the full set of required infrastructures making up the interface between air and ground transportation. Further, they offer a broad range of services and facilities which can be divided into three categories: The first category being basic services and facilities. These services and facilities include security services and air traffic control. The second category are ground traffic specific services like runway and taxiway services, apron services, loading and unloading of baggage and freight hold, and passenger services among others. Non-aviation business activities build the third category. Concessions, office rentals, car parking and further related activities are included here. The major customers of an airport are airlines, shippers and passengers (Dietman, 2008). Other interacting parties involved are handling agents, tenants, and surface transport service providers (Francis et al., 2002). Following the vision of airports to position themselves as “airport cities”, the range of services offered is still growing.

Today, different airports differ strongly in their characteristics and offerings. Due to different ownership and regulatory structures, different mixes of services and operating characteristics, different locations as well as the proximity of both population centres and competitive airports, there is a high degree of quality differentiation and a broad range of different external constraints. This heterogeneity of airports leads to in some difficulties in measuring and comparing the performance and productivity of airports. In order to stay competitive, airports need to be able to measure and to compare their productivity and performance with others as well as define and understand the best industry practices (Oum & Yu, 2004).

In 2009 the airports and ground services in Germany generated €13.8 billion which corresponds to a 0.6 % contribution to Germany's overall GDP. All together, 295,000 people were directly or indirectly employed by airports and ground services. It is estimated that 3.6 million tons of freight is transported and over 182 million passengers arrive or depart from one of Germany's airports every year (Oxford Economics, 2011). Despite these numbers, most airports are still not profitable. As of 2012, only 6 out of 22 international airports in Germany generate a profit (Flughafenverband ADV, January 2013). The largest airports in Germany include the airports in Frankfurt, Munich, Düsseldorf, Hamburg and Berlin-Tegel (respectively the long-expected Berlin-Brandenburg International Airport). Those airports handle over 127 million passengers a year, which represent almost 70 % of all passengers in Germany (Bundesverband der Deutschen Luftverkehrswirtschaft (BDL) e.V, 2013).

6.3 Weaknesses and Drawbacks in Airport Productivity Measurement

Humphreys and Francis (2002) state that productivity indicators as a form of performance measurement are essential for airports as this information enables managers to monitor performance and to identify how well certain areas are performing. Nevertheless, there has been limited evidence published about that topic in the past (Sharma, Dwivedi, & Seth, 2011). The range of stakeholders airports have to deal with are manifold e.g. passengers, airlines, handling agents or surface transport service providers, in addition to the interests and expectations of both the regional and national economy. These facts complicate the development of a useful airport productivity measurement system; though productivity measurement is a critical management activity at both the operational level of the individual airport and the wider system level.

Understanding how productivity can be measured at airports requires a thorough understanding of the processes and business divisions that exist at airports. To provide an overview three process chains are seen as most relevant from a productivity perspective for airports within the aviation business (Dietman, 2008): passenger processes, luggage processes and airside processes. Each chain looks at different performance indicators and dimensions. Besides the named aviation

perspective, the non-aviation processes also have a major impact of the performance of an airport (Oum & Yu, 2004). The non-aviation processes of airports gained importance over the last years. At Munich airport, for example, more than 40 % of the operating result is earned by the non-aviation businesses, which involve retail services, procurement processes as well as experience and gastronomic services.

6.3.1 Perspectives on Productivity?

Understanding the services provided by an airport is essential in order to meet the requirements and expectations of its diverse current and future set of stakeholders. The overall service offered by an airport is the combined activities of various organizations involved—including airlines, handling agents, customs and immigration officials, and concessionaires. All these different stakeholders may have different objectives and even a conflicting view on what determines productivity or a good service (Graham, 2013). Furthermore, the airport operator itself has only partial control of all processes which make up the final service offering. Therefore areas of responsibility have to be clearly identified and the airport operator has to define a common goal or standard regarding the service quality (Graham, 2013). Travellers in general value quality as an important component of service-based offerings. But they may have a different perception regarding the productivity of an airport compared to the internal productivity perspective of the airport (Humphreys & Francis, 2002). An example might illustrate the dilemma: No traveller wants to be rushed through the security point; everyone wants to be treated friendly and obligingly. For the provider of the security services, fulfilling these expectations implies contradicting goals and can result in a reduced throughput of passengers and a decrease in productivity. From the traveller's perspective, however, quality and productivity go hand in hand and form one integrated unit of perception and measurement (Humphreys & Francis, 2002). As the example shows, internal and the external productivity perspectives can be contradictory. In particular, increasing the internal productivity may often imply decreasing the service level perceived by customers and vice versa (Graham, 2013). The International Air Transport Association (IATA) gives recommendations about the service quality of airports by their well established level of service (LOS) standards ranging from A to F (International Air Transport Association, 2004). Those service levels provide some opportunity to compare airports according to their service quality and, thus, put pressure on the airports to keep their service level at an adequate standard (Dietman, 2008).

Service productivity and service quality perception from a travellers' viewpoint is captured by airports mostly via customer satisfaction surveys (Graham, 2013). For example, by the Airport Service Quality (ASQ) survey released by Airports Council International (ACI). More than 190 airports in 50 countries benchmark their customer satisfaction monthly based on standardized questionnaires (Airports Council International, 2014). Moreover, the World Airport Awards™ presented annually airport benchmarks. Determined by more than 12 million surveyed

travellers at 388 airports initiated by SKYTRAX (SKYTRAX, 2013). In addition, various airports have developed their own passenger satisfaction indices. However, all those surveys only cover the evaluation of existing services and do not aim to determine true customer needs for additional or improved service productivity. Marketing research only partially overcomes this gap by addressing mainly non-aviation related services, but lacking a comprehensive understanding of the passengers' expectations for airport services and the respective drivers of service productivity (Fodness & Murray, 2007).

6.3.2 Measuring Productivity at Airports

As mentioned above, most large airports regularly observe their service delivery performance (e.g. waiting time and queue length as essential processes). However, the objective measures of service quality can only cover a limited range of issues and service dimensions. For instance, while an airport can measure the reliability of equipment, it is not possible to measure whether travellers feel safe, assured and satisfied with the use of this equipment (Graham, 2013). Similarly, the perception of a traveller's waiting time in the security queue may be very different from the actual waiting time. Time and availability measures give no indication of the passengers' service perception. Moreover, the measures do not substantially focus on the passenger experience (Graham, 2013). These brief examples illustrate the difficulties of capturing and measuring productivity in the service setting of an airport. However, not only the measurement of productivity is a challenge for airports, so is the evaluation of this measurement. The measurement of the output-input relationship is only expedient, if a comparison with other time periods or with competitors is possible (Johnston & Jones, 2004).

A growing number of airports are making extensive use of partial performance measures like cost per passenger and total, aeronautical and non-aeronautical revenue per passenger (Graham, 2005). Some of the major limitations with the use of partial measures are that they tend to be very much data led and relate to areas where data is readily available, rather than looking at areas where performance assessment is ideally needed (Humphreys & Francis, 2002). Partial performance measures only give, as the name says, a "partial" and rather disjointed diagnosis of the situation. Moreover, the interactive value chain between the service provider and service customer is not adequately captured (Graham, 2005). To overcome this sometimes misleading trap, a number of different measurement methods have been introduced. Parametric or statistical total factor productivity (TFP) approaches, using stochastic frontier analysis and production or cost functions have been used to measure the productivity of airports. One of the most comprehensive studies was conducted by the Air Transport Research Society (ARTS) in 2012. It uses a production function to compare the performance and productivity of over 70 major international airports (ATRS, 2012). Also non-parametric index number approaches such as the Tornqvist total factor productivity (TFP) have also been used to investigate the productivity of airports.

This approach requires the aggregation of all outputs into a weighted outputs index and all inputs into a weighted input index which are the prices of the inputs and outputs in this case.

About 90 % of all academic studies dealing with the topic of airport productivity focus on data envelope analysis (DEA). This operations research method has been widely used to calculate the output to input relationship of non-heterogeneous industries with a non-parametric linear optimizing approach. It can deal with multiple inputs and outputs within a single analysis by optimizing weights with linear programming (Oum & Yu, 2004). Due to the fact that for DEA less demanding data is required, it is often seen as more attractive than other methods (Graham, 2005). As a result it has been used more extensively to measure airport performance. Concluding the picture, a multi-attribute approach which combines a number of partial performance measures as a weighted sum of inputs, has also been suggested to assess airport productivity (Jessop, 1999).

All of the suggested methods have their relative strengths and weaknesses, and—quite surprisingly—all underlying studies have in common that the terms performance and productivity are used interchangeably. Overall, the reported studies have added to the limited amount of knowledge with regards to comparative airport performance measurement (Graham, 2005). Still, many of the studies and methods suggested do have practical shortcomings that limit their value for airports. One example of these shortcomings is that all reported studies and suggested methods ignore the non-aviation service output, even though it sometimes accounts for a high percentage of the total airport revenue. Furthermore, while DEA is often seen as the preferred approach, some input factors like annualized capital, rental costs or even outsourcing are often ignored in DEA (Graham, 2005). There are some more problems involved in identifying correct inputs and outputs. This might be the reason why airport practice nowadays still struggle to widely adopt DEA (Oum & Yu, 2004).

Another challenge of comparing productivity between airports is the small amount of public information available for airports. Airport managers are concerned that publishing data or taking part in a benchmarking study might have a negative impact on their own operations. Airports with considerable market power could abuse the situation and take advantage of the information. Thus airport managers often have vast amounts of information on their own operations, but little to no information on other airports, and no clear incentives exist to share this information publicly (Graham, 2005).

According to the current literature the following question accrues: “What determinants of service productivity for airports exist and how are they captured?” To answer this question it is important to point out that the determinants depend on the specific processes looked at and on the point of view taken. Service productivity can be viewed as a strategic variable or as an operational variable; it can be observed from an internal or an external perspective, it can be partially looked at or as a whole, to state some examples. To clear up this blurry picture and to answer some of the challenging questions, the authors conducted an interview series with German airport managers in 2012 and 2013.

6.4 Reporting from an Interview Study

The study reported here was designed to identify what is the state of the art in airport productivity measurement and how do airport managers capture productivity in practice and what are best practise examples for productivity improvement. Therefore, the authors conducted 15 semi-structured interviews with 16 German airport managers. The interviews were conducted either face-to-face or as telephone interview starting in April 2012 until August 2013. They lasted between 30 min and 2 h (with an average of 60 min). For the study five of the largest (based on number of passengers per year) and three medium sized German airports were selected for being part of the sample and contacted for participation in this study. Especially at the two largest German airports more than one manager was responsible for productivity issues. Due to that reason at this airports more than one manager have been interviewed. All managers received the interview guideline and a short description of the study in advance. The guideline combines five related topics regarding the productivity at airports: (1) general information regarding position and task of the manager, (2) terminology of productivity, (3) productivity controlling (4) productivity management and (5) productivity prospects.

6.4.1 The Challenge of Defining Airport Productivity

All of the interviewed managers stressed the fact that airports are always striving for productivity improvements as a natural consequence of business thinking. They also unanimously stated that different stakeholders of an airport express different needs and wants, and stress different foci on productivity. Bringing together the different aspects to evaluate the service productivity of an airport feels often like “juggling”, as one manager stated. For all of the interview partners, the most obvious way to define productivity is the output-input ratio. And still, all interviewed managers were aware of the challenge: How to measure “input” and “output” so as to adequately capture airport productivity?

First of all, experts see productivity as either an operational variable or/and a strategic variable, both consequently require different approaches regarding their measurement. On the on hand, when productivity management is seen as strategic variable, productivity is seen as essential for the long-term success. Good productivity management is seen to result in good economic and profitable operations over time. Some interview statements, however, clearly show that often productivity management is a simple result of competitive action and fulfils the perceived need to prove an advantage in comparison to the rival airports which are in direct competition for the same customers (including airlines, passengers, and even the other airports’ customer groups described above). Thus, productivity management in practice is not always used as a result of early far-sighted planning. Still there are good examples that show long term strategic planning for productivity at airports. For instance, the case of Düsseldorf registering the trademark “Next Generation Hub” in order to emphasize the long-term development of the airport to what the

managers of the airport consider critical features of a modern hub in the aviation industry. In this case, measuring and increasing productivity and efficiency are clearly highlighted as critical steps for the intended strategic move.

On the other hand, productivity is considered as an operational variable which ensures efficient as well as effective processes which in turn result in time-saving and money-saving outcomes. Furthermore, through optimizing and increasing efficiency, the usage of resources and the quality standard of the product and services provided can be ensured. For that purpose, productivity measures and figures are essential to evaluate operative functions. In most cases, key performance indicators (KPI's) are used for that purpose. Some of the reported operational measures in use are throughput rates of processes including the passengers per hour passing through the security check or passport check, as well as the usability rate of the infrastructure like the percentage of passengers departing via boarding bridges, operating expense (OPEX) per passenger (PAX), aeronautical revenues per PAX, non-aeronautical revenues per PAX, and earnings before interest, taxes, depreciation, and amortization (EBITDA) per PAX. The calculation of these figures is relatively straightforward based on data from the financial reporting. Managers also reported that these figures, despite not being fully convincing, are regularly consulted to make decisions and to report about productivity. Also, employee productivity is very important, within the scope of an airport, as employee costs are next to the cost of infrastructure one of the largest cost pools (Schulz et al., 2010). Performance indicators here include sales per employee and the number of employees per process.

The comparability of those KPI's is a further challenge. The interviewees complain about the inability to compare the current productivity measures with any historical comparative data or data from competitors. Considering only total operating costs can lead to wrong conclusions, if they are not compared to total revenues but rather to other partial variables. Also the total airport personnel costs per passenger are difficult to compare across airports, as there is a strong dependency of this measure to the respective business model of the airport. Some airports outsource services and thus do not include those personnel costs in their calculations, while others provide those services directly and so have significantly more employees on their payroll. These examples show that measuring, evaluating and especially comparing key performance indicators should be handled with care. Therefore, it is extremely important to use the most accurate original data.

One step to tackle this challenge was undertaken by Eurocontrol within the last years. This European organization is responsible for the safety of air navigation and responsible for the coordination of the air traffic control. They published a manual with KPI's including a specific definition for each indicator. Airports can decide which indicators are relevant for their airport and suit for them. The important fact is that this manual provides a base for evaluating comparable results and figures. The downside, using KPI's to measure productivity generates large quantities of data. This data is not overly useful in a vacuum, but can become very powerful once it is analyzed and compared to other data. Therefore, measuring productivity implies not only gathering productivity data, but also evaluating and interpreting

the information. Therefore, more than a few airports need to make use of the same measuring base.

There exists a multitude of different performance measures which can be taken into account regarding productivity. Most important is that those measures are strategically and explicitly defined at the airport and all parties involved agree on one single strategic definition. So they strive for reaching the same goals.

In this context, the study revealed an interesting finding: As stated, data envelope analysis (DEA) is the most cited airport productivity method in the international research literature. In research it is known to be widely used in a variety of applications (Oum & Yu, 2004). During the interviews, however, 14 out of 16 interviewees surprisingly answered that they have never heard about DEA so far. One of the interviewees who was aware of DEA, had heard about it because he supervised a master thesis regarding this topic in cooperation with academia. Still, he was not completely sure whether DEA would be really practicable or advantageous for all airport settings. The other interviewee who had read some articles in preparation for the interview about DEA (because he had not heard about the technique before the interview) sees several problems for implementing it in practice. The first challenge he states is the definition of the input and output. Another challenge is the complexity of the theory. He said most of the time people at the airport are so busy with their day to day responsibilities and prefer solutions which are comprehensible and easily realisable. Last but not least, he stated that it was difficult to understand the papers and in order implement such a model, it has to be proven to be applicable in their industry. Nevertheless, he acknowledged that theoretical models would help to give new impulses and inspirations for thoughts on certain topics. In sum, we have to conclude that at least in the German airport industry DEA is definitely not a widely known or used approach.

6.4.2 Who Is the Customer?

Airport passenger processes, aircraft processes and freight processes differ significantly and each requires adequate approaches to productivity analysis to achieve meaningful results. As reported, the complexity increases even more by the diversity of stakeholders involved. From an airport operator's perspective, the definition of what constitutes an "airport customer" has expanded significantly in the last 10 years.

The two major customer groups of airports are the airlines and the travellers. At most airports the main revenue source is still the aviation sector, even though the importance of the non-aviation sector is increasingly and clearly strategic. Thus, airlines are still seen as the major customers from the perspective of the interviewed airport managers. In order to be allowed to use the airport infrastructure and services provided, airlines pay certain fees. Airline passengers on the other hand are seen by airport managers as secondary customers as their relationship with the airport is usually managed by the airlines. This changes when one considers the non-aviation sector of an airport's operation. Here the primary customer is the

Fig. 6.1 Airport stakeholders. *Source:* Own illustration



airline passenger, the traveller, as he or she generates revenue by spending money at the airport directly. Increasing competition in the aviation business, competition between the hub airports or airports in close proximity to each other make many airports fight for every flight coming in and going out. Thus, the negotiation position of airlines shifted and often it is more important, to an airport, to offer attractive flights to the travellers than doing a profit-making business, with starting and landing fees. As a consequence the travellers themselves become more and more a primary target for the airport management. It can be readily assumed that the authorities are aware of the interlaced and complex problem and state that a profitable airport which is working in an economic sense will continue to provide its customers with the high-quality infrastructure and services they demand at fair prices. The relationship of the two most important customer groups and the airport as well as further customer groups—as reported by the airport managers—is shown Fig. 6.1.

Capturing airport productivity is not only interesting for the airports, also airlines or other stakeholder groups, which are using the airport infrastructure could clearly benefit. Thus, it is important that airports work closely with airlines and other parties involved. Exchanging data especially on performance could optimize the performance of all parties, as it would decrease the information asymmetries that currently exist.

Grönroos and Ojasalo (2004) describe managing productivity as a mutual learning experience for the service provider and the customer. It is obvious that all stakeholders could profit from an alignment of their resources, production and consumption processes. However, it is clear from the interviews, that such a level of

cooperation would be very difficult to achieve—or is even seen as impossible. Like in many other industries, there is always a great demand for receiving information from a stakeholder group, but little interest in providing it to them in return. Each stakeholder group treats their data as highly confidential and would not share details and insights about their operations with parties whose commercial interests are not completely aligned. To give some examples: airlines could use data about an airport operations to demand a decrease in the fees as the data shows the true costs for the airport; airports would love to work with passenger data from the airlines if they would share their data with them. Opportunities arising from shared data are manifold, for example, airports could know when and which kind of travellers are arriving or departing—information the traveller often expects the airport to have. But this kind of data sits with the passenger or the airline or maybe sometimes with the travel agency only. As the interviewees reported, airports still have only very low levels of information about their passengers, while passengers expect them to act upon information like the following: Where does the traveller come from or go to? How old are travellers? When do they arrive or check in? How much time do they spend within the airport? Are they using frequent traveller programmes? Today, airports in search of data usually run separate surveys or even issue customer loyalty cards (for single airports!), just to create a basic understanding of travellers expectations and perceptions. In order to do so, some of the airports that participated in the study, like Munich, Düsseldorf, and Hamburg, established so called airport rewards cards. The success is—non-surprisingly—still being waited for. The example however shows that airports feel desperate to learn more about their customers. As one airport manager stated: “One hundred years ago, airports were still grassy fields, but still today we often do not have more knowledge about travellers than a street has about drivers.”

To summarise the findings, productivity indicators are seen as very useful by most airport managers as they would enable the management of the airport to capture measure and evaluate differentiated and complex services. Also comparative data would be welcome as a sound benchmarking across airports is seen as a potential driver for individual airport productivity. Nevertheless, to get good and reliable results, a broad range of influencing factors have to be taken into account. The different backgrounds and circumstances of airports in the national and international context are seen as a potential bias for the results.

6.4.3 Can Service Quality and Productivity be Aligned?

The level of service standards published by the IATA serves as a basis for those standards. But German authorities are still struggling to introduce these so called service level agreements (SLA), which are already standard at US-American and British airports. The SLA records a common understanding about services, priorities, responsibilities, guarantees, and warranties. A “level of service” is normally defined and within the SLA specific levels of availability, serviceability, performance and operation are described. Often an expected and a minimum level

of service are defined. So the customers can be informed about what to expect (the minimum), while providing a measurable (average) target value that shows the level of organization performance. In some contracts, penalties may be agreed in case the SLA is not achieved. It is important to mention that the SLA relates to the services the customer receives, and not the way the service provider delivers that service. As the managers reported, the discussion about SLA has been going on for quite a while now but they don't see them to become effective in the near future. However, they agreed that SLAs could and would help airports to know which level of service quality has to be reached and that processes can be planned accordingly. When trying to increase productivity it has to be ensured that the service quality will not be below the agreed level. As each partner is autonomous and has its own goals service level, agreements are a good way for the airport and the other parties to enforce a certain level which everyone knows they must meet.

Even without SLAs service quality is very important for all airport managers interviewed. Large airports in most cases have their own quality management teams to continuously track the service quality of airport processes. Questionnaires are run on a regular basis, which are used to identify potential for improvement and track the status and impact of changes made. Asking customers about their satisfaction helps to identify the real quality of the processes. If the customer is satisfied with the airport processes it is an indicator that the service quality is high. As mentioned earlier, those surveys most often base on the Airport Service Quality (ASQ) questionnaires by Airports Council International (ACI). By conducting ASQ surveys, current problems can be identified and airports can use them to see how high the customer satisfaction is compared to other airports. But again, benchmarking with other airports is a non-trivial issue. Interviewees see it as most expedient for an airport to first identify a peer group of other airports and run the comparative analysis within this context.

Most interviewees stressed the fact that they see productivity and service quality as interlinked and inseparable from each other. This opinion is in line with a number service productivity concepts (Johnston & Jones, 2004). Airport managers are aware that optimising productivity as operational variable can lead to higher service quality within different areas like decreasing flight delays, lowering waiting times for travellers or even increasing airport capacity by optimizing ground operations. The experts share the view that only a productive airport can offer infrastructure and services with fair prices and a broad variety. Ideally, they would aim for a win-win situation, as some examples might illustrate: Parking lots at airports are not only a very lucrative source of revenue, but also provide the possibility for the passenger to get there comfortably by car. Furthermore, punctuality is not only a measure of productivity, but is also a quality criterion. If an airport is known for its punctuality, it has a better reputation and consequently is more popular among travellers and airlines. Retrospective, the conclusion can be drawn that the process worked efficiently and the involved parties including traveller, employees and management are satisfied.

However, as stated earlier, in some instances the service quality and productivity enhancements cannot be aligned and in the worst case are contradictory to each

other. Above we explained that an overall improvement in waiting times is not only an improvement of service quality but also of productivity. This is still correct, but as quite some managers stressed, this has been reconsidered while looking at single processes. To give an example: travellers generally prefer short waiting times and short walking distances. This would mean they are most satisfied if airports are always using full capacities to offer fast services. However, if no passenger would have to wait at all, the degree of capacity utilization and use of resources would be highly inefficient and not economical. Consequently, it cannot always be the goal to have the happiest customers. It is more about seeking for an optimal balance between the service quality and the operating efficiency at an airport.

Sometimes it is beneficial to open fewer security checks or check-in counters during periods of lower volume, to save cost and increase the productivity of all counters, despite the fact that it increases waiting times for passengers. However, if the waiting times are still reasonable for the travellers and pay off economically for the airport, this small trade-off increases productivity. To find out what is reasonable is challenging and each airport has to decide on its own which level is still acceptable for their customers in each process.

For an airport it is difficult to capture comprehensive customer information regarding their needs, as stated earlier. Due to that reason, permanent traveller monitoring is a new movement in the airport industry. The idea is that airports want to know where a passenger or traveller is at what time, what he or she does and what behaviour he or she shows in general. Therefore, person tracking and counting systems are currently very attractive for airports; these systems enable the airport to reach new levels of people flow analysis and steering. Besides the normal passenger counting, process and waiting times in queuing areas can be measured precisely. The behaviour of passengers can be analysed and the passenger flow can be steered. Munich airport is one of the pioneers in Germany in this field. In summer 2012, a pilot project was started with Xovis to measure and display waiting times in specific areas (XOVIS, 2012). The goal of this project was to improve the passenger experience at the airport. The majority of the managers interviewed agree that this development is going to be a requirement for the future of airports. It is less clear how positive travellers see a permanent monitoring and tracking of their activities. Permanent monitoring of passengers, airplanes and large parts of the whole airport system can detect areas of low productivity and help to improve service quality. One of the biggest technological trends within this field is the Airport Collaborative Decision Making (ACDM or short CDM). We will discuss this in further detail in the last section of the chapter. Monitoring in general, as compared to questionnaires and complaint management, has the advantage that problems are not identified after the damage has already occurred, they are identified in real time. Accordingly, monitoring can provide more process security for airports. Still, even a good monitoring system needs smart management: if issues are identified, pragmatic and fast solutions have to be found and implemented. Subsequently and ongoing sustainable and effective long-term solutions need to be found. However, permanent monitoring is still a long way off, due to multiple reasons. First, the technology needed is very cost-intensive.

Airports need capital resources and personnel in order to implement such systems. Especially at small airports it will take quite some time before such complex systems can be implemented due to the limitations in terms of financial, organizational and knowledge resources. Second, data protection and data security laws are very restrictive in Germany. They protect the individual and often interfere or even disable developments that organisations call for. It will be interesting to follow which routes airport organizations will take in the future to act in the best interest of their customers and to drive their service productivity.

6.5 The Future of Airport Productivity

This chapter focussed on the airport industry as a fast growing modern service business with historic roots and certain path dependencies. The interview study revealed how much of a need airports see to become more productive in the future. It seems that these productivity improvements can only be reached in the future through more transparent processes and data sharing. Most stakeholders involved in the airport business have significant data pools, but without sharing its value for determining service productivity is limited.

The interview study reveals Airport Collaborative Decision Making (ACDM or short CDM) as one of the biggest technological trends within the German airport industry. The concept was introduced as a project of the Eurocontrol and the Airports Council International (ACI). According to the European Airport CDM website “Airport CDM is about partners (airport operators, aircraft operators/ground handlers, ATC and the Network Operations) working together more efficiently and transparently in the way they work and share data” (Euro-cdm.org, 2012).

The concept reduces information asymmetry and aims to improve productivity at airports by reducing delays, optimizing the utilization of resources and improving the predictability of events during the progress of a flight and ground operations. This model includes several of the relevant aspects named within this chapter for improving the productivity of airports. Eurocontrol published a list of KPIs within the scope of the Airport CDM. Using these indicators make it easier to compare performance and identify improvement potential (Eurocontrol, 2012). Several airports use or currently implement the ACDM system, including the following German airports: Munich, Frankfurt, Düsseldorf, Berlin and Stuttgart (Euro-cdm.org, 2012). Due to the high investment costs, so far only large airports have been able to implement the ACDM. The whole process is very time consuming because all IT systems at the airport need to be changed in order to implement the system list ACDM. Airports which have implemented ACDM certainly have a competitive advantage.

To conclude implementing an Airport Collaborative Decision Making system as a new technological trend can be very beneficial to the airport but it also needs to be considered if it is worth it to invest that amount of resources in terms of money, time and personnel, because as good the system is already, it is not able (yet) to illustrate

and capture the processes within the terminal of an airport. When speaking about an ACDM we are speaking about the airside (including apron) of an airport. So the question whether the implementation is reasonable for an airport has to be answered by each airport individually.

All things considered, it can be said that technological trends have a strong impact on airport productivity and thus need to be identified early on. Still, in the long run, it is more important for airports to think strategically about their productivity and how to get the information they need to provide productive and expedient services. Therefore, they have to adapt to the change of the customer needs as well as their overall position in a changing market. One of the many trends challenging the airport industry—and specifically airports in Germany—is the demographic change. In the future, more and more elderly people—often referred to as the “silver generation”—will be travellers and users of airport facilities. This customer group has different needs and wants compared to younger passengers. Therefore, thoughts on productivity have to be reconsidered in the view of changes airports expect to see in the future.

Expert's View***Dr. Bernhard Doll****orangehills GmbH*

Question: How and where will innovation in services increase productivity?

Bernhard Doll: In many “product-driven” industries, service innovation is the key for companies to continuing growth and economic prosperity. Services can offer fantastic possibilities to deliver product-service bundles with much higher perceived value to customers, to maintain better relationships to customers and to charge customers on a regular basis.

If companies manage to create both a productive product and service business at the same time (which is quite challenging); they will be able to implement entirely new business models. It's amazing to see how industries are navigating this transition right now, such as car, utility or music industry among many others.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Bernhard Doll: More and more companies will be simply forced to think about service innovation over the next years. The fierce (global) competition in many industries and increasing customers' expectations about how they want to be served will put enormous pressure on companies to innovate in service areas. These companies, however, need strategies to transform their way of doing business from “shipping boxes” to “serving human beings”.

To become a productive service innovator, companies need a very good understanding about the world of their customers. They need to tap into details and the human nature of their customers that they maybe haven't considered before. They need new tools to somehow deal with the intangible nature of services and processes and they need employees with the right mindset, to empathise with customers and provide them with service even beyond their expectations.

Hagen Habicht, Friedrich W. Heidemann, and Alastair Ross

Setting the Stage – Annotations by the Editors

“All the complexity of professional services cannot be boiled down into one or two numbers, but judicious use of selected indices can encourage questioning and comparison of existing professional and administrative practices.”
(Harvey, 1987, p. 29)

As the previous chapter showed productivity is hard to measure in areas where output is often intangible and stakeholders are manifold. The management of professional services is a good example as this sector often struggles with the unique characteristics of their business. What makes professional services so special? One argument is that professional knowledge is the core resource, because it is both, the input and output of the production processes. Producing services is based on the application of this knowledge by highly educated people who provide a one-time solution to specific clients' problems (Nachum, 1999).

The following chapter gives an overview of how innovation management can be a driver of productivity in law firms. *Hagen Habicht, Friedrich W. Heidemann and Alastair Ross* report on a study—the first of its kind carried out within the sector—based on 21 expert interviews in large German law firms. The research questions to be answered were: What are the key challenges and drivers of innovation management as a major driver of productivity in German law firms? And what are major German law firms doing in terms of innovation as a major driver of productivity? In order to answer these questions the companies were interviewed about their latest

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innovations, their innovation strategies, management efforts, and customer integration which impact a company's productivity. Major innovation trends and key challenges in the industry are also explored.

The study shows that innovation activities within the interviewed law firms increased in the last 3 years. As in the banking and insurance sectors the major drivers for innovation have been the financial crisis and the continuing deregulation of the German legal market. Furthermore the study shows that most companies have a medium level of innovation maturity, with pockets of innovation led by a few partners, rather than firm-wide engagement. Arguably there is a need for a culture change within those organizations so as to accelerate the pace of innovation and this shift will be difficult to make since law firms have enjoyed a culture of comparative stability in the past.

7.1 Driving Productivity by Innovation? Analyzing German Law Firms¹

This study gives an overview about innovation management as driver of productivity in German law firms. It is the first study of this kind in the German legal industry. 21 of the 200 largest German law firms (LF) have been interviewed and surveyed about their latest innovations, their innovation strategies, management efforts, and customer integration which impact a company's productivity. In addition, major innovation trends and key challenges in the industry have been collected. Our study reveals that—despite the widely portrayed image of tradition-oriented, highly specialized service firms—a substantial part of the large German law firms shows a substantial level of innovation activities. Moreover, most interviewed companies focus on specific areas of innovations and have increased their innovation activities in the last 3 years. This increase was primarily in response to the toughening business conditions for law firms. Major drivers of the development have been the financial crisis along with the resulting economic downturn after 2008 and the continuous deregulation of the German legal market. The major innovation foci of the interviewed law firms in the past 3 years were in service and product innovation, followed by process innovation and business model innovation—all of which have a direct impact on productivity. In the near future this focus will largely be the same. Innovation in services and products as well as in processes will remain dominant. However, business model innovation makes way for market positioning innovation.

Most companies in the sample display a medium level of innovation maturity, with pockets of innovation led by a few partners, rather than firm-wide engagement.

¹ This study reports from an international research collaboration conducted by Dr. Hagen Habicht and Friedrich W. Heidemann, Center for Leading Innovation and Cooperation at HHL Leipzig Graduate School of Management in cooperation with John Bessant, Professor of Innovation and Entrepreneurship at the University of Exeter and Alastair Ross, law firm consultant and Director of Codexx Associates Ltd.

More than two-thirds of the respondents consider the innovation efforts in their companies to increase at least ‘a little’ in the next few years. However, they recognise that the major challenges to improving innovativeness lay in their methods & resourcing for innovation as well as their culture and the combination with day-to-day business. Cultural change will likely be the toughest change to make, as law firms have enjoyed a culture of comparative stability in the past.

7.1.1 Introduction

Law firms were enjoying a level of prosperity and growth in the middle of the last decade that would continue for many of them. 2008 brought the beginning of a perfect storm to German law firms, one that still rages up until today—caused by the combination of a substantial economic downturn, the deregulation of the German legal market, the increasing rates of legal in-house consultancies, and increasing fluctuations of highly skilled lawyers (Commerzbank, 2013; Ribstein, 2010).

The world in 2013 is a much tougher place for German law firms. Clients are more price-conscious and use more robust purchasing approaches to reduce legal costs (Anger, 2011). According to one of the interviewed lawyers of law firm 20 (LF 20), the reduced business levels have impacted legal work in traditionally major areas such as M&A and Real Estate. This resulted in ‘low-ball’ pricing and an increasing pressure on margins. As a net result, law firms are facing major external pressures to innovate in order to increase internal productivity. This goes along with overcoming their traditionally ‘conservative’ cultures, and with moving away from consulting and advising clients in established ways. The interview partner representing LF 4 also explicitly confirmed the link to increasing productivity, saying that “there is much potential for incrementally and radically improving efficiency and effectiveness as well as delivered client value in the way law firms do business today.”

As a consequence, coping with increasing price pressure requires higher service productivity in law firms, a goal that remains to be achieved largely by innovation. Furthermore, in the long run, the success of law firms may depend on their capacity to sustain a high rate of innovation—this calls for innovation management capabilities.

Despite the intriguing nature of the topic, management research on law firms is scarce. To the best of the authors’ knowledge, there is no research study on productivity-related innovations in German law firms. Studies from other countries are very rare as well. Notable exceptions are practical oriented overviews (Codexx, 2013; Financial Times, 2013). In fact, we really don’t know much about innovation nor about productivity management in law firms at all. The present study aims to shed light on this topic by investigating law firms with respect to the following two research questions.

What are the key challenges and drivers of innovation management as main lever of productivity in German law firms?

What are major German law firms doing in terms of innovation as main lever of productivity?

To answer the questions, data from 21 large law firms were collected between March and August 2013 using a questionnaire and semi-structured interviews.

7.2 The Study Approach

The purpose of the study is to gain insights about the innovation management as a driver of productivity improvements in large German law firms. We chose company size as the sampling criterion because below a certain size the application of organizational practices and methods is strongly limited.

Consequently, we identified and contacted (via email and telephone) selected representatives of the 200 largest German law firms (based on annual turnover). Our sampling process is based on the JUVE rankings 2012 (<http://www.juve.de>), a comprehensive list of Germany's largest law firms on a national and regional level. Our final sample consists of 21 law firms, of which 10 are listed in the JUVE 50 ranking of the largest German law firms.²

To get a balanced view about innovation activities and challenges leading to increased productivity in the organization, only (senior) partners and managing partners have been interviewed. Besides that, communication officers were contacted and asked to forward our request to the most appropriate executive managers of the company. The semi-structured interviews lasted between 10 and 90 min. In addition, a survey containing a set of closed and open questions was answered. The complete questionnaire consists of 28 questions which are divided into three blocks. In the first block named "Where are you innovating?" questions focus on the areas of innovation activities and the intensity of innovation efforts. The second block—"How are you innovating?"—investigates firm specific characteristics such as strategic horizon, supportiveness of company culture, and leadership for innovation, which influence innovation activities. The third sequence of questions headlined "What are your innovation methods and challenges?" It investigates estimations concerning the company's current strengths of the innovation processes as well as future innovation methods and challenges.

We had to ensure complete anonymity to every respondent in order to achieve substantial participation. Furthermore, anonymity was the *modus operandi* required to encourage an open dialogue with us, being externals to the company, in the first place. In addition, we received a substantial number of friendly declines stating that (a) the company would by definition never participate in any study, (b) the company has no resources for participation, or (c) because the topic of innovation had so far not been considered in the company. Several partners of law firms who had declined to be interviewed formally also gave helpful insights and comments via informal email or phone talk.

Data analysis was performed in two ways. First a descriptive analysis based on numeric values was undertaken. Second, a content analysis as described by

² Statista (2013)

Easterby-Smith, Thorpe, and Jackson (2008) was conducted in order to gain further insight.

7.3 Results

Following Grönroos and Ojasalo, we define productivity as follows: “The productivity of an operation is related to how effectively input resources in a process (manufacturing process, service process) are transformed into economic results for the service provider and value for its customers” (2004, p. 414). In order to study the impact of innovation on productivity, we use the broad Schumpeterian approach which defines innovation as everything that is new to a company (Schumpeter, 1934). Following this approach, we collected various innovation-related aspects for each company. This gave us the chance to analyse the innovation management as practiced in German law firms.

7.3.1 Level of Innovation Activity Within Law Firms

We determined the level of innovation activity within law firms by inviting interviewees to position their firm against a simple activity scale (see Fig. 7.1). No respondent considered that his company had a ‘zero level’ of innovation activity. More than two-thirds of the interviewees agreed that their company systematically invests time and money in innovation activities. Frequently worded thematic areas are finance related topics and contract law. In addition, LF 2 developed a strategy concept involving selected partners and senior associates and LF 14 rotates associates to get them acquainted to different subjects and in consequence to foster multi-perspective in their thinking and doing.

An additional quarter of the companies has ‘pockets of ad hoc innovation activity’ and another 10% have ‘little innovation activity’, which is partly linked to the core fields of law a firm is specialized in, e.g. medical law which offers less opportunities to innovate compared to M&A (LF 20).

7.3.2 Innovation Focus in German Law Firms

Besides the level of activity, we investigated the areas of innovation efforts of the past 3 years and the expected areas of effort for the next 3 years. For this purpose we used the widely cited ‘Innovation Dimensions’ model from Isaksen and Tidd (2006) which covers the four innovation dimensions of (1) Process, (2) Service/Product, (3) Market Positioning, and (4) Business Model. The innovation dimensions are associated with productivity in the following way:

- Process innovation equals towards efforts for productivity increases due to improving efficiency and streamlining processes (Mention & Asikainen, 2012)

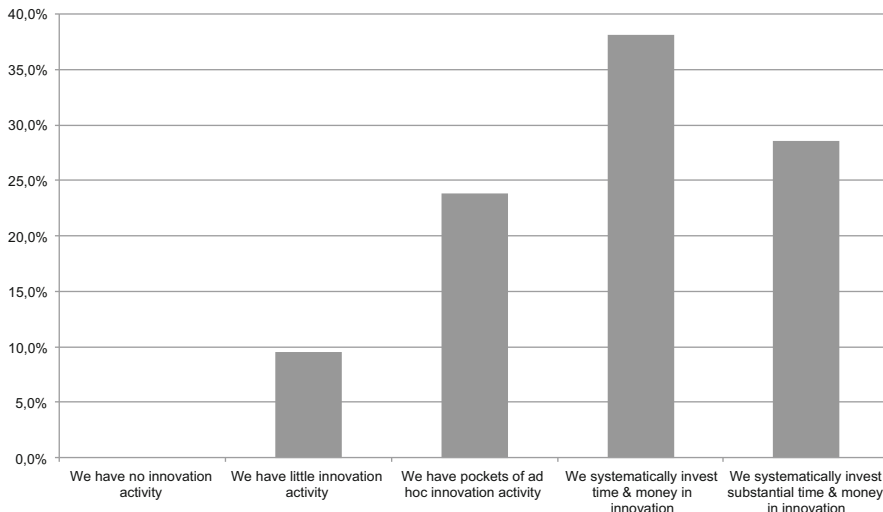


Fig. 7.1 Level of innovation activity in firms

- Service and product innovation as well as business model innovation can comprise productivity improvement due to more adjusted services and products which lead to a win-win-situation for the law firm and the clients (Musolesi & Huiban, 2010).
- Market positioning innovation has, contrary to the others, no substantial relation towards productivity (Ariss & Deilami, 2012).

The participants were requested to allocate percentages to the sum of 100 %. This practice allows a reduction of complexity as well as an abstract comparison of widely acknowledged innovation types.

Over the last 3 years, law firms have focused their innovation effort primarily in service and product innovation (approx. 35.7 %), followed by process innovation (approx. 26.9 %) and market positioning innovation (approx. 21 %). The remaining 16.9 % was dedicated to business model innovations (see Fig. 7.2). With regard to the upcoming 3 years (see Fig. 7.3), service and product innovation will remain the leading area of innovation efforts (34 %), followed by market positioning innovation (25.2 %), process innovation (24 %), and business model innovation (16.7 %). Hence, the overall priorities in innovation management are seen to remain stable. The only shift concerns a change of priority from process innovation towards market positioning innovation. This is an interesting finding as services and products are seen to offer the most potential. Even though law firms name process aspects for related productivity improvements (see below), innovations for positioning in the market, e.g. with respect to fields of law, clients, and regions are becoming more and more important. One worded reason for it is the need to demonstrate competences (LF 20).

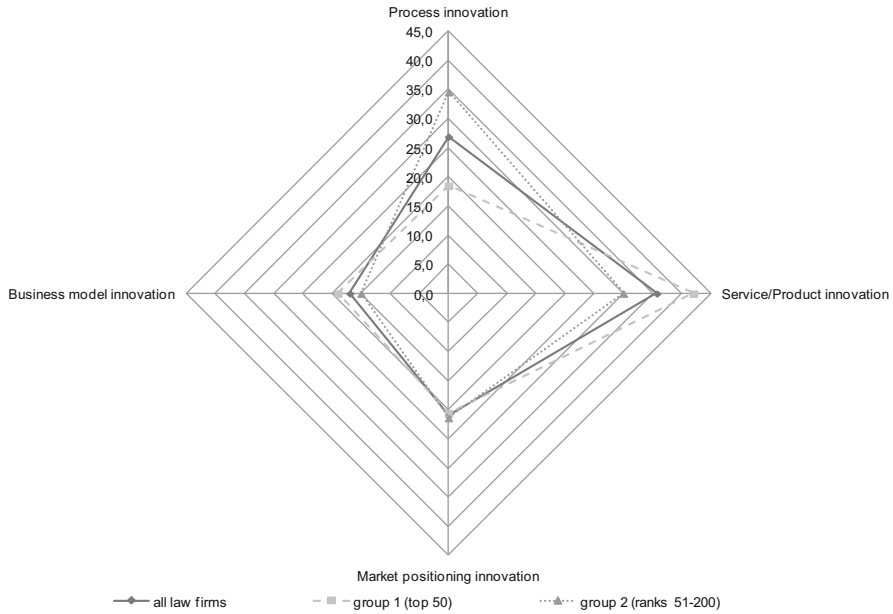


Fig. 7.2 Innovation focus over past 3 years (efforts average across 21 law firms in %)

In addition to the overall average of activities, we split the sample into the two groups of (1) among the TOP 50 companies and (2) companies ranking among place 51 and 200 according to firm size in order to highlight potential size-effects of the innovation focus. Whereas in group 1 (TOP 50), companies concentrate on service and product innovation, companies in group 2 mainly focus on process innovations (see dotted lines in Figs. 7.2 and 7.3). As process innovations have the most direct effect on productivity, this result may indicate a relatively stronger productivity focus in group 2. According examples comprise improving the application knowledge of IT as well as speeding up the processes with commodity tasks (LF 10) or streamlining decision processes (LF 11). On the other hand, however, in professional services there is a natural blurring between process innovation and service innovation. This is the case, because during the process of service provision, professionalised service workers creatively apply their usually large knowledge stocks in order to find an individual solution (Løwendahl, 2000). In our study the interviewee representing LF 4 confirmed the importance of ad-hoc innovations within the customer domain. Therefore, the worded differences in the weighting of innovating services and products or processes need further investigation. In the following, the mentioned dimensions will be presented individually in the order of their practical importance.

In law firms, *service and product innovation* is primarily considered to occur when a new or enhanced offering is developed or when an existing service is

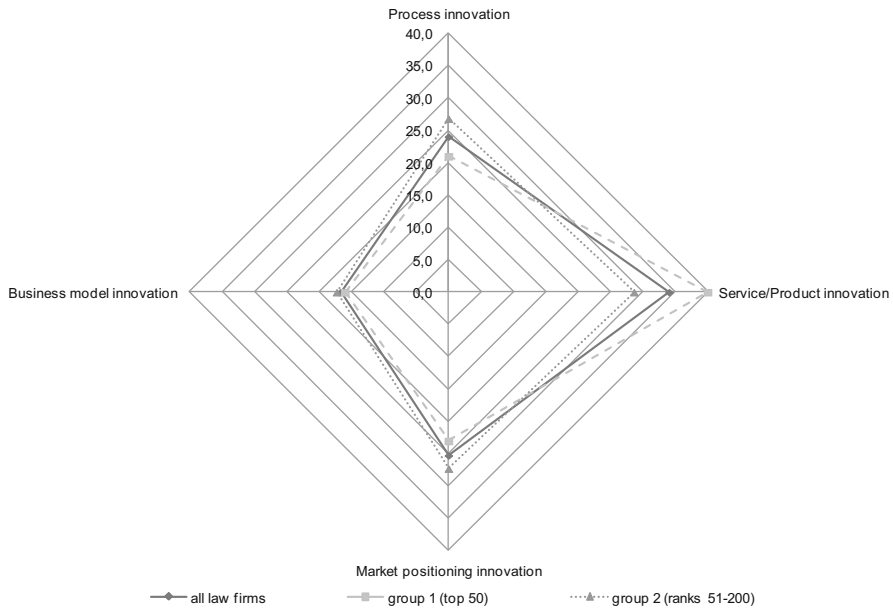


Fig. 7.3 Innovation focus over next 3 years (efforts average across 21 law firms in %)

modified to improve the client's value or experience (Hansen, Grosse-Dunker, & Reichwald, 2009; Hauschildt & Salomo, 2011). Examples of service innovations in law firms include:

- New lean services such as Employment Tribunals, Probates and Commercial Property Purchase which enable the company to offer more price competitive services.
- Continuous automatisation and formalisation of interactions with clients, e.g. clients can deliver required data in the case of consensual divorces through software electronically to the lawyer who reviews them for court. In consequence, direct interaction is reduced and necessary for the direct enforcement only.
- A number of law firms invite clients on a regular basis to panels and discussion sessions to talk about current issues and developments in their business, e.g. special obligations and changing subsidies relating to the change in retirement arrangements.

The given examples offer numerous single or combined opportunities to increase the productivity within law firms. As long as cases are comparable and require a very similar treatment, commodity products and services can be developed in order to maximize the productivity. Additionally, if high productivity can be communicated to and experienced by clients, a competitive advantage may be developed in terms of perceived service quality which is based on hard to imitate, complex management knowledge (Barney, 1991; Colbert, 2004; Eisenhardt & Martin, 2000).

Process innovations always include a higher productivity within a company. Although to different degrees, processes are a matter for improvement in every investigated company. Exemplarily, processes can be speeded up through learning. In addition, the application of IT can be a major source of process improvements. Different standardized office software solutions as well as law firm applications allow the companies to increase process speed. Moreover, collaboration among employees to solve productivity issues on a systemic basis (Tuan & Venkatesh, 2010). Finally, standardised collaboration between employees and clients in the form of self-services can yield productivity gains for both parties.

In our sample, the most prominently worded examples are:

- Increased use of self-service elements, e.g. in the form of client driven collection of case materials which are processed to the law firm via web forms.
- Automated info processing for document generation through individualized software solutions for case management and workflows.
- Practice management and document management IT solutions are applied to enhance the overall efficiency of legal operations.
- Application of lean and re-engineering techniques to streamline legal processes. This area is of special interest to law firms who have a strong process culture.
- Implementation of knowledge databases and best-case strategies to increase process efficiency and effectiveness as well as to enable organization-wide learning.

Market positioning innovation has become more important. Law firms need to consider it because law itself has become much more complex in recent years. As a consequence, many law firms cannot offer the full range of legal services anymore (Ribstein, 2010). This places the striving for strategic focus in a much more central position. One frequently worded trade-off is between delivering broad services world-wide with a big human capital stock or pursuing a so called boutique strategy (Nunn, 2012; Staub, 2012; Staub & Hehli Hidber, 2012), i.e. to focus on special issues and areas of law which require unique and sophisticated knowledge. The active positioning of a law firm with respect to its core audiences has become much more relevant.

However relevant market positioning innovations do not necessarily contribute to a firm's productivity. Consequently, productivity issues were not mentioned explicitly by the interviewees. The following core activities of market positioning were mentioned by interviewees:

- Active location strategy through geographic expansion in markets with strategically relevant clients or contraction through closing unprofitable or strategically unimportant offices.
- Repositioning the firm's value proposition—e.g. stronger focus on a specific field of law.
- Focus on new business sectors such as renewable energy.
- Recruiting partners and experienced lawyers to support new planned growth areas or to ensure expertise in additional fields of law.

This data underlines the—at best—indirect link between productivity and market positioning.

Among our interviewees, *business model innovation* is considered to be the most prestigious type of innovation, as it allows a company to change a whole industry towards its own purposes. In many cases it involves new modes of value creation and new value propositions (Osterwalder, 2004), both of which can have significant impact on productivity. However, establishing new business models requires substantial changes in a company's value creation system. It also involves considerable market risks as clients and other stakeholders will have to get used to a radically new type of service offer. Furthermore, renewing an established business model might be difficult to accomplish as law firms tend to be old-fashioned and less adventurous (LF 4, LF 8, LF 20). One interviewed partner stated that "this might be also the case because of the old and very traditional education which has remained the same as the system lawyers attended 150 years ago—except for the use of telephone, email and internet" (LF 4). The typically conservative and day-to-day business focused culture in law firms lowers the likelihood of such innovation even more (LF 4, LF 14). As expected, efforts for producing business model innovations are at a comparatively low level. In consequence, the ability to report productivity aspects is very limited.

Still, it comes as a surprise that even though almost 20 % of all innovation efforts were reported to be dedicated to business model innovation in the past and future estimations remain on the same level, neither in the interviews nor in the survey was any example of a business model innovation was given. It is all the more striking as—although rarely—business model innovations do occur in the legal industry. Prominently reported examples are Medienport and JuraXX—two law firms which offered legal advices in grocery stores, either as part of a shop in the shop concept, or in city centre shops of retail chains (Hagemester, 2004). This approach was completely new to the German market and did not succeed in long term. Hence questions arise, why these efforts did not bear any results so far and how law firms should deal with business model innovations in the future?

In the following, a comparative overview about productivity-related innovation foci will be given to describe the aggregated efforts, first overall, afterwards the average values of group 1 and group 2 separately.

Altogether, the participating companies do not expect to change their innovation efforts substantially in the near future (for exact figures see Table 7.1). Still, a slight shift towards more activities in the dimensions of market positioning innovation is expected. This can be interpreted as a result of the on-going competitive pressure. It reflects an increasing awareness that more customer orientation in innovation activities as well as improved productivity will be required for staying competitive.

Offering new services and products remains to be the most important innovation activity. The future difference between 'process innovation' and 'market positioning innovation' becomes marginal, whereas the importance for market positioning innovations for smaller law firms increases.

Table 7.1 Percentage of activity for different innovation areas

		Past	Future	Difference
All law firms	Service and product innovation	35.7	34.0	-1.7
	Process innovation	26.9	24.0	-2.9
	Market positioning innovation	21.0	25.2	4.3
	Business model innovation	16.9	16.7	-0.2
Group 1 (Top 50)	Service and product innovation	42.0	40.0	-2.0
	Process innovation	18.5	21.0	2.5
	Market positioning innovation	20.5	23.0	2.5
	Business model innovation	19.0	16.0	-3.0
Group 2 (ranks 51—200)	Service and product innovation	30.0	28.6	-1.4
	Process innovation	34.5	26.8	-7.7
	Market positioning innovation	21.4	27.3	5.9
	Business model innovation	15.0	17.3	2.3

Source: Own illustration

7.3.3 Topics for Key Innovation Activities in Next 3 Years

After investigating areas of innovation, the following section reports on topics of relevance for law firms. We asked them to name three topics which will be highly relevant for the company's innovation management in the next 3 years. Based on a content analysis, we identified four key fields which encompass the worded topics (see Fig. 7.4):

- Resources (1)
- Process & Efficiency (2)
- Services & Pricing (3)
- Client relationship (4)

The first three fields of 'Resources', 'Process & Efficiency', and 'Services & Pricing' seem to be most important, as they reflect the initially described external pressure on law firms to stay competitive. As a consequence, internal processes have to be optimised in order to be able to face the cost pressure due to the increasing competition. This demonstrates clearly that improving the productivity is central to the future changes and improvements. Field 4 'Client relationship' comprises various aspects which have long been an essential element of the legal profession. The trustful relationship between the adviser and the client has been emphasised in literature as well as conducted interviews (Løwendahl, 2000; Maister, 1993; LF 4; LF 5; LF 6; LF 7; LF 8; LF 17; LF 20). This implies that even though market conditions increasingly influence the operations and call for an improved productivity of law firms, the personal relationship still remains the important basis for consultancy as well as collaboration.

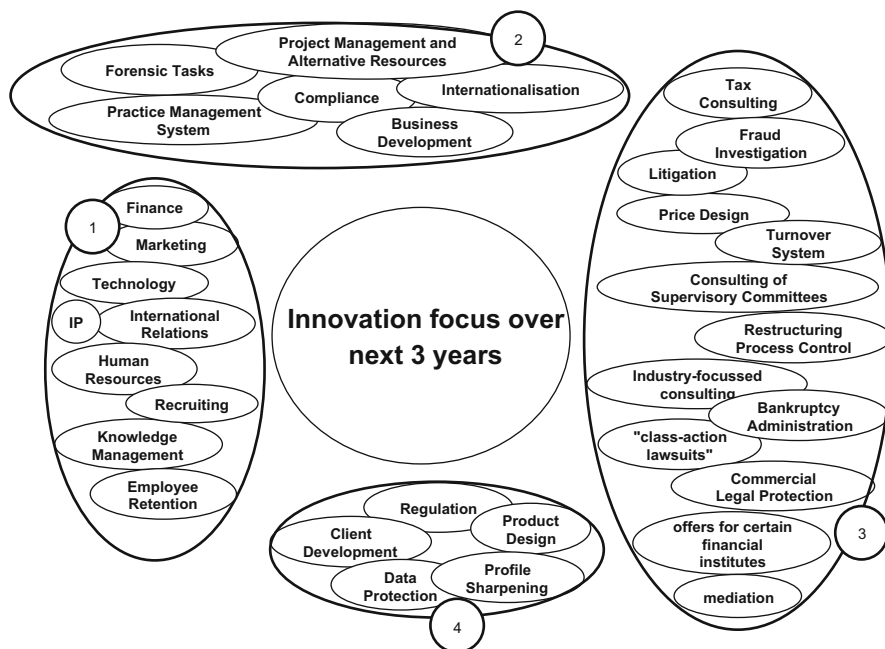


Fig. 7.4 Important innovation topics for next 3 years

7.3.4 The Change of the Level of Innovation Activity

Nevertheless, as innovation activity is central in the investigation, the change in the innovation level within a company over the next 3 years will be observed. Nearly two-thirds of the respondents considered the innovation level to increase whereas only 14 % expect it to drop (see The first three fields of ‘Resources’, ‘Process & Efficiency’, and ‘Services & Pricing seem to be most important, as they reflect the initially described external pressure on law firms to stay competitive. As a consequence, internal processes have to be optimised in order to be able to face the cost pressure due to the increasing competition. This demonstrates clearly that improving the productivity is central to the future changes and improvements. Field 4 ‘Client relationship’ comprises various aspects which have long been an essential element of the legal profession. The trustful relationship between the adviser and the client has been emphasised in literature as well as conducted interviews (Løwendahl, 2000; Maister, 1993; LF 4; LF 5; LF 6; LF 7; LF 8; LF 17; LF 20). This implies that even though market conditions increasingly influence the operations and call for an improved productivity of law firms, the personal relationship still remains the important basis for consultancy as well as collaboration (Fig. 7.5).

This underlines that law firms see enormous potential in innovation for improving their operations. However, as stated by a representative of LF 4 “the practical

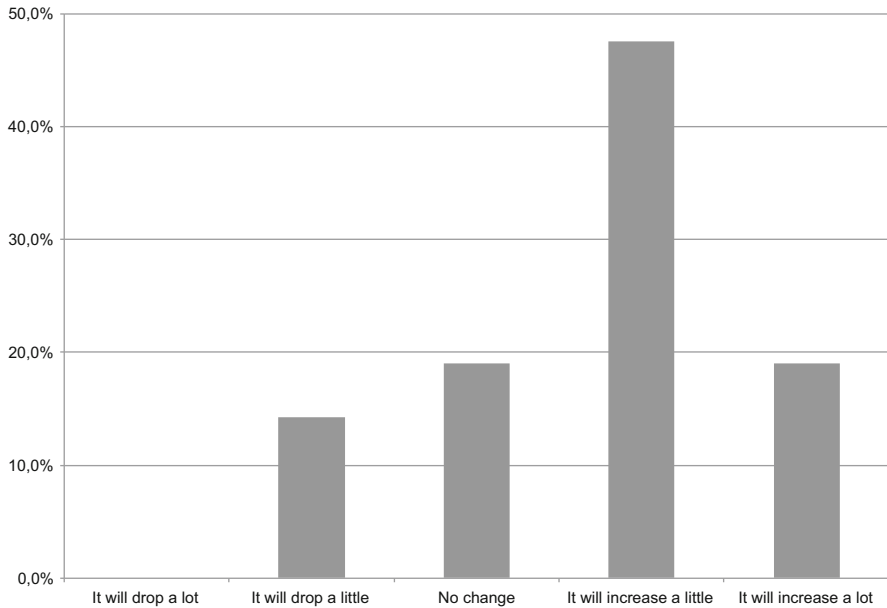


Fig. 7.5 Perceived change of the level of innovation activity over the next 3 years

realisation to increase the innovation level is constrained by the day-to-day business. It should not be forgotten that this is the way we make our money.”

7.3.5 Law Firm Innovation Maturity

Innovating requires resources which companies typically need to develop systematically (Habicht, Möslein, & Reichwald, 2011). In order to capture this facet of innovation management, we sought to profile law firms’ maturity in their innovation programs (Fig. 7.6). Our maturity measure recognized that in a law firm a major barrier to innovation is in the difficulty of engaging fee earners in innovation activities as their primary focus is the maximisation of chargeable time. Even though innovations, which also lead to increased productivity, require resources in terms of time, human capital and sunk costs in respect of lost money which could have been earned while innovating, they offer the opportunity for a law firm to be more productive and offer better services for their clients. This perspective needs to be considered and applied by the decision makers. Many law firms also lack effective processes for innovation and therefore partners can drive innovation, often ineffectively through championing ‘flagship projects’. Therefore we considered that widespread engagement in incremental innovation is indicative of a higher level of innovation maturity (due to the required changes in firm culture for example) than a few examples of more radical innovation. The former is

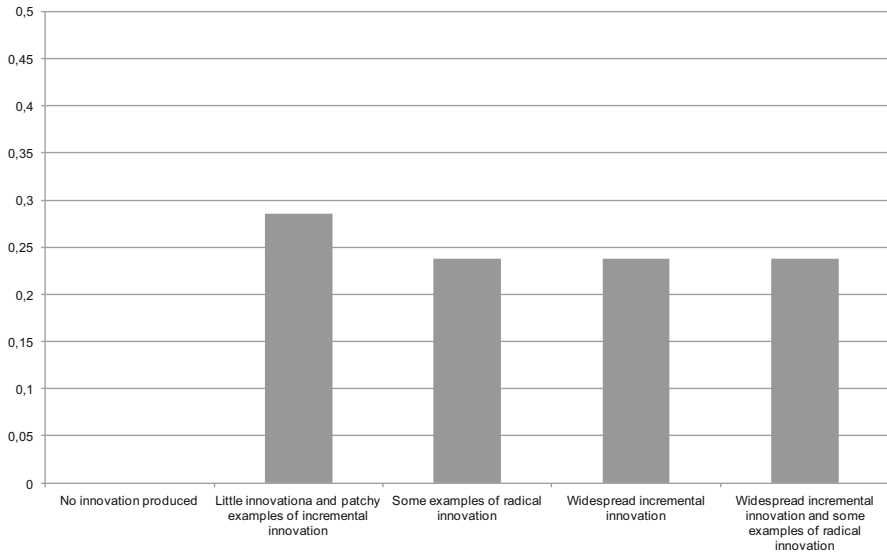


Fig. 7.6 Type and predictability of innovations

evidence of an embedded innovation system that provides the firm with a strong and sustainable platform for innovation. The latter is highly dependent on a few partners who may not provide repeated innovation for the firm and may well leave. Moreover continuous innovation also implements learning how to innovate, which makes planned innovation more productive from time to time.

Our sample shows that the bulk of law firms did not have widespread engagement in innovation activities. Some companies have coordinated and consulted innovation projects that deliver incremental or radical improvements. This reflects the ‘silo’ nature of law firms where the structure of partner led teams, based in separate offices, provides multiple barriers to firm-wide innovation activities. Partners are often motivated (through reward) to focus on their own team’s performance to the exclusion of others, so that a company-wide innovation as well as productivity improving engagement is less attractive within big law firms if one partner invests resources (=less revenue), whereby the whole firm, i.e. other partners, profit as well—without resource investments. A number of the contacted partners emphasised that their answers reflect only their own perception, i.e. their own area of expertise and responsibility. Operations and practises within the whole firm might be difficult to communicate to outsiders. Moreover, non-managing partners are rarely well-informed about the whole company. For this reason, contacted media relations and development officers, in addition to partners with innovation responsibility for our study as they tend to have a complementary view.

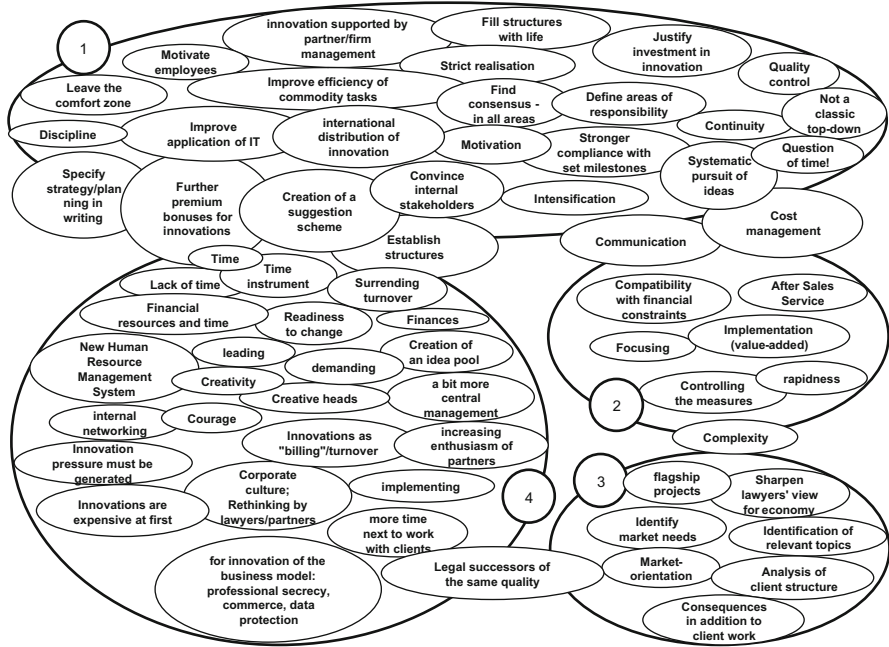


Fig. 7.7 Key challenges to innovation in law firms

7.3.6 Key Challenges to Innovation in Law Firms

We asked the interviewees to identify the ‘Top 5’ challenges to improving innovation in their company. Answers were grouped into overarching themes as shown in Fig. 7.7. Group 1 refers to answers in the field of ‘Processes & Efficiency’. Group 2 contains answers in the field ‘Service & Pricing’, group 3 assembles ‘Client’-related challenges, and group 4 encompasses challenges with respect to ‘Resources’. Few challenges comprise elements of two themes. They were placed in between the respective themes. Unsurprisingly, the answers address productivity related aspects as well, so that the need to improve productivity is emphasized and continues to be a central challenge for the future as well.

Based on the frequency of voicing, the areas ‘Resources’ and ‘Processes & Efficiency’ are considered to be most important. The main resources needed are time, personnel and senior partners supportive of innovation. This finding underlines the importance of turning innovation into monetary returns. Whereas the costs of innovation are easily accounted for and accrue immediately, its benefits occur much later and are often much less attributable to the initial innovation activity. Hence, any extra effort for innovation is difficult to communicate to senior partners and clients. In consequence, innovation efforts are omitted, even though they have the potential to increase the internal productivity (e.g. process innovation) or to improve the client’s cost-benefit-ratio (service and product

innovation). Therefore increased management support for innovation is required in order to foster the continuous development of innovations as a basis for competitive advantage. Since efficiency improvements within law firms typically require improvements in information systems and workflow, IT resources and budgets may become bottlenecks (LF 1; LF 2; 10; LF 14; LF 20).

Furthermore, the identified challenges comprise the three particularly important cultural themes of (1) short term orientation, (2) resistance to change, and (3) conservatism. These are difficult to change, with the partnership governance model inherently resisting and slowing down change (Nordenflycht, 2010; Ribstein, 2010). It is only the major and threatening changes in the external environment that are arming progressive management teams with the ability to push through the required changes in their companies that will support an innovation culture.

There is also recognition that “making it happen” (LF 21) through execution of new projects is a challenge for the companies. Law firms typically invest too little time and other resources in implementing new ideas, i.e. services or working processes. Thus, the realisation of innovations takes much longer than initially planned. The investigated law firms follow different approaches in dealing with this challenge. Some assign innovation management to partner priority (LF 4; LF 15; LF 19). A second measure is to include selected partners and senior associates in innovation processes from their perspective (LF 2). As a third strategy, we identified law firms which spread innovation management even wider by including all staff members in innovation efforts. It remains a task for future research to assess the effectiveness of these innovation approaches.

In order to dramatically improve innovation performance respondents explained two further strategies: in terms of developing innovation, one partner would like to establish a firm-specific “Think Tank” (LF 5) for target development and implementation of innovation. Another partner would like to separate “five associates to run wild as Skunk Works” (LF 14) in order to pursue innovation tasks. Both ideas propose to free junior staff members (associates) from the day-to-day business in order to focus on developing innovations.

Besides the given points—which are undoubtedly important—the client-lawyer-relationship remains to be the constant factor in this industry. The need for a trustful adviser is permanent as clients’ future may depend on this relationship. But trust is not the only success relevant feature of the relationship. Clients also require a consultancy beyond the advice.

7.4 Conclusion

The present study demonstrates that innovation as productivity lever is increasingly relevant for law firms in Germany. Innovation activities differ substantially among the investigated German law firms. The differences occur due to many reasons, e.g. the degree of specialisation or generalisation of innovation efforts within the company, the general understanding of innovation in the company as well as the different ways to put this understanding into action. The development and

implementation of an innovation supportive corporate culture also seems to become a crucial enabler. This is in particular the case where business models need to be changed. Finally, current market conditions are external drivers for all law firms which have been forced into a rethinking of business processes. Even though not stated directly, the need to increase productivity has become central for German law firms. Potentials for improvements are considered to be mainly in the areas of products and services as well as processes.

As the challenges and the drivers presented in the study differ from company to company, accordant management responses need to be chosen individually. Observed innovation strategies vary between single ideas and full fledged strategic planning. Employee integration ranges from single partners, to selected employees, to the involvement of all employees; in some cases including innovation-championing partners. The impact of achieved results may be company-wide or limited to single units. Overall, larger law firms tend to show higher innovation efforts than smaller companies.

Many contacted companies declined participation in the study by stating that innovation was not important to them. At the same time, some of them declared that productivity issues had already been discussed. This underlines the importance of this study's aim to raise attention for innovation as driver of service productivity in German law firms.

Concerning future research, more studies on particular innovation management practices, core resources and innovation capabilities as well as their impact on innovativeness, client-relationships and the financial performance are required to better understand this professional service industry. As law firms represent a truly neglected area, and the applicability of insights from other related industries, such as management consulting or tax and audit firms is not yet shown, in particular exploratory case studies are needed to better understand innovation management in law firms.

Acknowledgements The authors are particularly indebted to John Bessant who brought us together and inspired us with the idea as well as to Florian and Christoph Möslein, two experts of research and practice in jurisprudence who were of great help for understanding this particular reticent empirical field. Furthermore we gratefully acknowledge the financial support provided by the German Federal Ministry of Education and Research (Project ServProd, FKZ 01FL09008).

Expert's View

Thomas Zwack

Jakoby Zwack GmbH

Question: How and where will innovation in services increase productivity?

Thomas Zwack: As a consulting company for the insurance industry based in Germany we continuously and proactively respond to innovation needs of our clients. While insurers were maintaining their product centricity, the insured totally changed their requirements. Insurance clients were more or less a uniform group 20 years ago. But today we recognise two major different types of customers. One is chasing the cheapest offer and product parameters or service options are more or less irrelevant. The second group however is willing to pay a high premium but expects excellent accessibility and service. To achieve optimal value for both types of clients, insurers must address the entire value chain, including areas such as first notice of loss (FNOL), appraisals, rental management, repair and payments, subrogation, salvage and fraud.

To increase service productivity the insurance industry offers a set of possibilities like repair networks, independent adjusters, repairing with used parts, cooperation with rental firms, maximum configurable products, automatic fraud detection, etc. Insurers who do not pay attention to these capabilities, will risk their financial benefits and customers.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Thomas Zwack: Most insurance executives recognize the value of innovation, but only a few clearly understand the process of implementing service innovation into a business model and even fewer have the ability or position to successfully integrate continuous cycles of innovation in their companies. In a first step the insurance industry and their vendors need centralized teams looking at the future of insurance, looking at other industry groups for ideas, looking to change market dynamics on customer value, products and services, creating new markets and redefining the competition. As of today insurers have excellent product development departments but only a few have central R&D units that are already standard in other industry groups. They also tend to avoid spending a fixed percentage of the premium income into service innovation.

John Bessant

Setting the Stage – Annotations by the Editors

Healthcare is a core service field, not least because all of us will be involved at least in consumption if not service delivery. It has improved dramatically over the past century and benefitted from a range of innovations, both technological and organizational. But in the process healthcare delivery has become a very complex process with many different stakeholders involved such that the process and outcomes of these service operations attract intense, often critical, public interest.

Health care systems operate very differently across the world with a mixture of regulations and market mechanisms. But all healthcare organizations are becoming increasingly concerned with the rising costs of delivery and the simultaneous expansion in demand. In terms of productivity this sets up a number of challenges—for example around labour where the costs can exceed 50 % of a hospital's operating costs and 90 % of its variable costs.

In this context there is certainly a need for improvement to service productivity. But this may not be achieved through incremental innovation alone. 'Doing what we do but better' is certainly an important part of the prescription and the adoption, for example, of 'lean' practices testifies to a constant search for process innovations to improve efficiency. However the challenge is serious enough to require more radical solutions and this raises the question of where and how such solutions might be identified and explored. In this chapter **John Bessant** looks at one possible route drawing on experiences under 'extreme' or 'crisis' conditions where the lack of availability of financial and human resources is forcing a radical rethink of approaches to healthcare delivery.

There are demonstrable examples in places like India, Latin America and Africa and these models owe much to the systematic application of lean

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principles similar to those which enabled such spectacular productivity gains in the low cost airline industry. The chapter looks both at the how-question but also at the implications for diffusion to more established healthcare systems. It highlights the problems of a ‘not invented here’ response and suggests a process through which learning and transfer of these ideas might take place.

8.1 Improving Service Productivity Through Radical Innovation Along New Trajectories

The challenge of service productivity in many industrialized countries is significant, especially in the public sector. Whilst services now account for close to 80 % of activity in many economies (and this may well represent an underestimate, given the increasing proportion of manufacturing activity which involves ‘servitisation’ wrapping a service offering around a core set of products) there has been relatively slow growth in productivity across most of these.

In healthcare this is of growing significance since the combination of rising expectations, ageing population and limits on the ability of public or private funding streams to expand means that radical productivity improvements will be necessary. McKinsey estimates, for example, suggest that around \$7 trillion is spent on healthcare systems and accounts for a growing proportion of GDP in both developed and emerging economies. Such growth outstrips overall GDP growth by around 2 % per year, so the fraction spent on healthcare is rising inexorably; estimates are that if the US health care budget continues to grow it will account for 96.8 % of GDP by 2100 with the same problem confronting many other countries much sooner.¹

Faced with challenges like this, the need for radical shifts in service productivity is clear; the question is how might these be found through innovation? This chapter looks at some examples of radical service productivity (SP) gains achieved through identifying and working with novel trajectories and developing very different approaches. I follow Leifer and others in defining ‘radical’ not as simple improvements but as significant step changes in performance—for example where there is a 5–10 times improvement in resource efficiencies (labour cost input, scarce resource utilization, etc) without negative impact on quality (Leifer, 2000; Leifer et al., 2000).

Importantly the innovation issues do not lie simply in developing such approaches; it is increasingly clear that their transfer and adoption by others is also a challenge since by their nature they represent significant departure from conventional approaches. As such they trigger what might be termed an ‘immune system’ response which finds ways of excluding them from wider adoption. We will

¹ ‘The emerging market in healthcare innovation’, McKinsey Quarterly, May 2010.

Fig. 8.1 A simple map of innovation space (Tidd & Bessant, 2009)



return to this challenge later but begin with a brief review of the modalities through which innovation can affect service productivity.

8.2 The Role of Service Innovation

Innovation is the process underpinning service productivity improvement and there are multiple ways in which this can take place (see Fig. 8.1). We can think of changes oriented towards four key target areas:

- Innovation of services—essentially analogous to new product development
- Innovation in service production and delivery—essentially linked to process innovation, aimed at improving delivery of offerings
- Innovation in service markets—essentially linked to delivering services to unserved or underserved markets, or changing the positioning in recipient minds
- Innovation in service paradigm—essentially linked to changing the underlying business/mental models

Table 8.1 gives some examples of these, and we can see the opportunity for both incremental and radical innovation within this space.

SP is most commonly associated with the second of these, where the explicit target is to improve the ways in which services are created and delivered. So improving the speed of processing a financial transaction or enhancing the quality of a customer dining experience are typical examples of incremental SP improvement whilst shifting from face-to-face to online, or from assisted sales to self-service represent radical shifts in SP through innovation.

But SP is also affected by changes in the other dimensions. Changing the nature of the service itself—for example through simplification—makes it easier to deliver to a consistent quality. Adding various features and customizing to suit particular needs are other examples of ‘product’ innovation around service offerings.

Table 8.1 Exploring service innovation space

	Incremental—do what we do but better. . .	Radical—do something different. . .
<i>Innovation of service 'product'</i>	Adding new service offer to existing range	Introducing completely new service
<i>Innovation in service delivery process</i>	Back-office process improvement in banks, hotels, insurance, etc.	Radically new service delivery—e.g. online instead of face-to-face in banking, insurance, stock trading, auctions, etc.
<i>Innovation in service positioning</i>	Extending service offer to new geographical or social market segments	Creating or reaching completely new market—e.g. low cost airlines
<i>Innovation in service paradigms</i>	Modifying underlying business model—e.g. shifting emphasis from treatment to prevention or from acute to primary care	Reframing the model—e.g. Spotify moving from music ownership to a rental model or the 'servitisation' of product businesses. The UK Open University changed the underlying model of access to higher education reaching an unserved market via new delivery routes

Position innovation includes targeting different market segments and this provides information about alternative user needs which can shape the service offering and the delivery process in new ways. It can also involve changing the perception of the service—positioning it differently in the mind of the end user.

Of most significance is the potential which changing the underlying mental model has for opening up new or different space within which process innovation can take place. For example, by changing the concept of healthcare from a pay per use model to a national system free at the point of use and available to all drove radical changes in the ways healthcare operated in the UK. The Open University model represented a radically different approach to higher education, redefining it as something which could be available to anyone at any stage in their life and for motivations not necessarily linked to career progression. This shift in thinking drove innovation in order to realise the new model and develop a new system rather than simply adapt or improve existing components. This included process innovation (online and broadcast delivery, distributed tutor network, limited direct interaction, shift from students coming to the university to the university going out to them, etc.), product innovation (development of foundation and feeder modules, credit-based modular structure etc.) and position innovation (reaching widely different and previously unserved markets, growing to be the largest UK institution with close to half a million students and an extensive international footprint).

8.3 Looking Beyond the Lamp-Post for Service Innovation

One of the challenges in innovation is the problem of search. Organizations need to look for new ideas, technologies to use, market needs to satisfy, etc—and they do so with limited resources. As a result they operate within a particular frame, a search space which is termed the ‘selection environment’. It provides a stable and successful model for managing innovation but by its nature excludes some radically different options. Over time the possibilities in the existing selection environment become exhausted and the organization often expresses a need to ‘think outside the box’—in other words to explore further afield. This raises difficulties akin to the old anecdote about the drunk searching for his keys under the lamppost ‘because there’s more light here’. Innovation processes are tuned to search in existing space, relationships are made with key suppliers and sources of knowledge, user needs are understood within that context. Search beyond the frame—getting out of the box is difficult because:

- There are 360° of new space—in which direction should we look at how best do we deploy our scarce resources?
- The immune system is designed to focus and concentrate and will reject novel ideas which do not fit.
- Implementing new ideas from outside the frame may require a major reconfiguration in terms of skills, processes etc.—the way we do things around here—and set up resistance.

At the same time we know that radical gains can be made through such exploration. In particular service productivity improvements can come from reframing and systematically developing along new trajectories. This was the case, for example, in low cost airlines which represent a powerful case of service productivity improvement. The existing frame for the airline business around short haul was based in a model which dominated the behaviour of all the existing major airlines and allowed them space for innovation and competition.

The low cost entrants reframed the challenge in the early stage by targeting a market which did not exist—people who potentially would fly but were excluded on grounds of cost. (This is an example of ‘position’ innovation in the above 4Ps schema). By shifting the frame to include these users and their needs—for safe, low cost travel—the innovation trajectory was changed and became a driver for change in processes and product. The ‘product’ offering was stripped down to its very basic elements—a seat on an aeroplane—and much of the innovation was around removing the ‘frills’ (reserved allocated seating, in flight catering, lounges, personal services, etc) to drive down the costs and standardize the product. Process innovation was similarly targeted around reducing time and cost—through moving away from intermediaries in the booking process, simplifying check in, reducing turnaround times, etc.

Importantly the model did not evolve overnight but developed over an extended period in which there was considerable learning and interaction amongst players. Such experimentation took place away from the mainstream—indeed most low cost airlines were unable to access mainstream airports and were considered peripheral

operations similar to the charter business. As a result a different model developed in parallel with the mainstream, but running along a very different innovation trajectory.

Two things are important in this brief example. First, the shifting of the frame opened up new innovation space to explore and led to demonstrable and significant productivity gains as the model evolved through an extended learning phase. These radical productivity gains did not emerge from a single innovation but rather from the evolution of a new system within which multiple interacting innovations converged to a new model. Progress towards this was enabled by a clear vision which provided the focus for an extended learning process. We can see similar models in history—Henry Ford was not the inventor of the motor car but his vision of ‘a car for Everyman’ aimed to provide the car to an unserved market of ordinary people rather than to a wealthy few. The process of evolving a solution took around 15 years and involved extensive product and process innovation as well as continuous improvement of the emerging new model.

And second, it then had an impact not only amongst its new target market but later on the mainstream existing market as the advantages of a simpler, ‘good enough’ service with major price advantages were recognized. At this point, the airline business was turned on its head and leadership moved to those new entrants who had learned to operate the new model; existing carriers were forced to adapt their own operations but did so at a significant disadvantage. First they were late to the game and were forced to move up the learning curve behind the new entrants—and second they were encumbered in doing so by their existing structures, procedures and underlying culture—the way we do things round here’. (In many cases, early attempts to establish low cost subsidiaries (like British Airways’ ‘Go’ or KLM’s ‘Buzz’) foundered because of the cultural mismatches). This pattern of ‘disruptive innovation’ is a common experience and we will return to a fuller discussion of it later.

In the next section we consider the possibilities for radical service productivity improvement through an analogous process. Looking outside the mainstream selection environment at how the challenge of healthcare is being met in situations where there are very different framework conditions—low financial resources, lack of skills, high demand but spatially distributed, etc. Under such conditions there is growing evidence for a new approach which has been variously termed ‘frugal’, ‘jugaad’ or ‘bottom of the pyramid’ innovation.

8.4 Frugal Innovation as a New Paradigm for Service Productivity Improvement

Although there is a long tradition of innovation studies in developing country contexts (for example the extensive discussion of ‘intermediate’ and ‘appropriate’ technology), it was the writer C.K. Prahalad who first drew attention to the potentially significant opportunities opened up in this space (Prahalad, 2006). His 2006 book ‘The fortune at the bottom of the pyramid’ was essentially a ‘thought

experiment', which argued that most of the world's population—around 4 billion people—live on incomes of less than \$2/day. The typical response to this group was to see it as lying outside of the 'normal' market for goods and services but Prahalad challenged this, arguing that devising novel ways of delivering those goods and services could result in radically different innovative solutions and represent a viable alternative business model. He backed up his challenges with a set of case studies showing how such models were emerging in India, Latin America and Africa.

Subsequent studies have elaborated on both the model and the case illustrations and there is now growing convergence around the importance of what has been termed 'frugal innovation' (NESTA, 2012). The essence of frugal innovation is solving problems in cost-effective and sustainable fashion under severe resource constraints. It has some roots in traditional innovation disciplines such as value engineering and target costing, and underpins the lean philosophy (Womack & Jones, 2005). For example, the car manufacturer Nissan has made extensive use of the 'frugal engineering' approach to significantly bring down costs and improve productivity, seeking not only improvements to existing utilisation but also radical redesign for simplification and standardisation.

By its nature frugal innovation requires creative and ingenious problem solving since conventional solution pathways are not available due to resource constraints. A number of writers have used the Hindi term 'jugaad innovation' to describe an approach which is flexible, improvisational and creative, often providing ingenious work-arounds to problems (Radjou, Prabhu, Ahuja, & Roberts, 2012). Such models offer an interesting alternative pathway challenging the dominant innovation trajectories in manufacturing and service businesses—for example through simplification.

Examples include:

- The Tata Nano, a simple safe car designed for India with a target cost of \$2,000. This was achieved through extensive value engineering and creative working with suppliers; the car is on sale and a more advanced version—the Pixel—will be sold in Europe in 2014.
- General Electric's portable ECG scanner, designed for use by peripatetic midwives visiting villages in rural India. Originally conceived as a simpler version of their 'mainstream' product the result is a hand-held device which has cut the cost of the machine by 60 % and made low cost scans available, with a typical price of \$0.2/scan. The device has proved popular in mainstream Western markets as well as India.
- The Aakash computer, a seven inch, touch screen, internet enabled device, was launched in 2011. Datawind, a UK based company, are supplying the first 100,000 devices to the government of India at \$50 each but in a high enough volume, the company believes they can sell them to Indian government for just \$35.

It is relevant in our discussion because the 'frugal innovation' approach lays emphasis on simplicity and functionality without compromising quality—opening up a different envelope or search space. Such approaches offer an exciting

laboratory for new possibilities and evidence is accumulating to suggest that it works it is offering radical SP improvements without compromising quality. We recognise the underlying possibility—low cost airlines have transformed short haul flying by radical SP improvements coupled with maintenance of core quality standard around safety even if other aspects of the ‘quality’ dimension have been downgraded, e.g. user experience.

In the following section we explore some cases of ‘frugal’ innovation in the healthcare context which we will then analyze and discuss in the remainder of the chapter.

8.5 Case Examples

8.5.1 Aravind Eye Clinics

Whilst there are many complex optical disorders, cataracts are not generally regarded as a difficult challenge in eye care. Yet for nearly fifty million people around the world—nine million of whom are in India—cataracts mean blindness because they are unable to afford medical treatment. This has not only direct implications for quality of life; it also poses a significant threat to economic well-being since blindness may restrict employment opportunities. On retirement as Head of Ophthalmology in a major Indian hospital, Dr G. Venkataswamy began exploring how to target and treat this group, using the simple tools and techniques which he and colleagues had worked with over many years.

This was not an insignificant problem—whilst the treatment itself—diagnosis, operation and after-care—is well-developed in the eye hospitals of the world, it comes at a price. In the USA, for example, treating cataracts costs between \$2,500 and \$3,000 and even in an Indian hospital the cost works out around \$300. For a country like India where most people, especially in rural areas, earn less than \$2/day, such a price tag puts treatment out of the reach of most. Meeting the needs of this segment is an example of what C.K. Prahalad calls, ‘the bottom of the pyramid’.

That vision drove a programme of innovation and today the Aravind Eye Care System is the largest and most productive eye care facility in the world. In the year 2007/2008, about 2.4 million persons received outpatient eye care and over 285,000 underwent eye surgeries at the Aravind Eye Hospitals at Madurai, Theni, Tirunelveli, Coimbatore and Puducherry.

Achieving this required extensive search outside the medical sector, looking at other fields with the same challenge of carrying out activities systematically, reproducibly and to a high quality standard—but at low cost. He found inspiration in McDonalds, the fast food company which pioneered an approach based on reproducibility—despite huge variations in the context in which they are located, all McDonalds outlets operate on the same model, and staff is trained in a core set of skills which are common to all its operations. This model, developed in the 1950s, was in turn borrowed from an earlier exponent, Henry Ford. He and his team of

skilled engineers in the early 1900s faced the same challenge—how to make a complex product (the Model T Ford) systematically and reliably but at a low enough price that it could become ‘a car for Everyman’? Their solution was to design a system which standardised as much of the process as possible and reduce the key skills and discretionary elements to a minimum—and then apply this across a high volume of production. In turn these ideas weren’t new—the principles of division of labour go right back to the 18th century and the observations of Adam Smith on pin-making in the early days of the UK’s factory system.

The basis of the Aravind eye clinics is standardisation and ‘engineering’ cataract surgery for high volume production. He opened his first hospital in 1977 with 30 beds and managed to generate a surplus in the first year of work so that a second 70 bed hospital could be opened catering exclusively to the poor and offering operations free of charge. In 1981 a fee-paying hospital with 250 beds was opened and another free hospital with 350 beds followed in 1984; by the turn of the century there were around 1,500 beds (of which the majority were free) in Madurai. The model spread out to other locations across Tamil Nadu so that by 2003 there were five Aravind hospitals with a total of 3,649 beds of which 2,850 were free.

Just as Ford, McDonalds and Toyota focused on continuously improving and extending their system models, so the Aravind Eye Hospitals gradually shifted to become the Aravind Eye Care System. Key elements were added—for example, a dedicated factory for producing lenses, a training centre to provide key skills, specialist ophthalmic research centres, and an international eye bank. Of particular importance has been the Aravind Eye Camp model which takes the system out to rural locations, offering advice and diagnosis and feeding patients into the core hospitals where the high productivity model can treat them. This brings an element of preventive medicine into the system—by identifying early symptoms, particularly amongst children, relatively low cost measures (such as corrective glasses) can be implemented. There is now an extensive education programme linked to the camps which reach out to rural communities.

Another important element in the system approach is the attention given to training so as to ensure an adequate supply of key skills. 900 ophthalmic assistants are taken on and trained each year to support the specialist doctors, whilst other skills such as counselling and education are also developed via dedicated training courses. Significantly recruitment and motivation are still strongly linked to the core values of Dr V—there is a strong social commitment which means that staff often works for less than they could earn in other parts of India’s health system.

As with their earlier counterparts, the success of the model relies on a process of continuous improvement directed towards a clear and sharp focus. Target costing is a well-known tool in product innovation for engineering the design of production systems, and in the case of the original cataract operation Dr V. set this as being around \$50/operation (assuming no complications ensued). This compares to around \$300 as an average cost for treatment in a conventional Indian hospital (and \$1,650 in a US hospital). Developing and refining the system has meant that the average cost in the Aravind system is \$25, based on a proportion of patients paying between \$50 and \$300 but over 60 % being treated free. In 2003 Aravind

became the largest single cataract surgery provider in the world. The key is in the volumes—around 200,000 patients are treated each year, based on the high volume/low margin kind of business model which Henry Ford used on the Model T and which now drives the low cost airline industry.

Inevitably the approach involved rethinking the underlying model. In a conventional Western hospital an eye operation would typically take 30 min—yet the Aravind system needs only 10. This high productivity is achieved by significant process innovation driven by close analysis of value adding time. For example, each surgeon works on two operating tables alternately, and is supported by a team of paramedics to carry out less-skill dependent aspects such as washing the eye, putting in sutures, giving anaesthetic injections etc. 70 % of activities are carried out by a team of four nurses supporting the surgeon, two assisting directly and two acting as ‘running nurses’ bringing fresh instruments from the sterile area.

Of considerable importance is the fact that this low cost treatment is not provided by compromising on quality. A key statistic in medical care is infection rate—and the Aravind system actually has better performance than many Western hospitals. For instance in 2004 it was about 4 per 10,000 cases at Aravind, while the UK published rate was 6 per 10,000. (Interestingly the idea of having two patients in the same operating area is prohibited in many US hospitals because of fears of infection). Aravind also operate a very close outcome monitoring system, especially for cataract surgery, where every case sheet on discharge is fed into the computer and then analysed. In turn this feeds a continuous improvement process—measuring, reviewing and then changing. They put in a lot of effort to follow up on every camp patient and around 90 % of the patients are interviewed as part of this process which provides valuable feedback on factors like outcomes of cataract surgery, the number of people recovering normal vision, intermediate vision and so on.

The same high volume/low margin model has been applied to hit target costings in other areas. For example early operations often involved fitting an ‘intra-ocular lens’ which was expensive as an imported product. Value engineering the design and then setting up manufacture within a division of Aravind—Aurolab—now means that the IOLs can be made for a fraction of the import price (\$6 vs. \$100–\$150 for a US made lens of the same quality). In the process Aurolab have become a major producer with about 10 % of the global market share.

But there is another important feature to this story: with such a high volume of surgery—200,000 plus cases per year, with each doctor carrying out around 2,600 operations/year (against an Indian average of around 400)—comes a rich learning opportunity. The principles of the ‘experience curve’ have applied across many different industrial sectors—and there is no reason to suppose that healthcare is any different. Learning by doing is a powerful aid to developing robust systems—and in the Aravind case the model is now being looked at by many health authorities around the world.

8.5.2 LifeSpring Hospitals

As with the Aravind example the origins of this innovation lie in concern for a specific group of users who are marginalized from access to a key medical service—maternity and perinatal care—on the basis of cost. The problem of maternal mortality is significant; India has the highest rate of pregnancy-related deaths in the world, with around 117,000 per year. (The Maternal Mortality Rate—the number of such deaths per 100,000 live births—is 540 whereas the US figure is 17). There is a high correlation with perinatal treatment; of the estimated 26million births each year only 43 % are supported by skilled staff.

Established in 2005 LifeSpring targets customers from a key tier in the Indian population, not the very bottom but low down the pyramid. Their customers are typically women whose husbands work in the informal sector, who have no health coverage and who are urban slum dwellers or in low income housing. The mission is to provide core maternal healthcare (antenatal and postnatal, normal and caesarean deliveries, and family planning services) at an affordable price. LifeSpring also provides paediatric care (including immunizations), diagnostic and pharmacy services, and health care education to the communities in which its hospitals are located.

Lifespring was set up as a joint venture between Hindustan Latex (a major manufacturer of contraceptives) and the Acumen Fund (a US-based social capital investor) and has treated more than 200,000 patients and delivered nearly 12,000 healthy babies since its inception in 2005. The model involves creating small—20–25 bed—hospitals; the first broke even within 20 months and enabled the expansion of a chain of similar facilities via what has become a standard operating model. It maintains a tight focus, specialising in obstetrics, gynaecology and paediatrics for women within a 10 km operating radius of their hospitals. Importantly the facility is designed for high throughput of ‘standard’ cases; women with complications are identified early and referred to other clinics. Lifespring has become the largest chain of maternity hospitals in South India, treating more than 70,000 patients and delivering more than 7,000 healthy babies each year; it now operates 12 hospitals in the Hyderabad area.

The hospitals are positioned as a low cost alternative to private clinics; there are some government facilities which offer lower cost (subsidized) treatment but these are oversubscribed and access is often difficult. Typically the charges for normal and Caesarean deliveries are 12 % of private clinics; normal births cost around 1.5 K rupees as against 8–10 K and Caesarean figures are 6 K as against 20–30 K (Monitor Group, 2008).

Achieving these significant reductions has again involved a process of innovation against a clear focused target vision. Once more the basic principles of high volume standardized ‘production’ are central to this and there are clear similarities to the Aravind model. In particular Lifespring’s model is characterized by four ‘pillars’ which provide a focus around which a range of innovations are grouped:

- Service specialization
- High throughput
- High asset utilization
- No frills service

(Significantly these are essentially the core principles of the low cost airline business model which has had such a disruptive effect in short-haul aviation).

Service specialization involves a high level of standardization around a tightly focused service offering. This allows for rapid replication and spread of the model—a ‘drag and drop’ approach. Importantly complications are screened out early and such patients are cross-referred to other specialized clinics. Operating protocols and procedures are standardized which allows for the rapid training of low-skilled staff and the replication of the model quickly into other situations. Standardized kits are used for a wide range of surgical and other procedures and the range of medications is kept low to reduce cost and increase purchasing leverage. Importantly a lower skill-grade of the nurse—ANM as opposed to GNM²—is recruited; these nurses are trained internally in a narrow field and achieve a high level of competence. This helps retention whilst also reducing labour costs.

High throughput involves operating at a much higher volume (outpatient and deliveries) than traditional players, enabling Lifespring to spread its fixed costs over a larger number of customers. In their hospitals they complete 100–120 deliveries per month compared to 30–40 in similarly sized hospitals). Making this model work depends on maintaining a consistent flow of patients. This is achieved by focusing on areas of high population density but also working with those communities to ensure widespread awareness. This is important in a sector with low literacy where word of mouth is the key communication channel and where trusted recommendation is of significance. Lifespring operate through a ‘sales force’ working in the community and make use of education ‘camps’ and offer vouchers and baby packs to generate repeat business.

The ‘no frills’ element involves systematic focus on driving down costs through elimination of unnecessary and non-value-adding activity—essentially the principles of ‘lean thinking’ (Womack & Jones, 1996). Medicines used are drawn from a narrow range and inventories are kept low through a ‘just-in-time’ policy; pharmacy services are outsourced to reduce costs and also cut the risk of pilferage. The hospitals do not run their own ambulances and wards are general rather than specialized. Capital expenditure is reduced through renting space in old hospital premises and by working with a standard and limited set of equipment.

High asset utilization is achieved through deploying a cluster model; by setting up multiple small hospitals within a single city many key resources—ambulances, back-up facilities, etc.—can be shared. Of particular significance (since the main cost in prenatal care is in doctor’s salaries) is the use of fixed salaries for doctors.

² General Nursing and Midwifery and Auxiliary Nursing and Midwifery certification by the Indian Nursing Council.

8.5.3 Narayana Hrudayalaya Hospitals

As with the preceding examples, the Narayana Hrudayalaya Hospitals (NHL) model began with a sharp focus on delivery of a specialized target to bottom of pyramid users. In this case the founder and visionary was Devi Shetty who originally trained as a cardiologist and whose vision was to bring cardiac care within reach of this group. More than 2 million Indians need, but cannot afford, heart surgery; in 2011 heart disease overtook communicable diseases as the major cause of death and this has significant knock-on economic effects since family breadwinners are often the victims. His first step was to establish a 150 bed hospital in Bengaluru in 2001, but this model has spread rapidly on the back of significant productivity gains. His NHL 'health city' complex now on the site is the world's largest and also cheapest heart care institute. It includes the world's largest heart and cancer hospitals, a specialty hospital for all the plastic reconstructive surgery, an institute for organ transplant, a hospital and also training and research institutes.

The 1,000-bed heart facility provides high-quality yet very inexpensive heart surgery; in 2008 there were 3,174 cardiac bypass surgeries and 2,777 paediatric operations, more than twice the volumes achieved in leading specialized hospitals in the US. Their success rate is higher than that of their counterparts in New York State, and the mortality and hospital-acquired infection rates equal those of the best hospitals worldwide. The hospital reports a 7.7 % margin, higher than the average for US hospitals, but charges US\$3,000 or less per surgery, compared with US \$5,000–7,000 in private hospitals in India and up to US\$50,000 in the US. With further changes in processes, negotiations with suppliers and creative partnerships, NHL plans to reduce its costs even further.

Its significant improvements in productivity have come through systematic process innovation which has reduced the cost of a heart surgery to \$1,500 for a 3–4 day surgery and care. Large corporate hospital chains charge \$5,500 or more for this. Similarly, because of scale in dialysis, prices are cheaper by 15–30 %.

Once again the underlying principles are simple and would be recognized by Henry Ford or Taichi Ohno of Toyota—economies of scale achieved through standardization and linked to continuous and systematic improvement over time. For example, the paediatric cardiac unit is the largest facility in the world with around 50–60 cases undergoing treatment at any one time—probably, the number of cases that other hospitals would handle in a year. Such scale drives significant economies in key items of procurement of equipment drugs, and other consumables as well as allowing for more efficient utilization of human resources. (For example, NHL is currently the largest customer for heart valves in the world).

Central to the model is policy deployment—focusing on a core goal—cost reduction without compromising quality—but then recognizing the myriad ways in which that can be delivered by mobilizing high involvement innovation (Bessant & Francis, 1999; Bessant, 2003). Examples include cutting the cost of items like sutures and gloves by nearly 50 % through a combination of incremental innovation and negotiations of volume discounts with suppliers. Careful attention to value and utilization has brought a sharp focus to innovation in equipment utilization; for

example air conditioning is only deployed in areas where it is required for medical reasons, such as in operating theatres. (This ‘value stream mapping’ approach is a core component of lean thinking methodology) (Hines, Cousins, Jones, Lamming, & Rich, 1999).

Another theme recognizable in the manufacturing world is that of using simple low cost machinery as opposed to complex multi-function devices which carry higher capital and maintenance costs. Existing equipment is also supported through careful maintenance to extend its lifetime using approaches drawn from the ‘total productive maintenance’ experience in manufacturing (Vaag, 2001).

Land and buildings are major components of hospital costs but NHL have managed to reduce these by concentrating on out of town sites which are cheaper and by partnering with government who provide subsidies in return for NHL treating a proportion of patients (typically 5 %) at no cost. Another strategy is to take over ‘failed’ investments—such as a hotel—and re-use the facility; the conversion cost is considerably lower than purpose building.

Human resource policies are another key component; where necessary NHL makes use of skilled doctors but for a wide range of activities it employs nurses and other staff. By training and specializing them NHL builds capacity and flexibility into the system. However non-core activities such as security or cleaning are outsourced. Cost savings also come from changing the relationship with doctors who concentrate their efforts in NHL hospitals in return for a high but fixed salary—as opposed to consulting with several hospitals. This means they do not waste time travelling between patients but also builds experience and learning across established teams.

The scale of operation also allows for considerable learning effects; NHL carries out ten times the volume of heart surgeries of other hospitals currently accounting for around 12 % of all heart surgeries (90,000 annually). With such high volumes surgeons at NHL become more experienced; NHL currently has the best success rate of any cardiac hospital in the world. Similar patterns can be seen in other areas; for example NHL performs the maximum number of dialyses by any hospital chain in India, while the Mazumdar Shaw Cancer Centre does the most bone marrow transplants.

As with LifeSpring, the standardization of the core model makes it relatively easy to replicate and scale and in a period of just over 10 years NHL has expanded its operations to 11 cities with 14 hospitals and 5,000 beds. The NHL chain is now the fourth largest in India and offers care across a number of treatment areas beyond cardiology; NHL now offers care in orthopaedics, oncology, nephrology, neurology, eye care, dermatology and dental care. It has even moved into cosmetic treatment such as rhinoplasty, liposuction and breast reduction or augmentation.

Of particular relevance in NHL is the idea of system level thinking. It is not just the direct medical care but innovation in the much wider system which makes this such a powerful model. Examples include close links with pharmaceutical firms who work with NHL on clinical trials and with equipment makers, who not only offer lower prices in return for guaranteed volumes, but are also experimenting with new business models. For example, NHL has been able to convince equipment

vendors to install machines and accept returns on a pay-per-use model since volumes of use are so much higher than conventional hospitals.

It has also been very active in developing the wider health infrastructure in India, for example through involvement with micro-insurance for bottom of pyramid citizens.

Shetty pioneered the idea of the Yeshasvini medical insurance scheme which was originally targeted at the estimated 2.2 million farmers and peasants in the Karnataka region who were part of the Karnataka Milk Federation. (It has since been extended to a wider range of people across the region). Established in 2003, this scheme offers a comprehensive package covering surgery and associated out-patient care for an average cost of ₹2.2/year for adults and ₹1.2/year for children. Its viability is based on some simple principles; typically less than 0.8 % of the population requires surgery and no-one willingly wants it; as a consequence fraud levels are very low.

As with the previous models the core goal of delivering low cost insurance is then supported by extensive innovation across the system to drive down costs through standardization of operating procedures, simplification of administration (for example, the farmer's co-operative is responsible for collecting payments, and the regional government allowed post offices to handle the issuing of membership cards) and improvements in resource utilization. The scheme concentrates on common types of surgery—1,650 varieties—and also offers outpatient consultation pre and post surgery. In order to deliver this, it mobilises a network of around 400 hospitals with under-utilized operating theatres (utilization rates in the region can be as low as 35 %); around 30,000 operations and 85,000 consultations were carried out during the first 2 years of the scheme's operation.

A recent evaluation of the scheme by health economists concluded that 'the programme is found to have increased utilisation of health-care services, reduced out-of-pocket spending, and ensured better health and economic outcomes...' (Aggarwal, 2010) The scheme is self-funding although the government contributes a third of the 7.5 rupees premium.

NHL are also involved in hospital design as they are now a major customer for construction; in this way their influence on design-for-purpose can drive further economies and improvements in quality of service. NHL are also pioneering telemedicine approaches to extend the outreach and 'front-end' of the healthcare system. Through an extensive network of on-line consultations NHL can prepare for patients coming into its facilities and reduce in-house costs, duration of stay, etc. whilst enhancing the quality of care provided.

As with many social entrepreneurs there is a clear business vision—it is not simply a philanthropic charity or aid dependent system but a viable business model in which cross-subsidy takes place. Wealthier patients still receive cheaper care but the margin between actual delivery costs and selling price to them generates a surplus which can be used to help those least able to afford it. About 5 % of its patients (equivalent to 50–60 free surgeries/week) receive free treatment and an additional 27 % receive subsidized treatment.

NHL have already demonstrated the transferability of its standardized model; it can operate a ‘drag and drop’ approach and is now exploring moving beyond India with facilities in Malaysia. Of particular significance is another investment in the Cayman Islands where the aim is to tap into the neighbouring US market which is only an hour away. A 250–300 bed facility is being built which will cater for a growing segment of the population worried by spiralling US healthcare costs.

8.5.4 Apollo Hospitals

Another example of hospital innovation is the Apollo group which was found by Dr. Prathap C. Reddy in 1983 and has now grown to over 8,500 beds across 54 hospitals within and outside India. It employs over 60,000 people and uses a similar approach—of standardisation and replication to enable scale at low cost. Reddy has been labelled the ‘architect of healthcare in India’; importantly the model is now receiving considerable international recognition for its quality standards and awards for best practice. For example, the Hyderabad hospital was the first in the world, outside the US, to receive the US-based Joint Commission International (JCI) ‘Disease- or Condition-Specific Care (DCSC) Certification for its Acute Stroke treatment in 2006. Since its founding, Apollo has had the very impressive track record of about 90,000 hospitalisations with a success rate of 99.4%.

Productivity gains have been significant—for example, administrative costs have been contained to account for only 7 % of a patient’s bill, compared to the U.S. average of 25 %. As with the NHL case, Apollo have worked to reduce the costs of major procedures—for example lowering the cost of a heart bypass surgery to about US\$2,300. This comes in part from pioneering new techniques and capturing the learning across a high volume of operations. An example is the “beating-heart surgery” process—a highly skilled operation in which surgeons repair blood vessels while the heart is beating and which allows for quicker recovery and lower costs. Apollo now conducts beating-heart surgery in about 90 % of such procedures, compared to 5–7% internationally.

Growth has been underpinned by strong performance, not only in terms of productivity but also in health outcomes which are comparable to major hospitals around the world. Significantly, 15 % of patients are now from outside the country and many are high income ‘medical tourists’ taking advantage of relatively low cost and high quality care for elective surgery such as hip replacements. The Chennai hospital now does the most cementless hip replacement operations in the world.

The underlying concept is a systematic approach, offering a complete architecture of healthcare including clinics, diagnostic centres and pharmacies (they operate over 1,000 retail pharmacies and are rapidly expanding this activity). They are also active in the health insurance space, for example, offering health insurance that costs 2.5 US cents a day for a family of five.

This is underpinned by various healthcare management initiatives including education, training and telemedicine services. It is now one of the largest players

in the telemedicine sector; having begun a pilot project in 2000, it now operates 71 centres across India. Of particular interest is the idea of 'Reach' hospitals which was initiated in 2008 and which are small satellite facilities opened in rural areas offering a limited range of low cost services to low income populations. (The demographics of India are that 85% of this 'bottom of the pyramid group, with monthly incomes of less than \$70, live outside the cities but the concentration of healthcare facilities and services are still based in the cities). The operating model of Reach hospitals is to cross-subsidise care by selling services to high income patients at competitive rates (up to 30 % cheaper than major hospitals) and using the resources to treat low income families.

A typical Reach hospital has between 150 and 200 beds, 40 intensive care beds and 5 operating theatres. It is able to provide a good range of key services including cardiology, oncology, radiology, neurosurgery, video endoscopy, as well as blood bank; check-up; complete lab; dental; ear, nose, and throat; and eye care services. In some cases, Reach hospitals also run an emergency air ambulance service to cover remote areas. The model makes extensive use of telemedicine and mobile health approaches allowing patients to communicate with specialist doctors via phone or Internet. This offers the significant advantage of reducing travel times and distances as well as cutting waiting times for patients before they receive a second opinion from a specialist. The system also offers medical alert and disease management services on a remote basis.

Apollo is increasingly partnering up with major organisations in order to develop healthcare applications suited to the local context. One example is the 'Health highway' project with IBM which is an ambitious integrated information system which aims to bring all the information involved in healthcare—patient records, hospital management, technical knowledge, etc.—into a single integrated model and deploy it via internet and mobile technology across the country.

They also have the resources and scale to explore technologically advanced solutions—for example they pioneered the use of CT scanners in India during the 1980s. An important source of technology awareness and diffusion lies in the large population of Indian doctors who study in global centres of excellence and then return to practice in India, bringing with them an up-to-date understanding not only of the technology available but also how to best adapt and use it in the local context.

Telemedicine has grown significantly in part because of extensive investment in satellite technology by the Indian government. Apollo hospitals operate a fleet of diagnostic vans which have satellite connectivity with ISRO, the Indian Space Research Organization. This provides a mobile service able to offer diagnostic tools like ultrasound and X-ray, the results of which are beamed to the main base hospitals. Its key advantages lie in the ability to reach and connect; for example, after the 2004 tsunami Apollo were quickly able to provide medical services into the affected regions.

8.5.5 Telemedicine and M-health

The above examples describe individual cases but it will also be useful to look at some ‘frugal innovation’ approaches which are building on the existing (and rapidly evolving) platform of internet and mobile communications. One of the far from mainstream challenges which is being addressed in emerging economies is the difficulty of covering large geographical areas with limited resources and uneven distribution of skills and assets. In particular diagnosis and treatment problems include:

- Populations are widely dispersed, often in remote areas with limited access,
- Skilled resources—qualified and experienced medical personnel—are scarce,
- Specialist equipment is expensive and concentrated in key locations, requiring travel to the site,
- Cost of delivery of care cannot be met due to low income levels, lack of health budget etc.

An emerging alternative approach is drawing on both technological advances in remote communications and new operating models which manage human resources more effectively.

Typically in such systems is the dominant model one which puts the patient at the centre and brings resources to them. In diagnosis this is achieved by making use of high quality online technology to allow a skilled and experienced diagnostician to assess a patient. Ancillary care and preparation of patients can be carried out in situ by suitably trained but relatively unskilled local people—the same model as we have seen in the Aravind, NHL and Lifespring examples. Since accurate diagnosis can provide early warning, more expensive complications can be avoided by early treatment. Simple treatments can be administered by local semi-skilled staff under the online supervision of experienced professionals. But telemedicine also acts as a filter, allowing scarce resources to be concentrated on those patients whose condition is serious enough to warrant further attention. They can then be directed to key specialist resource centres—or treated by increasingly sophisticated approaches which remotely deploy the expertise of highly trained specialists. For example experienced surgeons can ‘talk through’ and monitor/mentor less experienced local staff, or in some cases deploy robotic tools remotely to explore and act.

There is also an educational dimension—telemedicine also allows training of staff both through expert demonstration and also extended outreach. The same principle of a core centre of excellence serving a variety of satellite facilities can be applied, with significant implications for scaling the delivery of education and training.

One of the significant advantages in emerging economies is, paradoxically, the lack of a developed telecommunications infrastructure. It means that the leap-frog to mobile communications and internet services is facilitated by the absence of sunk costs in fixed line investments and opens the opportunity for rapid scaling of reach. India, for example, has nearly 600 million mobile phone users, with around 80 % of the population having access to a phone. Coupled with low cost communications and conferencing—for example across platforms like Skype and WebEx—the

potential for a highly connected system overlaid on a geographically dispersed country is significant. This is particularly relevant in the context of M-health—using mobile phones to educate, alert and enable prevention as well as facilitate access to diagnosis and treatment.

Key elements of the innovation include:

- communication platform—once web-based, now increasingly mobile phones play a role,
- e-health implies extensive use of ICT in all aspects but as a channel to connect better patients with medical care,
- Business model of distributed care, remote operation and move away from concentration to networking,
- A system level model—linking diagnosis via an e-platform—with delivery in distributed treatment centres.

Such models are scalable and transferable—for example, India is part of a major consortium working to transfer the model to Africa, leveraging their experience and the technology of Indian satellites. The involvement of major companies like WIPRO, Infosys, IBM and CISCO also offers a rich knowledge base on which to draw. An example is ANTF (Apollo Telemedicine Networking Foundation) a not-for-profit part of the Apollo Hospitals Group. They established a Rural Telemedicine centre in Aragonda (in Andhra Pradesh and are now one of the largest providers with over 125 peripheral centres including ten overseas. Since the network was established more than 71,000 teleconsultations in 25 different disciplines have been provided and patients have been evaluated from distances ranging from 200 to 7,500 km.

Closely linked to the emergence of radical innovation in the field of telemedicine has been the appropriation of mobile phone technology to offer new, high reach and low cost communication options in the wider health care and management space. For example, under extreme conditions—such as in the immediate aftermath of a disaster like an earthquake or tsunami—there is an urgent need to establish robust and reliable communication networks. Gathering information, processing it and making it available to those who need it in order to make accurate decisions about resource allocation, prioritising logistics and real-time status reporting are all key needs towards which innovation is targeted. Significant progress has been made by humanitarian agencies in learning to deal with this challenge by deploying information and communication technologies.

For example, one of the powerful and high impact innovations in delivering aid in recent years has been the idea of providing cash to distressed populations rather than trying to distribute food aid (Ramalingam, Scriven, & Foley, 2010). This has the advantage of providing relief whilst reducing transportation and distribution costs and also offers significant empowerment to recipient populations, reducing their sense of dependency. Whilst simple in its concept, it presents significant logistical and security issues but the use of mobile phone technology opens up major new opportunities in this space. For example, the aid agency Concern Worldwide (CW) pioneered the use of ‘mobile money’ to develop an emergency response programme in the post-election violence in Kenya in 2007. It included the

distribution of mobile phones as enabling devices and was able to succeed because of a partnership with M-PESA, a powerful and robust platform which had been developed in Kenya to enable what is effectively mobile banking amongst low income groups.

In the chaos following the election ‘normal’ communication and information networks were disrupted which made it difficult for aid agencies to identify where their help might be needed—and when they arrived at a location their ability to co-ordinate logistics etc. was seriously compromised. CW identified a problem area in the remote Kerio valley area and began developing an emergency food programme working with local partners from the Catholic Diocese of Eldoret. However it quickly became clear that the remoteness of the location would make distributing food expensive—and there was a continuing security risk. Consequently the team began exploring an alternative cash distribution programme using M-PESA as an enabling platform.

The process involved distributing mobile phones and also working with M-PESA to facilitate the transfer of large amounts of money (M-PESA normally has a limit on size of transaction to prevent money laundering). Importantly it empowered local recipients to solve their own problems locally rather than encouraging dependence on traditional aid distribution. It proved successful according to independent evaluations which suggested around 70 % of the money transferred to the region was spent on food and the remainder on transport and other non-food essentials. Whilst the programme was expensive in terms of the initial cost of the phones, it provided a downstream and sustainable framework on which the supported communities could build.

Similar models for emergency aid have been used in other regions; for example CW used the approach in Niger where it was possible to conduct a randomised evaluation of the mobile-phone cash transfer programme compared with other options (Aker, Boumnijel, McClelland, & Tierney, 2010). One third of the targeted villages received monthly cash transfers via Zap (the name given to the mobile phone approach), one third received manual transfers and one third received manual transfers and they were also given a mobile phone. The results indicated that the Zap delivery mechanism strongly reduced the variable distribution costs for CW and also cut the costs for the recipients in obtaining the money. There were additional benefits; *‘households in Zap villages had higher diet diversity, depleted fewer assets and grew more types of crops, especially marginal cash crops grown by women’*.

The availability of an alternative communications platform based around mobile phones offers other opportunities in the humanitarian aid space. For example it can be used in crisis mapping—quickly collecting and collating diverse information to provide an accurate picture of what is happening and allow for co-coordinated responses. Again in the context of post-election violence in Kenya, a scheme called Ushahidi (a word which means ‘testimony’ in Swahili) was developed which effectively mobilized a ‘crowdsourcing’ approach to collect and collate such information across various channels—Twitter, email, SMS and voice traffic at www.ushahidi.com. It enabled users to identify and provide alerts about specific

problems and collated data allowing aid agencies to visualise a rapidly changing situation. Importantly such a model differs from conventional centralised collection and collation by deploying a decentralised network approach; variants on this have been used in many trouble spots around the world; the Ushahidi platform is easily transferable and allows aid agencies and others to set up fast and robust crisis mapping.

The original platform was developed by a group of Kenyan citizen journalists to map incidents of violence; it quickly grew to around 45,000 users and the team realized there was demand for this kind of tool in other applications. Ushahidi has been streamlined and simplified so that it can run on many devices and can be set up in minutes, accepting data submitted via phone, SMS, email, twitter, etc.; the ‘Crowdmap’ application allows users to set up a system within 2 min. Since 2008 it has been used widely, supported by a largely volunteer workforce, in situations as varied as snow clearing after the Washington snow, emergency support after the Australian floods and disaster relief after the Haiti earthquake. Within 2 h of the Japanese earthquake and tsunami, a version of the platform was available to help locate where people were trapped, where food and water supplies were available, where transportation links were working or had been damaged, etc. (<http://www.sinsai.info/ushahidi>). Other non-emergency applications are now emerging—for example a Canadian site is using a version to crowdsource information about heritage buildings (www.Thisplacematters.ca).

8.6 Key Features of Case Studies

These cases share a number of features beyond them just being impressive solutions to social and humanitarian needs. In particular they reinforce the view that resource-constrained or crisis conditions can provide a powerful learning laboratory for innovation and allow experimentation towards radical solutions. Importantly these conditions mean that the repertoire of ‘conventional’ solutions is not viable and so a search for new solutions is triggered—essentially recreating the kind of ‘fluid state’ characterised by early stages of the innovation life cycle (Utterback & Abernathy, 1975). Within this space entrepreneurial behaviour is important, emphasising experimentation and fast learning through failure and setback as much as success. It also highlights the role of users in context who can help shape and configure innovations so that they are suitable for wider diffusion; the process is essentially one of co-evolution.

Solving problems within this context requires a wider search because conventional ones by definition are not appropriate. This forces a high level of ‘open innovation; exploration of new insights and ideas across sectors is a key feature and a central theme in all of the above examples is what Hargadon calls ‘recombinant’ innovation (Hargadon, 2003). That is, solutions and techniques were widely available and proven in other contexts; the key contribution of the entrepreneurs was to bring them together in a new setting.

For example, the core ideas underpinning the significant productivity gains in the Indian healthcare cases are essentially using core principles of the Ford/Taylor mass production system which were developed in the early part of the twentieth century. In the case of this model, it was created by a synthesis of multiple and proven practices from several different industrial sectors—standardisation of parts came from the small-arms industry, scientific method from the steel industry and the assembly line from ideas around disassembly in Chicago abattoirs. Ford and his team of engineers worked over many years to weld these different ideas into a coherent system which was then refined through a process of continuous experimentation, learning and improvement.

These principles of open innovation can be seen clearly in the development of mass production—and they were similarly present in the emergence of lean thinking which brought together ideas from a number of different fields. (For example the original idea behind ‘just in time’ and the kanban system in the automotive industry came from observations of supermarkets in the USA). In each case the process involves significant learning from different worlds and assimilation into an effective new an effective new system—and the role of entrepreneurs as brokers is critical to this.

Working in this way requires a reframing or redefining within the context of what is needed rather than making prior assumptions. By abstracting to the basics of the problem new insights about potential solutions emerge from other sectors—it can trigger novel search behaviour and cue attention to new stimuli. This process of reframing and abstraction also allows for a powerful rearrangement of the underlying system; and corresponds to what Henderson and Clark call ‘architectural innovation’ (Henderson & Clark, 1990).

It involves being able to work at a higher level of abstraction, drawing out categories which provide frameworks within which innovation can take place. It is characteristic of new paradigms—for example, mass production, lean thinking, low cost flying—that they can be reduced to some core principles which provide a focus for new innovation trajectories. For example, mass production in Ford’s system required a focus on high throughput, low variety and high utilisation; finding ways to provide these drove the emergence of a new high productivity approach. Lean manufacturing rests on core principles of flow and value stream management—and the challenge of complying with these led to the development of classic innovations like just-in-time, single unit flow, kanban, poke-yoke and simplification of machinery (Womack & Jones, 1996).

It is also important to recognise the process of learning and continuous improvement within this new architecture. In each case—as with earlier examples of system innovation like Ford’s mass production factory or Toyota’s lean model—the overarching vision provides the framework within which a process of continued and sustained incremental improvement can take place, mobilising high levels of participation in the innovation process. The productivity gains which emerged came as much from this process of continuous focused improvement as from the original breakthrough idea. Central to this is the principle of ‘policy deployment’—

hoshin kanri—which breaks down high level strategic targets into local level problems which can be solved by continuous incremental innovation (Akao, 1991).

Putting in place robust mechanisms to enable experimentation and subsequent capture and sharing of learning is central to the development of a system which can be replicated. The underlying process is one which relies heavily on converting tacit knowledge to formally codified forms which become available for others to use in what become standard operating procedures and eventually a standard operating model (Nonaka, 1991).³

This codification into standard operating models is of key importance in allowing replication, diffusion and scaling of the new system—as we see in the NHL, Aravind and LifeSpring examples. In similar fashion the focus on innovation in humanitarian agencies involves a growing recognition of the need to share and capture lessons learning so that they are available as part of an emerging ‘best practice’ repertoire. Learning and sharing information about common problems and solutions allows for the building up of long-term capacities to deal with future problems—through institutionalising lessons learned such as stockpiling, scenarios, rehearsal, etc. (Ramalingam et al., 2010).

Another central theme is the concept of system level innovation. Improvements can take place at component level by bringing in new elements—for example, replacing a manual transaction with cash register and then with bar code scanning. But this is essentially a component improvement; the big impact comes at the system level—changing and challenging the overall architecture and then refining this new model.

Ford’s vision was not simply an improvement on the assembly tools or operations of his competitors; it was a fundamental rethink of the whole process from extraction of iron ore right through to sales and service of the finished product. Self-service shopping was not simply changing the point of contact with the customer—that was only the tip of an iceberg. Changes to make it work were in logistics and inventory management, in information systems, etc. In low cost airlines the low price seat is enabled by system changes in order processing, capacity management, turnaround times, etc. Table 8.2 summarises some of the key common features across these cases.

This cross-case analysis mirrors the findings of a McKinsey study (2010) which examined a wide range of healthcare innovations which offered radical new approaches with significant productivity enhancing implications. They suggested six key ways in which such innovation processes operated:

- High user engagement, working within and with communities,
- Using existing technology in disruptive fashion—for example mobile phones,

³ The UK supermarket chain Tesco uses a similar principle; it captures learning about supermarket operations and codifies them into a standard operating model (SOM) informally referred to as ‘Tesco in a box’; this package can then be used to transfer to new locations in a ‘drag and drop’ manner. New learning from the new site is then developed and assimilated back into the SOM.

Table 8.2 Common features across the cases

Aravind Eye System	Lifespring Hospitals	NHL	Apollo
Key figure with vision—driving entrepreneurial focus—Dr Venkataswamy	Key figure with vision—driving entrepreneurial focus	Key figure with vision—driving entrepreneurial focus—Devi Shetty	Key figure with vision—driving entrepreneurial focus—Pathap Reddy “Our mission is to bring healthcare of international standards within the reach of every individual. We are committed to the achievement and maintenance of excellence in education, research and healthcare for the benefit of humanity”
Simple focused vision—target cost of \$30 for basic cataract operation	Simple focused vision—low cost perinatal care to BoP	Simple focused vision—low cost cardiac care, subsequently applied to many other operations but retaining focus in each case	Simple focused vision—low cost health care, especially focused on low income segment
Service specialization—focused factory concept, only work on eye surgery and ophthalmics	Service specialization—focused factory concept, only perinatal care (and early referral of complications to specialist hospitals)	Service specialization—focused factory concept, only focusing on cardiac (or other core area)	Service specialization—focused factory concept, especially in the Reach hospitals
No frills model—simplify and standardize all elements in the process	No frills model—simplify and standardize—e.g. no ambulances, limited range of medicines, JIT supply of them	No frills model—simplify and standardize all elements in the process	No frills model—simplify and standardize all elements in the process
Assembled system from proven models outside sector—McDonalds skills structure, Ford model of mass production	Assembled system from proven models outside sector	Assembled system from proven models outside sector—Shetty has been called ‘the Henry Ford of heart care’	Assembled system from proven models outside sector
Standardization of components and procedures	Standardization of components and procedures	Standardization of components and procedures	Standardization of components and procedures

(continued)

Table 8.2 (continued)

Aravind Eye System	Lifespring Hospitals	NHL	Apollo
SMED (single-minute-exchange-of-die) fast changeover principles—prepare and manage internal/external operations	SMED principles—prepare and manage internal/external operations—e.g. use of standard surgery ‘pack’	SMED principles	SMED principles
High throughput—250,000 operations/year	High throughput 70,000 births/year	High throughput 90,000 heart surgeries/year	High throughput—highest volume of cementless hip replacements in the world. Insurance business targeting 300 m people (bigger than US market)
High asset utilization—key asset is skilled doctor	High asset utilization	High asset utilization	High asset utilization
Mobilise low skill base through standardization of tasks, training, division of labour	Mobilise low skill base through standardization of tasks, training, division of labour	Mobilise low skill base through standardization of tasks, training, division of labour	Mobilise low skill base through standardization of tasks, training, division of labour
Scaleability—easy to replicate, drag and drop standardized model. Grown from 1 hospital to 11	Scaleability—easy to replicate, drag and drop standardized model Grown from 1 hospital in 2005 to 12	Scaleability—easy to replicate, drag and drop standardized model Grown from 1 hospital in 2001 to 14	Scaleability—easy to replicate, drag and drop standardized model Grown from 1 hospital in 1982 to 54 in 2012
Kaizen—learning curve effects	Kaizen—learning curve effects	Kaizen—learning curve effects	Kaizen—learning curve effects
System level architecture—lens manufacture, eye camps to facilitate diagnosis, integrated transport to base hospitals, etc.	System level architecture	System level architecture—moving into telemedicine, micro-insurance, health education, equipment manufacturing, etc.	System level architecture—moving into pharmacies, telemedicine, micro-insurance, health education, equipment manufacturing, etc.
Understanding patient needs	Understanding patient needs	Understanding patient needs	Understanding patient needs
Training and education for prevention—outreach educational services	Training and education for prevention—outreach educational services	Training and education for prevention—outreach educational services	Training and education for prevention—outreach educational services

- Rethinking skills deployment and utilisation, with emphasis on training up low and unskilled staff,
- Focus on standardisation which permits improvement and transferability,
- Leveraging external assets—for example through reusing existing physical facilities or by mobilising internet platforms,

- Opening up new revenue streams—for example by collaborating with retail or banking players.

They highlighted four approaches to achieving SP gains:

- ‘Franchising’—harnessing local entrepreneurs and devolving to local community level a standard model,
- Production specialization, deploying ‘lean’ thinking and ‘best practice’ drawn from manufacturing and other advanced sectors,
- Technology-enabled, adapting existing frameworks such as mobile communications, internet and satellite systems,
- Integrated care model—linking various players in new system architectures which focus on meeting the needs of the patient.

We can see examples of these in our cases and in the wider literature. The ‘franchising’ approach is essentially the model which McDonalds and others have used to good effect—creating a standard (and measurable) model which can be placed in a wide variety of settings and engaging skill development processes to help deliver it. Much of the Pakistani primary care system is not operated by skilled doctors but by nurse practitioners who have been trained in this franchise model and have enabled scaling up across the whole country. The scalability of Apollo, Lifespring and others relies on this kind of quality-assured transfer process embodied in a franchising approach.

Systems like the Aravind model have drawn, as we have seen, from decades of manufacturing experience around driving out waste and creating lean operations with a high emphasis on value adding and waste elimination. Central to this is the idea, originally propounded by Wickham Skinner in the 1970s, of the ‘focused factory’ (Skinner, 1974). By specialising and focusing around a key area it is possible to drive down costs without compromising on quality. The Aravind system now deals with close to 60 % of the entire UK NHS volume of eye operations—yet does so with infection rates and complications figures slightly better than UK hospitals and at around 1 % of the cost!

Using new technologies in novel ways—for example, the concept of distributed mobile care—has huge implications especially in situations where there is no existing platform to displace. The telemedicine and mobile communications cases are both good examples of this trend.

Applying these ideas in a service context has a number of advantages. First, services are far less dominated by constraints of intellectual property protection—it is relatively easy to transfer and apply ideas from elsewhere. The challenge is one of translation, of abstracting and then modifying the underlying principles of innovations used elsewhere, rather than acquisition. Second experimentation is facilitated because much of service activity is low capital cost—for example changing procedures rather than replacing expensive machinery.

Finally it is important to underline the point that these models work. They are proven in context and making a major contribution to healthcare under ‘bottom of the pyramid’ conditions—low skills availability, limited financial resources, weak infrastructure, distributed demand, etc. The question is whether they represent transferrable models which could be adapted to industrialised countries as a route

to service productivity improvement. And if they do, what are the barriers and enablers to this process taking place?

8.7 Learning from Outside the Frame

The challenge for many industrialised countries is that healthcare systems, although still innovative, are unable to deliver the kind of service productivity improvement needed to keep pace with rising demand. At the same time we have seen in the above cases and the many other emerging examples a possible alternative in which radical service productivity improvements have been achieved without compromising key issues like patient safety. The question is thus raised about whether and how such ideas might be transferred from the laboratory of the emerging world to the mainstream?

This forms part of a wider challenge of learning from outside the frame—there is extensive evidence that radical improvements in SP can and come via entrepreneurs working outside the mainstream and bringing in radically different ideas. For example:

- in the UK the major thrust for online insurance broking and banking came from IT professionals working outside the core sector
- the development of McDonalds and the ‘fast food’ revolution drew on ideas from manufacturing industry
- the fast turnaround procedures used in low cost airlines were pioneered by Southwest Airlines using ideas drawn from manufacturing which had in turn learned from Formula 1 motor racing

We can map such innovation on a simple model as shown in Fig. 8.2. The vertical axis corresponds to the familiar incremental/radical search which organizations undertake to develop improved or radically new solutions. But the horizontal relates to the framing of environmental elements (technological, market, social, regulatory, etc.) from which to seek out innovation options. Just as in human cognition organisations have limited attentional resources and so choose to frame world in particular ways so as to maximize their search efficiency (Kahneman, 1973). This framing is implicit in business models and the resulting innovation activity within such a frame gives rise to what different writers refer to as a ‘dominant logic’ (Prahalad, 2004), ‘technological trajectory’ (Dosi, 1982), or ‘industry recipes’ (Spender, 1996).

Viewed in this way the left hand zones on our model represent familiar territory in innovation literature, dealing with the ‘exploit’ and explore domains but assuming a bounded selection environment (March, 1991). Within this space a set of solutions are identified and implemented and although there may be local and short-term advantages accruing to individual players as a result of early discovery, intellectual property protection, etc. the pattern of innovation becomes quickly shared across all players.

However alternative frames are possible, bringing in different elements—and this is very much the role of entrepreneurs identifying new space and opportunity

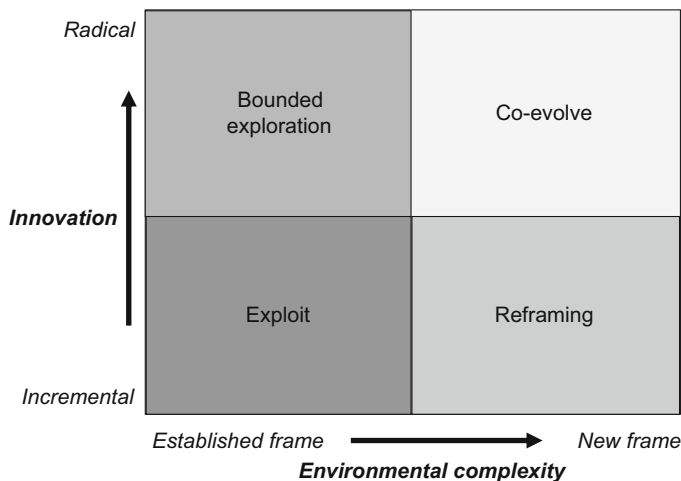


Fig. 8.2 Framing innovation space for search behaviour (Bessant, Stamm, Bettina, & Moeslein, 2011)

on the map. As Schumpeter (Schumpeter, 1950) pointed out, the role of the entrepreneur is ‘to reform or revolutionise the pattern of production’ and, as Rosenberg and Birdzell point out ‘...new enterprises are useful devices for experimenting with innovation, because they can be established on a small, experimental scale at relatively low cost and therefore in large numbers, and their efforts can be intensely focused on a single target.’ (Rosenberg & Birdzell, 1986) They have greater flexibility to experiment, uninhibited by the biases, standard operating procedures, bureaucracy, cultures, strategic commitments, and other rigidities common in established organizations of all kinds.

As Ulwick, Christensen and others have pointed out, working with the needs of unserved or underserved markets (moving to the right hand side of our model) provides a powerful opportunity for disruptive innovation (Christensen, Anthony, & Roth, 2004; Ulwick, 2005). By definition, meeting their needs will involve novel solutions, recombining elements in new configurations which are better suited and often doing so along a radically different price/performance trajectory.

Such solutions are unlikely to emerge in the context of the left hand side of our model because of the framing problem outlined earlier. For example, Mohammed Yunus set up Grameen bank, pioneering microfinance as a way of bringing banking services to an unserved section of the population. The model became successful, serving some 8 million people in Bangladesh and has been profitable since 1993; it has been widely replicated and microcredit schemes of this kind now support over 100 million families worldwide. Yet the original idea was rejected by the Bangladeshi government, the banks, the international relief agencies, and local business entrepreneurs.

In similar fashion recombination of technological elements—either by introducing a novel approach from elsewhere (e.g. mobile phone technology

substituting for existing banking systems) or by using a simpler variant (GE's simple low cost ultrasound scanner for the rural market in emerging economies)—offers powerful new opportunities which may be disruptive. Entrepreneurs working in this space are dealing with a 'crisis'—meeting needs of an unserved or underserved group within characteristics which marginalize them from access to 'mainstream' solutions—for example, through cost. Developing simple, robust and lower-cost variants requires considerable ingenuity and highlights again the key role which an open innovation approach plays, with entrepreneurs borrowing and adapting ideas from many locations.

8.8 Dealing with Disruptive Innovation

This raises a number of issues which map on to the wider experience of radical innovation when it comes from outside the normal frame. Disruptive or discontinuous innovation not only offers significant improvements along key performance and productivity parameters but also challenges the existing structures and architectures of the incumbent model. The process is complex but there is a pattern from which we can learn; in essence disruptive innovation has the following characteristics:

- Slowdown and maturity of mainstream innovation within an existing selection environment promotes exploration outside of that frame, often led by entrepreneurs seeking new approaches
- Identifying new framing conditions—unserved markets, underused technologies—creates new space which holds innovation opportunities. Working in this space involves extensive experimentation, probe and learn failures, user interaction, etc—and requires an entrepreneurial mindset and approach. For this reason existing incumbents tend to ignore what is going on—it is not relevant to their core markets and involves very different and high-risk behaviour.
- Extensive learning takes place in the new laboratory and scale builds via co-evolution with users and other players in the new context. Eventually a stable new configuration emerges—the core system—within which kaizen—continuous improvement takes place.
- The significant performance gains offered by the new system establish new players in that unserved market context—but also begin to attract the attention of other markets where the system solution offers clear advantages—good enough for lower price. At this point the mainstream players take notice and begin to explore and invest but they are late to the game and still have to climb the learning curve. They are encumbered in doing so because of existing structures and procedures and so face a challenge—either set up new operations to learn and exploit the new model or change themselves (both options are available and hybrids are common).
- Finally the new model becomes the dominant architecture and innovation moves into this frame as its new selection environment and a process of maturing of the model begins. Importantly there is a cyclic pattern to this—the gains from

working in the new frame gradually diminish and eventually drive search outside the box for another approach and the cycle repeats.

Studies of disruptive innovation suggest that whilst it represents a challenge to existing incumbents it need not be a threat but can instead represent an opportunity. It requires resolving what Christensen calls ‘the innovator’s dilemma’—how to simultaneously innovate within the existing search space but also explore and begin to learn in a newly emerging and possibly distant one.

For example, the Philips Corporation is transforming itself in its core area of lighting in response to both radical technological change in light sources (the shift to solid state devices) and engagement with end users rather than as a business-to-business operation. The potential for users to customise and control their lighting experience opens up significantly new space—but exploring and exploiting it will require very different approaches and structures. Philips has been engaged in a process of parallel learning and prototyping since 2002 and has built up capabilities to ride this new wave.

In similar fashion Lego has built a parallel organisation working in much more interactive fashion with its market of children as co-creators. Using the technologies of customised design and manufacturing and establishing a new relationship with end users via social networking sites across the internet it has developed a way of riding the wave of change.

The consequence of failing to respond to changes emerging far from the mainstream are also clear; many strong incumbent organisations have been unable to manage the challenge of disruptive innovation and have been marginalized and even disappeared. The case of Polaroid, for example, suggests that the discontinuities offered by the technology of digital imaging opened up new possibilities in the market but the company was unable to adapt its dominant business model and fell behind, eventually filing for Chapter 11 bankruptcy.

Of course healthcare and other public services do not follow the same pattern as in the private sector and in particular they differ in that competition does not necessarily pose a threat to their survival. The risk is that without this stimulus they are even more insulated from radical thinking from outside their frame—and the need for disruptive innovation becomes more acute. A number of commentators have drawn attention to this challenge in fields like education and healthcare (Christensen, Grossman, & Hwang, 2009; Hamel, 2000). Given the serious challenges posed to the long-term viability of the current model of service delivery in healthcare it could be argued that exploring alternative models should have a high priority and that we need to pay attention to mechanisms which help identify, explore and potentially transfer and deploy novel approaches (Crisp, 2010).

8.9 Transferring the Model

This kind of experience suggests that incumbent organizations and established players need to develop additional capabilities to work in new search space. Table 8.3 summarises the challenge.

Table 8.3 Capabilities needed to learn in new selection environments

Capacity	Characteristic activity
Observatory	Extensive search in novel directions to find relevant approaches which could be adapted—requires ability to abstract problem and solution thinking to a higher level and brokerage mechanisms to make connections
Laboratory	Experimentation around core ideas and creating in context a new system through recombination of proven elements from elsewhere
Prototyping	Development of a scale version of the system which allows for testing and configuration in context with users. Also provides a ‘boundary object’ which can demonstrate potential and engage key agents in further development and diffusion
Scaling and diffusion	Codification of core model into a ‘standard’ transferable package which can be replicated. Importantly this allows for further innovation and continuous improvement via channels which integrate emerging ideas into the ‘standard operating model’

Exploration of potential new directions involves the observatory stage, in which search behaviour is enabled in novel ways. This corresponds to open innovation search patterns and may well require brokerage, cross-sector linkages, working with users, foresight, ethnography and multiple other approaches (Bessant & Stamm, 2008). It often involves deliberate recruitment of ‘outsiders’ to bring alternative experience and perspectives; for example much of the later success of the Aravind model came through the engagement of David Green who brought considerable experience of low cost manufacturing models and helped establish the Aurolab network.⁴

It also requires the ability to abstract the core problem to a higher level such that potential solutions in other sectors/worlds can be perceived as relevant. For example the significant productivity improvements in machinery set-up in Japanese factories came in part from learning about pit stops in motor racing; in turn these ideas were adopted by low cost airlines seeking to reduce turnaround times at terminals, and hospitals looking to optimize operating theatre usage. Although very different in sectoral context the underlying process of changeover is the same (Bessant, 2003; Shingo, 1983).

The laboratory stage involves experimentation with the original idea to adapt it to the new context. By its nature, this process involves failure and fast learning and user input is critical in shaping and configuring a robust solution. Whilst the initial idea may be radical, it’s shaping and development involves integrating a wide range of small scale incremental improvements in a process of experimentation, learning, capture and codification. Within the framework of a core vision such incremental

⁴ David Green’s approach provides a system level example of low cost manufacturing and micro-franchising which enables employment at the bottom of the pyramid whilst also offering low cost solutions to key product and process needs like eyecare, hearing care or clean water.

experimentation can engage a large number of people in a process of policy deployment driven innovation—hoshin kanri⁵ (Bessant & Francis, 1999).

In the prototype stage there is further evidence of high user engagement and development of robust configurations which will actually work and be accepted. At this stage it is important to have a working model of the system level innovation which can act as a ‘boundary object’ demonstrating the operation and advantages of the new approach but also allowing input from potential adopters in further shaping and developing the ideas. For example, Shetty’s first hospital in Bangalore allowed a wide variety of people to see the potential and to add their insights into shaping the ‘standard model’ which was then replicated widely. In similar fashion the first Aravind eye clinic allowed for prototyping and learning but also provided a vehicle for engaging key players who could help in scaling up and diffusion.

Finally widespread diffusion depends on the codification of the new system into a transferable model—a ‘standard package’. This does not mean that further innovation will not take place; indeed it is characteristic of the examples given that continuous improvement is embedded in their design. But the basic model has become standardised and codified to the point that it can be handed on to others who have not had direct experience and sufficient detail of the ‘standard operating model’ is available to enable them to set up and operate in a different context. This part of the process is assisted by the fact that users and players have been involved in co-creating and especially configuring the model.

8.10 Enablers and Barriers

Whilst there is growing evidence to support the viability of the models described in the context in which they emerged there is still a question as to whether they can be successfully adapted and transferred. A number of factors are likely to influence this process and we can usefully adapt diffusion theory to consider some of them here.

As Rogers (Rogers, 2003) suggests there are four sets of factors which will modulate the diffusion of innovations:

- Perceived characteristics of the innovation itself,
- Characteristics of the adopting unit,
- Characteristics of the innovating unit,
- Contextual influences.

In terms of the innovation characteristics, Rogers highlights five key characteristics and underlines the important point that it is perceptions of these which shape adoption, not necessarily objective performance measures.

- The first is *perceived relative advantage*—the degree to which the innovation is perceived as offering something better than that which it replaces. Although the

⁵ Similar patterns of shared experimentation can be seen in the activities of online user communities.

evidence is accumulating of significant SP gains, these may be offset by perceptions around quality and the variety of choice available. Seeing these innovations as confined to a small set of standardised operations may limit their diffusion—although it is becoming clear that the underlying models involve some generic principles with widespread application potential. Arguably these limiting perceptions would be offset through better availability and publicity around core evidence.

- The second characteristic is *observability*—the ‘seeing-is-believing’ effect. Once again it is easy to dismiss the potential of the novel approaches because they are taking place in a context far from the mainstream industrialized world. But growing application of the models in diverse contexts coupled with increasing publicity is likely to change this.
- *Trialability* is a third characteristic—the degree to which the model can be tried out as a pilot before committing to full-scale adoption. So far most of the application and development of models like that of Aravind or NHL have taken place in the developing world but arguably controlled and closely monitored experiments within a mainstream setting might help accelerate diffusion.
- The fourth characteristic is *perceived complexity*—how difficult is the new model to understand? Given that the emphasis of frugal innovation is towards simplicity and low cost solutions this ought to act as an accelerator to take-up.
- The final characteristic is perhaps the most influential in this particular case—the *perceived compatibility* of the new models with the social, professional and operating structures into which they might be adopted. Many of the core elements—for example, the reliance on less-skilled staff and specialised training of them to carry out key tasks pose significant challenges to established professional structures in mainstream environments. In similar fashion the ‘industrialisation’ of many operations may conflict with the dominant models.

Moving to the characteristics of the adopting unit the issue further underlines the compatibility issue above—the extent to which the social and operating structures are receptive to new ideas. The problem for many organizations in the face of radical innovation is that they view novel options through the lens of the existing trajectory. This can lead to non-adoption for a variety of reasons—perceived technical or financial barriers, concerns about scale and scope of application or the ubiquitous ‘not invented here’ effect. In many ways this operates as a kind of ‘immune system’ providing barriers to protect the organisation from potentially risky variants from outside.

This theme emerges again in the context of the innovating unit 0- the source of the novel ideas. In this case there is a perceived wide gap between the worlds of frugal innovators in emerging economies and those of potential adopters in the mainstream. In Rogers’ terms innovation adoption is likely to be accelerated when there is a match between the source and receiver—adopters favour innovations transmitted by ‘people like us’. Such ‘homophilic’ effects are largely absent from this current model; instead the pattern is closer to Christensen’s observations about disruptive innovation in which there is a large gap between the two worlds.

On a more positive note the context in this case may drive closer inspection and exploration of alternative models. First there is growing availability of powerful new technologies which can enable low cost widespread application of

telemedicine, mobile medicine, etc. And second the scope for existing healthcare systems to achieve the required SP improvements to make them sustainable is very limited and the growing perception of crisis may drive radical change.

This pattern can be seen in earlier examples of diffusion of new innovation trajectories which begin with a crisis stage. This leads to articulating a clear and focused vision which demands a novel response; existing trajectories are unable to deliver performance changes on the scale required. Examples of such high level vision include the US ‘man on the moon’, Henry Ford’s idea of ‘a car for Everyman at a price Everyman can afford’, or the ‘invisible aeroplane’ which led Lockheed-Martin to develop stealth technology through its ‘skunk works’ team (Rich & Janos, 1994). Such visions set stretch targets and force search behaviour in new directions; they also cue attentional responses to new signals rather than filtering them out. In the cases that the ability to find a passionate entrepreneur at the centre may not be coincidence—their role is to have the vision but also the passion to infect others and bring them into the vision.

8.11 Summary and Conclusions

Radical productivity improvements in services, particularly in the public sector, are urgently needed. But whilst there is extensive innovative activity in these sectors it draws upon ideas and solutions emerging from a particular selection environment and is, as a consequence, limited to certain trajectories and rates of improvement. Innovation studies have long highlighted the potential for radical shifts in productivity through deploying ideas developed within different selection environments and there is also extensive literature on the transfer of such ideas across sectors. In this chapter we have argued that there is scope to look for radical improvements in service productivity by exploring at the fringes of the mainstream and taking a fresh perspective.

Working in this space requires an entrepreneurial approach, able to experiment and deal with failure as a learning opportunity. It involves a process of ‘probe and learn’ development, importantly co-evolving with user communities a set of robust solutions which meet the needs of that group. In the process it allows for the development of scalable and transferable models which can extend the impact to other similar groups. We have given a number of examples from healthcare in this chapter and it is clear that there is now growing evidence that radical service productivity gains can be made without compromising safety or other key performance criteria. In a world of resource shortages this is certainly an avenue worth exploring.

But the challenge is increasingly likely to come not in diffusing such models to similar populations but rather in adopting elements of them to transfer into different ‘mainstream’ environments. The need for productivity improvement is clear and the potential of such approaches to deliver such gains has been increasingly demonstrated; there is now an evidence base on which to draw. The challenge lies in the adopting system and in the structures and individuals who could enable or restrict the exploration and implementation of such approaches.

Expert's View

Prof. Dr. Dennis Hilgers

Johannes Kepler University of Linz

Question: How and where will innovation in services increase productivity?

Dennis Hilgers: Due to intensive service research in the last years, we very well know that service innovation moderates the national productivity tremendously. At the moment more than 75 % of the European economic value creation (GDP) is generated in the service industry, depicting the high relevance of this discipline. To sustain further competitiveness against US and Asians markets more devotion into service innovation is needed, especially in the sectors of health, education, security and IT, crisis resilience and material sciences. Furthermore innovation in public services and the allocation of efficient public services in relation of government to citizens and firms is essential for a modern and sustainable public sector and public-private ecosystem. We very well now that entrepreneurial growth relies on an effective public sector transcending bureaucratic control by adopting eGovernment practises and lean back office processes.

Question: How and where will innovation in services increase productivity?

Dennis Hilgers: All innovation efforts in redesigning and further developing the German service industry are strongly linked with innovation in IT and connectivity. In the same way, as the gains of process orientation of services and operations in the last two decades were driven by severe technical progress, the next step is to align the service industry to the age of interconnected knowledge and cognitive surplus. This new paradigm is not about interconnected machines anymore. It is about interconnected human beings and is the underlying principle of the web 2.0 buzz and reveals its benefit e.g. in the open innovation research of the last decade. New models of innovation have suggested that the innovation process of product and service development is becoming more open, emphasising the importance of external knowledge, and systematically involving external actors and sources in innovation endeavours. The growing success of open innovation practices in many firms indicates that these principles can be applied for reinventing our service industries.

Bob Lillis

Setting the Stage – Annotations by the Editors

In this chapter, *Bob Lillis* offers some insights into why service productivity is an on-going issue faced by all services due to its impact on organisational costs and competitiveness. As he shows, responsibility for the improvement of service productivity usually falls on service operations management. In this chapter, some of the main barriers that underline why service productivity improvement is so difficult to achieve are analysed and strategies that can help service operations managers overcome these barriers are developed.

The chapter frames these issues and then explores them in the context of a successful hotel innovator—CitizenM. CitizenM is a boutique hotel located near Schiphol airport in Amsterdam, the Netherlands. The hotel was launched in 2008 with a unique service concept. Its success in recognising and overcoming the typical barriers to service productivity has allowed it to provide an effective delivery of a personalised guest experience while running a highly productive, ‘back’ and ‘front’ office. Since 2008, three further CitizenM hotels have been opened and a further 11 are in the planned pipeline. The case uses data from interviews with staff at the hotel and the Group Chief Operating Officer, Michael Levie (one of the four founding partners) to show how the typical barriers to service productivity were overcome.

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9.1 Overcoming the Barriers to Service Productivity

The problem of poor productivity has plagued many services, given the impact it has on organisational costs and competitiveness (The Economist, October 2010). With most of the service organisation's resources tied up in its operations, responsibility for improving productivity usually falls on its operations management and presents a significant challenge. In a recent conversation, the Client Services Director of a Global Risk Management Corporation stated the challenge in his organisation in these terms:

'It's recognised that not so long ago when revenue was so strong, you could get away with operational inefficiency because frankly you were making 40 % margin. Those days have come to an end. Now 98 % of our employees including members of the main board consider themselves operational. . . with a relentless focus put on operational productivity improvement, which must take place while ensuring we don't lose sight of what customers want and value.'

Thus, the challenge for service operations is to ensure that customers' requirements and expectations are met or exceeded while simultaneously striving to do more with less to achieve low operating costs through high levels of resource utilisation. For the majority of service organisations, this must be accomplished in spite of the variability and unpredictability of customers' requirements. How can service operations management meet this challenge? In this chapter, I examine service productivity from a service operations viewpoint. I analyse five main barriers that make service productivity improvement so difficult to achieve and present strategies that can help service operations managers overcome them.

The chapter is organised as follows. Section 9.2 describes the effect that service peculiarities have on traditional approaches to productivity improvement. Section 9.3 examines five of the common barriers that hamper the improvement of service productivity. In Sect. 9.4, I explore five strategies to overcome them. Finally, Sect. 9.5 presents a case study illustrating a service that successfully met the challenge of achieving service productivity. CitizenM is a budget boutique hotel located near Schiphol airport in Amsterdam, the Netherlands. The hotel was launched in 2008 with a unique service concept. Its success in recognising and overcoming the typical barriers to service productivity allow it to provide effective delivery of a personalised guest experience while running highly productive 'back' and 'front' offices. Since 2008, three further CitizenM hotels have been opened and another 11 are in the pipeline. The case study features interviews with the Group Chief Operating Officer, who is one of the company's four founding partners.

9.2 Service Peculiarities and Service Productivity

Any discussion of improvement in service productivity must start by recognising the general peculiarities of services and their impact on productivity. In general, services are characterised by their intangibility and perishability, simultaneity and

heterogeneity (van Looy, van Dierdonck, & Gemmel, 2003). These peculiarities can make it difficult for service operations managers to pinpoint their precise product offerings and manage them productively. For example, intangibility and perishability are integral to most experiential services, where the focus is on the customer's experience when interacting with the organisation, rather than just the functional benefits following from the products and services the organisation delivers (Voss & Zomerdijs, 2007). Simultaneity is also common to experiential services, whereby the service is produced and consumed at the same time. Clearly, in such circumstances the customer has to be present at the place where the service is provided. This peculiarity of simultaneity in many services also means that they carry a greater risk of the experience of the process being different on each occasion depending on circumstances, for example, where the service took place, which member of staff performed it, and particularly the attitude and mood of all the parties involved at the time the service was performed. Hence, the capacity for variability, or heterogeneity, represents another significant challenge for service operations management.

These problems are compounded because services vary considerably in the extent to which these peculiarities hold. For example, managers of some services traditionally referred to as pure services grapple with high degrees of service intangibility and perishability as well as simultaneity and heterogeneity. These include services offered by corporate lawyers, executive coaches, doctors and physiotherapists: all typically are personalised, with a high degree of contact between provider and customer. At the other extreme, many services exhibit fewer service peculiarities and have far less intangibility and simultaneity in their offerings. They include retail banking services such as the processing of cheques, fast food restaurants, mail order and postal services: all these are commodity-type services with little or no direct contact between customer and provider. There are other services that fit neither of these extremes. Instead, they exhibit dominance in either simultaneity and heterogeneity or intangibility and perishability but not both. An example of the former would be a visit to the barbers for a haircut and of the latter, distance-learning courses, which retain high degrees of intangibility but are low in simultaneity. A further complication is that a service organisation may offer a wide range of services, each possessing differing degrees of service peculiarity. Think of the variety of services offered by a commercial bank or a health care organisation, which range from pure services to commodity-type service offerings and many in between.

Given the varying degrees of peculiarity prevailing in different services, typical approaches to productivity improvement that may work for one type of service may not necessarily do so for another. The established approaches to operational productivity improvement tend to seek to increase output and include investing in automation, upgrading equipment, standardising the process, reducing staff churn and employing specialised training staff. The successful adoption of any or all of these conventional productivity approaches will be influenced by the extent of service peculiarities occurring in the nature of an organisation's offerings,

		Degree of intangibility & perishability	
		Low	High
Degree of simultaneity & heterogeneity	High	<p>Service example: Haircut at the Barbers</p> <p><u>Appropriate/Consider:</u> Specialist staff training Ways to reduce churn Upgrading equipment</p> <p><u>Least appropriate:</u> Investing in automation Standardise the process</p>	<p>Service example: Examination by a Doctor</p> <p><u>Appropriate/Consider:</u> Specialist staff training Ways to reduce churn Upgrading equipment</p> <p><u>Least appropriate:</u> Investing in automation Standardise the process</p>
	Low	<p>Service example: Bank Processing Cheques</p> <p><u>Appropriate/Consider:</u> Investing in automation Upgrading equipment Standardise process</p> <p><u>Least appropriate:</u> Specialist staff training Ways to reduce churn</p>	<p>Service example: Education Course Online</p> <p><u>Appropriate/Consider:</u> Investing in automation Upgrading equipment Standardise process</p> <p><u>Least appropriate:</u> Specialist staff training Ways to reduce churn</p>

Fig. 9.1 Service peculiarities and typical approaches to productivity improvement

particularly the degree of simultaneity. Figure 9.1 links service peculiarities with typical approaches to productivity improvement.

Figure 9.1 shows how important the extent of simultaneity inherent in the service is to deciding which productivity improvement approaches can be adopted. For example, striving to improve the number of patients a doctor can examine in a period of time by investing in automation or standardising the process is less likely to bring about a sustained productivity performance improvement because of the customer component, which renders the performance of the service unique. However, efforts focused on reducing the churn of doctors (allowing them to become increasingly familiar with individual patients and their history), specialised staff training (to enable the doctor to diagnose patients' complaints more speedily) and perhaps upgrading equipment may be more suitable. Conversely, for a bank's

cheque processing operations (exhibiting low intangibility and simultaneity), investing in automation and examining ways to standardise the process may prove more fruitful for productivity improvement.

Hence, a key issue for service organisations is to determine how customers will perceive the productivity approaches they plan to implement. The inability to store services and customers' involvement in the production process add complexity to the management of service productivity. They create barriers that must be addressed if service productivity performance is to be improved. In the next section, I examine five of the key barriers that result from service peculiarities.

9.3 Five Barriers to Service Productivity Improvement

9.3.1 Barrier 1: Confusing Efficiency, Utilisation or Effectiveness with Productivity

There is a weight of evidence to suggest that the terms productivity, efficiency, utilisation and effectiveness are commonly misunderstood by managers (see e.g. Chew, 1988; Jackson & Petersson, 1999; Koss & Lewis, 1993) and continue to be so (Johnston & Jones, 2004). In his review of 'performance' terminology, Tangen (2005, p. 35) demonstrated that, *'those who use the term productivity rarely define it; there is a lack of awareness of the multiple interpretations of the term as well as the consequences to which such discrepancy leads...'* Similarly, the terms effectiveness and efficiency further complicate the terminology in this field, as they are frequently confused with each other and with productivity. Table 9.1 shows just a few of the definitions that have appeared in the literature and gives a flavour of some of the perspectives held.

Even the simplest definition of productivity as units of output divided by units of input (Chew, 1988) is made complicated for the management of service productivity because of service peculiarities. Difficulty frequently arises in the measurement of both inputs and outputs. Simultaneity and heterogeneity help render each service transaction with each customer unique, as the doctor/patients example I used earlier shows. This means that the attempt to standardise both inputs and outputs for service productivity measurement purposes is problematic. Similarly, inputs and outputs in many services may contain intangibles, which again makes the determination of standardisation for measurement purposes challenging (see e.g. Grönroos & Ojasalo, 2004).

Different interpretations of the performance terminology can cause managers to devise and use measures of utilisation and efficiency as proxies for productivity measures. This is a common failing in the experiential service sector. For example, in the hospitality industry, measurement and improvement regimes are often created based on room utilisation or restaurant seat occupancy rates, which are taken to denote how well productivity is being managed (especially if linked to revenue) but which are really concerned with capacity management. A better measure of productivity is clearly to focus on what labour cost (input) is required to produce the

Table 9.1 Examples of definitions of productivity, efficiency and effectiveness

Definitions of productivity	Definitions of efficiency	Definitions of effectiveness
Productivity = units of output/units of input	Efficiency is an input and transformation process question, defined as the ratio between resources expected to be consumed and actually consumed	Effectiveness, which involves doing the right things, at the right time, with the right quality, etc., can be defined as the ratio between actual output and expected input
(Chew, 1988)	(Sink & Tuttle, 1989)	(Sink & Tuttle, 1989)
Productivity is the ratio of what is produced to what is required to produce it. Productivity measures the relationship between output such as goods and services produced, and inputs that include labour, capital, material and other resources	Efficiency is used for passive or operational activity, which is usually defined technically so that the system and its behaviour are foreseeable in advance	Effectiveness is basically used in active or innovative activity performed by a risk taker and based on a rather broad perspective
(Hill, 1993)	(Kurosawa, 1991)	(Kurosawa, 1991)
Productivity = efficiency × effectiveness = value adding time/total time	Efficiency is a measure of how economically the firm's resources are utilised when providing the given level of customer satisfaction	Effectiveness is the degree of accomplishment of objectives, and shows how well a set of results is accomplished
(Jackson & Petersson, 1999)	(Neely, Gregory, & Platts, 1995)	(Sumanth, 1994)
Productivity = (output/ input × quality = efficiency × utilisation × quality	Efficiency = ideal system dependent time/total time	Operational effectiveness means performing similar activities better than rivals perform them
(Al-Darrab, 2000)	(Jackson, 2000)	(Porter, 1996)
Productivity = the ratio of operational outputs to inputs over a period of time, where inputs are materials, customers, staff, costs, etc., and outputs are customers, used resources, revenue, etc.	Efficiency is a measure of how well effective capacity is being converted into actual output	Effectiveness = value added time/ideal system dependent time
(Johnston & Jones, 2004)	(Slack, Brandon-Jones, & Johnston, 2013)	(Jackson, 2000)

Source: Adapted from Tangen (2005)

output. Confusion over the terminology can lead to measurement systems being built without a clear understanding of what is being measured or improved and represents a missed opportunity for service operations management. It is a barrier to service productivity improvement.

9.3.2 Barrier 2: The Customer Component: Mistaking Outputs for Outcomes

Table 9.1 included different authors' definitions of the term 'effectiveness'. Effectiveness is very diffuse and difficult to quantify, and one of the mistakes that can be made by service operations management is to equate it with productivity. Service peculiarities place great importance on the outcomes of the service experience, not just the output the service process produces. For example, hospitals have many operations that process customers who become the outputs of these processes. How productive those processes become in terms of increasing the capability to process more customers has little bearing on the effectiveness of those processes, i.e. the outcomes customers receive as a result of experiencing those processes.

Pure services tend to recognise this distinction. However, problems can occur in commodity-type services if their service operations management interpret outputs as outcomes. For example, information technology and information management operations within a large service organisation may become increasingly productive, able to undertake more data extraction jobs and reporting tasks without any increase in headcount over a period of time and believe that by doing so they are providing an improved service to their internal customers. Yet their operations may not be providing outcomes that their internal customers really want or value.

Outcomes describe both the results of the service process for the customer and the customer's experience of that process. Outcomes are effectively the service product, which may incorporate feelings, emotions or judgements viewed from the customer's perspective. Mistaking outputs with outcomes is an important barrier to the successful management of service productivity. The need to distinguish between outputs and outcomes helps explain why in Six Sigma methodology voice of the customer (VOC) data are so vital to gather—because these data provide information about what customers care about. Commercial banks, for example, now seek to distinguish between VOC and voice of the business (VOB) metrics in their performance measurement system, with the former often focused on outcomes and the latter on outputs, as a way to overcome this barrier.

9.3.3 Barrier 3: Poor Service Process Design and a Willingness to 'Buy' Service

The view that poor service productivity is due to mismanagement is one that has been consistently held in various operations theories of organisations, including the process management view (Karwan & Markland, 2006). Rather than concentrating

operational improvement efforts on managing existing resource and processes more productively, services typified by high degrees of customer contact may regard quality of service outcomes as a direct consequence of the amount of time labour resource is expended in the process and therefore add additional resource into the service process. Similarly, organisations whose margin on their service products is high or that have relatively few customers (so that the loss of one customer can have serious consequences on total revenue) may decide to manage productivity in this way.

This approach to the management of the service delivery process is a barrier to service productivity improvement. It can often result from inadequate operations management thinking, which manifests itself through poor service process design. For example, government bodies, habitually branded as inefficient and unproductive, have been under severe pressure in recent times to cut costs. Lord Bichard, a founding director of the Institute of UK Government, gave a keynote speech at the 2013 UK Public Services conference on Continuous Improvement in which he emphasised the role that the poor design of services has had on hindering best-value outcomes for the public, leading to inefficient and unproductive service delivery in the sector.

As a result of service peculiarities, good service design demands that all elements of the service delivered must be considered from the perspectives of both the provider and the customer. Mismanagement of service can stem from a divergence between, *'what we do around here and what our customers expect, which are seldom discussed, articulated or compared'* (Johnston, Clark, & Shulver, 2012, p. 54). The development of the service concept offers the best method to capture the nature of the service, in order for customers to discern what they are getting and staff to understand what they are providing. Failure to consider the service concept adequately from both perspectives in service design represents a significant barrier to service productivity.

9.3.4 Barrier 4: The Service Quality Versus Resource Productivity Trade-off

Failure to achieve a balance between the resources operations have available to them and service intensity can have a negative effect on service quality and resource productivity, resulting in poor outcomes for customers. Therefore, the ideal service operating point is a level of resource productivity at which the service concept is not compromised and no customers are disgruntled by lower perceptions of service quality. Any inability to manage the trade-off between service quality and resource productivity appropriately is manifested either by customers having to wait longer or feeling rushed (if there are too few resources to meet the service intensity required) or by customers feeling neglected and ignored (if there are too many resources to meet the service intensity expected). To capture these notions, in their study of the practice of customer service management, Armistead & Clark, (1992) coined the term 'coping strategy', which they defined as *'...the strategy*

which [services] follow when [they] are unable to match capacity with service intensity in the short-term...seen in those periods when the operations would describe themselves as busy or slack' (Armistead & Clark, 1992, p. 147). They argued that any failure by service operations management to devise and plan a suitable coping strategy has adverse effects on customer satisfaction and service productivity.

Clearly it is impractical to maintain a perfect balance at all times between the demand for the service and the resources allocated to satisfying that demand. Service operations managers are faced with an imbalanced state in the short-term, in which they may well have either more resource available than is needed for the level of demand (which will lower service productivity) or demand from customers that cannot be met from the resources available (which may, ironically, lead to high service productivity). In both cases, there will be a potential loss of customers who will make a judgement on the productivity of the resources as part of their assessment of the quality of the service offered. Therefore, a key consideration for management will be whether they can afford to compromise on the original design of the service concept; and if so, how short-term coping strategies could be devised that would permit an increase in service productivity without the service concept being compromised. Given that, in practical terms, all service organisations will need to be able to 'cope' on occasions, if coping strategies are not needed, this can only signify that the organisation has too much resource.

9.3.5 Barrier 5: The Productivity Paradox and the 'People Factor'

A number of studies were carried out in the 1990s that support the existence of what Koonce (1991) had termed the 'productivity paradox'. These studies (including one that surveyed more than 1,000 major American businesses) concluded that profitability in one in two companies that had cut jobs and downsized had failed to increase (Greenberg, 1991). The failure was attributed to the productivity paradox—that organisations do not give enough consideration to the 'people factor' when restructuring and job cutting. A reduction in staff means the survivors face larger workloads and longer hours. As a result there is an increase in workplace accidents and mistakes in work. *'The error correction and reworking leads to an increase in production costs. . . [and] customers suffer as employees strive to handle the expanded workload at the expense of customer service'* (Appelbaum, Henson, & Knee, 1999, p. 486).

Fifteen years later, the 'people factor' can still be seen in the wide-scale adoption but poor implementation of lean thinking by many services. The most common misconception of lean management is that lean means job cuts. This *'misconception may be due to the [use of] the term "lean" especially in the context of lean and mean'* (Arnheiter & Maleyeff, 2005, p. 11). Lean thinking demands that if an employee is carrying out non-value added activities within a job role, management and the employee collaborate to find a better way to perform the job that eliminates the valueless activities. Managers quite naturally tend to be keen on eliminating

waste in its various forms (the acronym TIMWOOD to represent the seven forms of waste is commonly used in many financial institutions¹) and target this aspect of lean thinking for implementation. However, it is merely one part of the philosophy. Lean philosophy decrees that it is counterproductive to succeed in eliminating waste, only to then have the employee laid off. In these circumstances, know-how is lost to the business and it is also a disincentive for all other employees to participate in the lean journey. The productivity paradox or ‘people factor’ can be witnessed in the poor implementation of lean management by some service organizations and therefore becomes a fifth barrier to service productivity.

Section 9.2 has presented a set of views related to the challenges of service productivity. It examined five of the most common barriers faced by managers as they struggle to improve service productivity in an increasingly competitive environment. The focus of the chapter now shifts from recognition of those barriers to consideration of five strategies and approaches that can help overcome them, beginning with a clearly defined and communicated service concept.

9.4 Strategies to Help Overcome the Barriers to Service Productivity

9.4.1 Understanding and Communicating the Service Concept

A vital first stage in good service design is consideration of all the components of the intended delivered service from the perspectives of both the customer and service provider. These components may be encapsulated within the service concept, which has been defined and redefined by a succession of academics, most recently Johnston et al. (2012). Their service concept differentiates between the service provided (the operations view) and the service received (the customers’ view). The operations perspective focuses on the inputs, making sure the processes are working well, whereas customers are only interested in the outcomes or benefits they receive from the outputs of the processes. Johnston et al. (2012) argue that recognising both perspectives is important because ‘...operations need to manage their suppliers, people, facilities, process and technologies, but at the same time recognise how their efforts create value for the customer, which in turn creates value for the organisation’ (p. 26).

This method of service concept differentiation mitigates barrier 3 by helping to articulate to both staff and customers the nature of the service provided and received. As well as offering an excellent starting point for good service design, it is also a mechanism for helping avoid operations mistaking inputs and outputs for outcomes (barrier 2). It therefore helps prevent confusion between efficiency (management of capacity), productivity (ratio of actual output to input) and

¹The acronym TIMWOOD stands for the seven forms of waste: **T**ransport, **I**nventory, **M**otion, **W**aiting, **O**verproducing, **O**ver processing and **D**efect waste.

effectiveness (how well the output is translated into desirable outcomes) in the creation of measurement systems.

9.4.2 Application of Good Practice Service Re-design Principles

The thoughtful application of good practice service re-design principles offers a second means to mitigate the barriers to service productivity, especially barriers 2, 3 and 5. Rijers and Liman Mansar (2005) put forward a generic list of seven features that they present as commonly applicable. The adoption of these principles helps to eradicate TIMWOOD (various forms of waste). They are:

- eliminate tasks,
- change the task sequence to help alleviate bottlenecks, so balancing and speeding up throughput,
- automate tasks,
- provide employees with greater discretion to change the service offering for top customers,
- have one employee perform as many stages in the process as possible for single customer requests,
- reduce customer contact in the process,
- turn generalist employees into specialists or specialists into generalists to even out the process flow.

Their work found that these principles have been applied in particular within healthcare, software development and business planning service environments. However, Reijers and Liman Mansar (2005) acknowledged that more work was needed to examine the universal applicability of each principle. This has been explored by Ponsignon, Smart, and Maull (2012). They conclude that eliminating and re-sequencing tasks are the only universal principles; the other five are dependent on the extent of the presence of service peculiarities in the service offering.

9.4.3 Obtaining the Benefits of Technology Outsourcing

Twenty years after the phrase ‘productivity paradox’ was coined, workforce downsizing retains its popularity (Gandolfi & Littler, 2012), but it is now frequently enacted through the use of outsourced service providers, such as those based in developing countries, for example India or Vietnam, which are able to deliver cost and efficiency benefits. Many large service organisations have sought to address the ‘productivity paradox’ and ‘people factor’ through this method. The banking and insurance sectors have been particularly successful in reporting cost and efficiency savings. This has been achieved through the reconfiguration of their business processes across a hub or network of different localities. Each locality becomes responsible for a different part of the total end-to-end process but with differing wage rates prevailing.

Yet recent research conducted in German manufacturing industries suggests that '*...outsourcing, contrary to popular belief, strongly correlates negatively with labour productivity as it diminishes revenues or increases expenses*' (Broedner, Kinkel, & Lay, 2009, p. 128). While pointing out that, for purposes of corroboration, further studies are needed in environments other than manufacturing, they argue that outsourcing decisions are '*typically legitimated by simple production cost comparisons...not taking aspects of competence formation...[into account]*' (p. 128).

However, in citing several studies, Broedner et al. (2009) emphasise the importance of the competence formation view, recognising that outsourcing can enhance a firm's technological change capability by utilising suppliers that handle new technologies best and exploiting the best available sources at any given time. This suggests that while considerable benefit can accrue to a firm by technological outsourcing, it is vital for organisations not to lose touch with technological changes that may offer new opportunities for product and process innovations. This can support service productivity. The potential benefit derived from scanning for new technologies and exploiting the best available sources through partnerships can also help alleviate barriers 3 and 4.

9.4.4 Realising the Potential of Customer Engagement Technologies

The advent of electronic commerce and a proliferation of new customer engagement technologies help to overcome the barriers to service productivity by supporting the achievement of good service design (avoiding barrier 3) and can form part of a strategy to minimise coping (barrier 4). However, there is an important caveat to this statement. The results of a series of research studies have shown that using technology to increase self-service options for customers can aid efficiency and productivity; but other studies have struggled to identify the productivity benefits from IT investments (see e.g. Dabholkar, 2000; Karwan & Markland, 2006 for a review of several of these studies). These struggles have been attributed in particular to a lack of clear understanding by service operations managers of how the technology will affect service processes. As with five of the seven good practice-service processes re-design principles discussed earlier, the potential for new technologies to overcome barriers to service productivity is also service context specific.

Adopting customer self-service options through customer engagement technologies is perhaps most likely to be successful in services where the service concept offers the opportunity to standardise the service process by minimising the vagaries within it caused by simultaneity and heterogeneity. In these cases adoption would boost the achievement of desired customer outcomes such as low cost, increased accessibility, speedier or hassle-free service. As Karwan and Markland (2006, p. 350), citing the work of Schmenner (1986, 2004) point out, '*...minimising throughput time and decreasing the effects of variation that result from*

customization for and interaction with customers [is hugely significant for service productivity]'. Examples of the introduction of technology for purposes of increasing self-service options are typically seen in supermarkets (for example, self-service check-outs) and banks (24/7 cash dispensers), which have sought to replace costly front-line providers with less costly automation. However, for many services, the most likely avenue by which to minimise the effects of service peculiarities on service productivity is in that part of the delivery process not seen by customers, namely the back office.

Overall, studies examining the effect of customer engagement technologies on service performance and service productivity indicate that optimum results are most likely to be obtained when the technology is developed as an integral part of the service concept rather than being bolted onto existing processes and infrastructure. The successful implementation of new technologies as an integral part of the service concept can amplify outcomes that are most desired by the customers and offers a potentially potent means to alleviate the barriers to service productivity.

9.4.5 Addressing the 'People Factor'

A full understanding by the organisation of demand variability is important to the successful implementation of a coping strategy if barrier 4 is to be alleviated. Figure 9.2 provides some guidance on the most appropriate employment terms for service organisations to adopt, given the levels of demand variability. For some services, demand variability is related to clearly identifiable causal factors, such as seasonality or dates of particular events. In some, the actual pattern of demand variability period to period can be fairly predictable; in others, it is less so. This is shown as the x-axis of Fig. 9.2. The degree to which demand is uncertain within periods is shown as the y-axis in Fig. 9.2.

For some services, total demand over the entire planning period may be reasonably predictable and the level of uncertainty of demand within each of those periods also low. In these circumstances, overtime may be the most suitable method to use and the adoption of monthly or annualised hours of least benefit. However, for others, the total demand over the whole planning period may be reasonably predictable but the actual pattern of demand from hour to hour, day to day or week to week within the planning period may be almost random. The effect of this situation can mean that at particular times of the year, the service operations workforce may have to work considerable amounts of overtime to meet short-term overload, only to be idle at other times. Thus, the use of annualised hours may be most appropriate and overtime least in these circumstances. Selecting the best terms of employment to use given demand variability can assist in the optimisation of service productivity as an element of the service organisation's coping strategy.

The obvious omission from Fig. 9.2 is the use of notorious zero-hours contract arrangements, which is proving increasingly popular with some services employers in the UK. Under the provisions of these contracts, the employee is 'on call' and the employer under no obligation to offer work—but when it does, the employee must

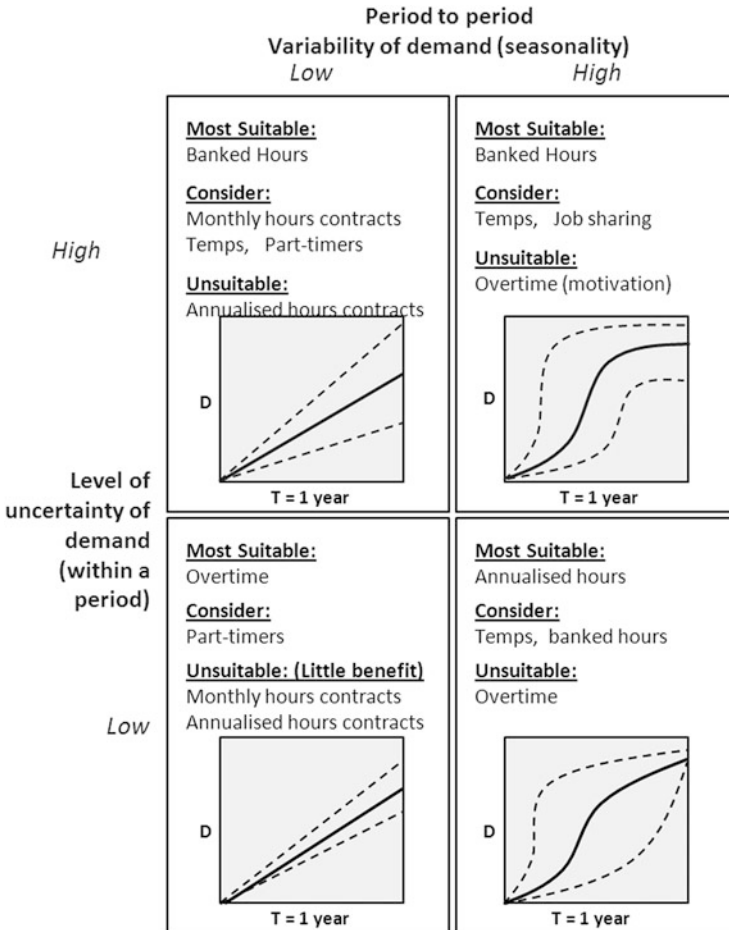


Fig. 9.2 Best-fit terms of employment. Source: Adapted from New, Wheatley, and Szejcowski (1999)

accept it. While there are obvious advantages for service productivity and labour cost reduction, these arrangements on occasion must negate the development of a culture of collaboration, which is a core part of lean philosophy.

So far, in this chapter I have focused on five of the main barriers faced by service operations management in their quest to improve service productivity and discussed five strategies that can help alleviate those barriers. They are (1) understanding and communicating the service concept; (2) the application of good practice service process re-design principles; (3) taking advantage of opportunities for outsourcing; (4) recognising the potential of customer engagement technologies; and (5) addressing the ‘people’ factor, which pervades the ‘productivity paradox’. In the following section, I present a case study of an experiential service that has

successfully integrated these five strategies, increasing operational productivity and customer productivity and satisfaction.

9.5 Case Study Example: CitizenM Hotels

In November 2004, four men met for dinner at the Tjoe Tjoe Mas restaurant at the Newport Hotel in Huizen in the Netherlands. Each had quite different and complementary specialist skills. Michael Levie was an experienced hotelier, Rattan Chadha, an entrepreneur with experience in the fashion industry, Robin Chadha, a brand boffin and Jan Wulf van Alkemade specialised in market trends and customer offerings. In their various business lives, they had all travelled extensively to different parts of the world. As a result they held a common view that they had not encountered anything new and exciting in the hotel sector. They believed that hotels simply did not offer the levels of familiarity, automation and technology already used in domestic settings. They felt that no one was catering to the changing needs of frequent travellers, not to mention the need for basic hospitality.

By the end of their dinner, they had agreed that something needed to be done. They embarked on a new journey, and between then and the summer of 2008 they made reality of their dreams by opening a new 230-room niche hotel at Schiphol in Amsterdam. A year after that, they opened a 215-room hotel in the city of Amsterdam and a year after that a further 198-room hotel in Glasgow in the United Kingdom.

Their concept is called CitizenM. The budget boutique hotels are based on creating hi-tech modules in a factory setting and then assembling them on site. The assembly takes around 15 days and the construction costs are around 60 % of typical four-star hotel costs.

On top of that, the hotels operate with less than half of the staff (full-time equivalent) of traditional four-star hotels and obtain in excess of 50 % direct web reservations. The combination of low construction costs, low running costs and high service productivity means that the hotels show positive returns in year one. By comparison with four- and five-star hotels, CitizenM achieved 130 % revenues per room (REVPAR) within 2 years at Schiphol and occupancy in excess of 90 % per annum.

A measure of the popularity of their concept is the feedback provided on TripAdvisor.com where in 2011 the Glasgow CitizenM was rated number one in Glasgow, and Schiphol number one out of 370 hotels in Amsterdam. The city property was number 12 in Amsterdam and was named '*most trendy hotel worldwide*' by TripAdvisor (guests) in 2010 and 2011.

9.5.1 How CitizenM Hotel Overcomes the Barriers to Service Productivity

9.5.1.1 A Clearly Defined and Communicated Service Concept

The ideas the four partners had originally discussed over dinner in 2004 were translated into a concept that they believed would appeal to a new type of traveller. According to Michael Levie, one of the four friends and now the company's Chief Operating Officer, *'Traditionally, hotels don't innovate and they usually box people in terms of gender, age, income, origin, you name it. . . whereas today's traveller, is someone that travels in jeans, in a cheap T-shirt, has a designer watch, drinks champagne, carries an iPad, may take public transport home and does that for business and for leisure'*. CitizenM hotels (the M is for mobile citizens of the world) aimed to provide a new type of hotel experience for a new type of customer; a mid-market traveller visiting for business or leisure who, Michael Levie believes, *'does not have a deep wallet but does have a lifestyle aspiration'*.

The service concept is clearly defined from both the customer and operations perspectives. From the customers' perspective, Michael Levie says, *'we looked at what people really value. Tonight, you're staying at a hotel because there was no time to get back home. So what would you like in your environment? In your own home, you probably have high-speed internet, content of the TV that you like, you have a phone with a good telephone rate and probably your bedroom is not the largest but you have a living room and dining room with your family in the kitchen.'* He goes on to say, *'We focus on what these travellers want, what they aspire to and provide that at a high-end luxury but for an affordable price.'* The concept is tailored for travellers who want control over their service experience but do not want to stay in their rooms for the entire duration of their stay, preferring to spend most of their time in the city or in the hotels' social areas.

From the operations perspective, as Michael makes clear, *'we then sought to design our service concept based on home lifestyle features. So you probably arrive with us around seven o'clock. You need something quick to eat if you're by yourself. If you're with friends or clients, you will probably go out to town and grab a nice meal in a nice restaurant. In your room, you need a good-sized bed, comfortable crisp sheets and towels, and aesthetically nicely designed; a great rain shower and you will want all the basics including Wi-Fi. [As at home], materials need to be durable, our processes need to be quick and reliable and if I don't know and use your name, we've not delivered service.'* Michael summarises the CitizenM hotel concept in these terms: *'In the end, they buy a night of sleep but the experience that they have with us is also convenient, quick, efficient and all those touch points that are important to our guests. . . every little facet has been specially designed, taken care of and reworked.'*

With the concept defined, CitizenM then looked at what other experiential services were doing in terms of managing productively. As Michael makes clear, *'we looked way beyond our own walls. We looked at how other industries do efficiency. If you've ever taken a luxury cruise or flown in a private aeroplane,*

[they have] *pretty cool, small spaces. Providing a small space is fine if you could do it aesthetically well with attention to detail and with good quality. The size of each of our rooms is 14.5 square metres [equivalent to 50 square feet]. We [realised] that we could provide small rooms of great quality but [with the advantage] that we could mass manufacture them [and enable us] to transport rooms over road or by boat or train; the building processes would be cheaper, value engineering would be easier, the processes productive and good functionality.*' Thus, the hotels are constructed from pre-fabricated modules in offsite factories with the company able to maintain consistently good quality standards using a faster building process.

An important part of the CitizenM service concept is good functionality. Guests are offered an array of self-service options from self-check in and check out to processing their own breakfast. All hotel rooms feature an extra-large king-size bed, a powerful rain shower, a wall-to-wall window, free Wi-Fi internet access, Skype phone rates and an international plug system (UK, Europe and USA). There is also a touch screen MoodPad that gives the guest full control of the room, including the television, window blinds, temperature, coloured lighting (for a more ambient room experience) and wake-up alarm themes. As Michael says, *'good functionality must be seen in all parts of the day-to-day offering [not just bedrooms]. For example, a lot of our guests travel on 12- or 14-hour flights. It may be six pm but their biological clock says it's breakfast time. So we offer 24-hour breakfast...'*

The total service concept that CitizenM defined successfully aligns the customer's perspective, with its focus on outcomes, benefits and judgements, with the operations perspective, which is concerned with managing the inputs and ensuring the processes are working well for the service to be provided as desired. It offers an excellent starting point for good service design (mitigating barrier 3) and helps avoid operations mistaking inputs and outputs for outcomes (barrier 2).

9.5.1.2 The Application of Good Practice Service Design Principles

Good process design principles have been applied throughout the CitizenM properties. For example, each bedroom contains an extra-large bed that has been designed to fit precisely wall-to-wall as an integral fitting in the room. While the result is aesthetically pleasing to the guest, stripping the bed and remaking it presents a challenge to the housekeeper. This has been solved by the application of good practice process design principles. Fourteen steps are involved in remaking a bed, taking 70 seconds to carry out, with the sequence of tasks in the process being optimised². Other examples of the application of good practice design principles include:

- Separate job roles for receptionists, waiters and cooks are not needed. For example, guests check themselves in and out. Many touch points between the

²The process of stripping and remaking the bed may be viewed in Part 3 of the CitizenM Hotel multi-media case study (2012). Authors: Dr. Bob Lillis, Dr. Chris Van Der Hoven and Professor Keith Goffin. It may be accessed free on <http://www.thecasecentre.org/CitizenMcase>.

customer and service provider take place at the interface between technology and the guest and are automated. Technology negates the need for more service personnel to be employed.

- Front office staff—called ambassadors—are given extensive decision-making authority. Their job role is deliberately made generalist (unlike most hotels, which require specialist job roles to be performed) and if required, each ambassador is able to perform all steps for any single customer request.

As well as obviously allaying barrier 3 and assisting in the removal of TIMWOOD, these actions also serve to benefit CitizenM in its ability to cope (barrier 4) and form an essential element of the successful implementation of lean thinking throughout the hotel (barrier 5).

9.5.1.3 Taking Advantage of Outsourcing Possibilities

The use of outsourcing is a recognised method for alleviating the productivity paradox (barrier 5) but CitizenM has used it not only for outsourcing their front-office technology needs, but also in the management of their back office. For example, the servicing and cleaning of all hotel and guests' rooms is outsourced to EW Facility Services of the Netherlands. According to the housekeeping staff, an EW housekeeper is required to clean 23 rooms per shift, taking 17 min to clean each one for check-outs and 14 min for the room of a guest who is staying on. This compares with 8–15 rooms per shift for a housekeeper cleaning bedrooms in a four-star hotel.

However, CitizenM pays cleaning costs to EW Services in the form of a set fee only for each room sold per night and the fee includes costs of linen, towelling and other room accessories. This enables CitizenM to avoid confusion in its performance measurement system between the management of hotel capacity (efficiency and utilisation shown as room occupancy percentages) and its room productivity ratios (units of output—number of rooms sold, over units of input—the cost of labour incurred for cleaning and servicing the rooms sold). This means that room servicing and cleaning costs are always in direct correlation to rooms sold (output) and no on-costs are incurred. There is also the additional advantage that storage space in the back office for linen and accessory items is not required. EW owns the linen, which is delivered on a daily basis as occupancies dictate. In addition, the churn of housekeeping staff at CitizenM Schiphol is low by industry standards. According to two of the housekeepers, *'we have got a group of housekeepers who have been here since the hotel was opened 3 years ago. Housekeepers stay because it's a good place to work. Training is good; promotion is possible; and a recognition scheme exists for us.'*

9.5.1.4 Implementing Customer Engagement Technologies

The use of smart, contemporary technology forms an integral part of the service concept by supporting guest personalisation at low cost. CitizenM outsourced its IT requirements, selecting Swisscom to advise on the most efficient use of technology to support the service concept. According to Michael Levie, *'Swisscom developed a technology blueprint for us [whereby] the widest number of hotel and guest services*

would be unified into one network infrastructure. From a catalogue of Internet Protocol-compliant technologies, we chose preferred service providers for our PBX system, room lighting and heating, ventilation and air conditioning, with Swisscom co-ordinating the links with all vendors, such as NEC, Philips. . .'

The advanced use of technology saves costs on maintenance and energy consumption but equally, it allows the company to personalise the service; for example, it stores guests' music choices and room ambience settings and offers them the next time the guest reserves a room or at check-in. No IT service support staff is needed on site. Even guests' arrival and departure is fully automated, with guests able to check themselves in and out at e-kiosks. Michael Levie explains: *'We had looked at a kiosk in an office building that was providing information on the building and on the tenants. We approached the company who made both its hard- and software and asked if they would help us do hotel kiosk check-in and check-outs. Nine months later it was up and running. E-kiosks provide an automated process which guests have control over; they know how to spell their own name and they probably made the reservation themselves. So it is a three-step process to check themselves in'.*

Network standardisation and application visualisation are key factors in helping streamline CitizenM's hotel operations while allowing a focus on guests. These successful implementations of customer engagement technologies are not bolt-ons. Instead, they form an integral part of the service concept by serving to intensify service outcomes while enabling CitizenM to operate productively and avoid barriers 3 and 4.

9.5.1.5 Addressing the 'People Factor'

The hotel employs a full-time employee per five rooms compared to the industry average of a full-time employee for every two rooms. It has a flat organisational structure comprising a hotel manager, an assistant hotel manager and between one and five ambassadors on duty in any eight-hour shift (depending on seasonality and demand variability week by week), one of whom also acts as the senior manager. As well as fulfilling front-office duties, such as acting as host, receptionist, breakfast server and bartender, ambassadors also undertake back-office functions, like preparing arrival and departures reports, accepting deliveries and so on.

Hotel managers, assistants and ambassadors are employed full-time with basic pay in line with market conditions prevailing in the hotel's locality. Temps and part-time employees are not used. With predictable seasonality and relatively low demand uncertainty, the implementation of annualised or monthly hour contracts would likely bring little productivity benefit. Terms of employment include specialised training and a personal development plan. Significantly, staff are incentivised not only on the sales they achieve but also on guest satisfaction measures, based on the net promoter score—the percentage of guests who are

promoters of the hotel brand minus the percentage who are detractors³. The incentive scheme is paid monthly. Using an incentive method based on sales achieved is typical within the retailing industry but less common in the hotel industry.

Encouraging responsibility for delivery of the service concept has been an important factor in building workforce collaboration and engagement. As Michael Levie explains, *'The culture here is not about having a good idea and instructing people how to execute it; it's about a teaming up of partnerships. For people to excel, to have high morale and be highly productive, to push themselves every day, you need to create an environment that allows them to do that. Our front-office people, we call them ambassadors, are the most important people because they deliver the service. So they come to work through the front door. They and our housekeepers eat where the guests eat. They have great locker rooms and we take care of them. We incentivise them to be fully responsible for guests' satisfaction with the rest of the organisation to support them. So it's a different philosophy, different culture. We hire people that have a genuine kindness and friendliness in their nature. We do not do a traditional interview. We use role-plays and try to reveal and develop their personal characteristics through "Wow" training. And as such, it's very easy to then see whether that person is suited to the role of ambassador, able to spontaneously offer excellent service.'*

Initial recruitment and training for ambassadors takes 4 weeks. 'Wow' training is conducted through exercises intended to show the new recruit how to deliver excellent customer service through behavioural skills and ways to strengthen customer relationships, as well as the more traditional development of basic technical hotel skills. Continued training one-to-one with a CitizenM corporate trainer usually takes 4 days and includes shadowing the 'buddy' in a live situation. An ambassador is sent 'solo' when the hotel manager is satisfied that he or she can offer the required levels of service intensity.

9.5.2 The Future

The company has recently opened its first hotel in London and is in the process of rolling out a further 11 in other locations, including New York and Paris. When challenged about losing service productivity as the business grows, Michael Levie says, *'...the hotels operate as retail stores and we have a very flat and small service office. We won't grow the number of specialists over time.'* In regard to keeping up-to-date with technological change, he says, *'...since opening our first hotel [at Schiphol in 2008], we have already upgraded and changed our operating system*

³The net promoter score measurement tool was introduced by Reichheld (2003). The most important proposed benefit of this method is believed to derive from simplifying and communicating the objective of creating more 'promoters' of a brand and fewer 'detractors', while seeking to convert 'passives'.

and in-room technology. Our central hotel networks with IP- (Internet Protocol) based room technology make this possible. Value engineering is central to our ethos, and we celebrate each time we introduce a new product. The day after the celebrations, we start out on our next quest to improve our offering.'

9.6 Summary

CitizenM hotel has been successful in overcoming the barriers to service productivity. The innovative nature of its service concept, the application of good practice process design principles, its use of customer engagement technology and successful outsourcing and the company's ability to address the people factor have allowed it to run 'lean' but provide effective delivery of a personalised guest experience. The summation is best left to Michael Levie, the Group Chief Operating Officer: *'We are able to sell our hotel experience much cheaper [than competitors]. How? Because we construct much cheaper, we operate much cheaper, our distribution channels are much cheaper. So we are able to share these service efficiencies and productivities with the guest.'*

Expert's View

Dr. Alexander Gogoll

Siemens AG

Question: How and where will innovation in services increase productivity?

Alexander Gogoll: Service innovation is affecting both the effectiveness and efficiency of the core dimensions of service quality, be it the results of a service transaction, the processes along the service value chain, or the resources needed to deliver excellent services. Service innovation increases the productivity of the entire service delivery system.

- (1.) Regarding the results dimension of service quality, service innovation leads to more customer focused offerings, increasing the overall effectiveness of service. As value propositions are derived from authentic customer needs, this will also allow for price premiums.
- (2.) The process dimension will be affected most heavily by service innovation. The efficiency of service operations along the value chain can be improved drastically by smart and flexible process designs with managed interactions as well as the application of information and communication technology in comprehensive value creation networks, sustainable partnerships, integrating customers, service providers, and suppliers.
- (3.) Last, but not least, there is the resource dimension with major improvement potential regarding service automation through technology. As most services rely on information and communication, innovation in the field of ICT will increase productivity, and with the dawn of the internet, mobile front ends, apps and everything else available there has been a quantum leap in productivity—but there is still room for improvement. And there is also the people side, where innovation in education and holistic competence management for all participants in multilateral value creation networks will increase productivity, but also affect and develop future social systems.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Alexander Gogoll: The rate of change will be affected by both economic pressure and business opportunities (push/pull effects).

- (1.) Economic pressure is resulting from the increasing need for economies of scale and scope due to heavy investments in service infrastructure and increased competition in the service arena, both on a regional, but also on a global scale. Legal restrictions (e.g., tax legislation, environmental

(continued)

protection, labour laws) might both be accelerating and/or inhibiting factors in this respect.

- (2.) Business opportunities will arise from upcoming customer needs due to developments in the B2C or B2B market (e.g., total cost of ownership concept, performance based contracts), but also can be created by innovative market definition and/or alternate market segmentation. The rate of change will be affected by the market dynamics and the potential of which is to be addressed in short, medium, and long term. Accelerating and inhibiting factors are market transparency and competitive landscape. But when it comes to innovation and speed of change, there are also socio-cultural aspects which have to be taken into account, as service relies on people.

Innovative View on Value Creation – Investigating Requirements for a Holistic Service Life Cycle Management

10

Sabine Janeschek and Matthias Gouthier

Setting the Stage – Annotations by the Editors

The previous chapters have shown in different ways the significance of customer-centric business. Even in manufacturing fields like mechanical engineering, companies have identified the profit potential of industrial services like repair services, technical support, or trainings and in consequence have expanded their service portfolio. By offering added value through industrial services, a mechanical engineering company can differentiate its offerings and gain a competitive advantage, which is likely to result in an increase in sales and market share. To distinguish their services and products and gain long-lasting customer loyalty, particularly mechanical engineering and IT firms make use of service life cycle management (SLM). SLM is different from product life cycle management (PLM), which examines the entire life cycle of a product, rather than the organisation as a whole.

SLM refers to a strategy that supports service organisations and helps them recognise their gross income potential. This is done by examining the service opportunities proactively as a life cycle instead of a solitary event or set of discrete events. But in contrast to the traditional PLM perspective, a corresponding and interlinked service life cycle approach is still in its infancy and empirical studies in this context are still rare. The chapter by *Sabine Janeschek and Matthias Gouthier* explores relevant requirements for a

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structured implementation of a SLM concept, which could guide firms and support them to implement such an innovative service-oriented management approach in a more standardised way.

10.1 Introduction

Companies focusing on products can offer supplementary service innovations to their customers with the goal to help them getting more value from the products themselves. By developing service innovations to support the core products, a company can differentiate itself from competitors, reach a higher share of revenue, increase revenue stability, and improve the relationship to the customer (Bettencourt, 2010). The structured elaboration of services from a life cycle perspective can be interpreted as an innovative approach, which can lead to an increase in value for the customer. In particular, the integration of an innovative service management approach—like a service live cycle management (SLM) concept—in a company's strategy can help companies handle services in a more effective and efficient way. This in turn supports companies in order to differentiate themselves from competitors and furthermore also increase revenue in the long run. Advantages for the company as well as for customers can be observed.

According to Meffert and Bruhn (2009) the analysis of a product life cycle or service life cycle aims at identifying general rules for single phases of the life cycle, with the goal to draw strategic decisions. Such a holistic perspective provides valuable information, and results in an increase in productivity and value for the company, i.e. the service provider, as well as for the customer. The relevance of life cycle management is not only a meaningful topic for academics, but is also a significant area for practitioners. Siemens AG with its Teamcenter solution is a very good example. Teamcenter is an integrated suite of product life cycle management (PLM) applications of Siemens and can be seen as an extension of a classical PLM as it includes SLM elements (Siemens, 2013).

But in contrast to the traditional PLM perspective, a corresponding and interlinked service life cycle approach is still in its infancy and empirical studies in this context are still rare. Therefore, there does not yet exist an all-embracing and holistic understanding of this concept. In particular, an elaboration of relevant requirements for a structured implementation of a SLM concept is missing. An elaboration and overview of necessary requirements would guide companies and support them to implement such an innovative service-oriented management approach in a more standardised way. As a consequence, the following research question is formulated:

What are the requirements for the structured implementation of a holistic service life cycle management concept?

Through an empirical study using personalised interviews, the authors aim at developing a deeper understanding regarding necessary requirements. Furthermore, the authors provide a catalogue of requirements for the implementation of a holistic SLM concept.

To investigate this topic in detail the chapter is structured as follows. In a first step, in order to elaborate this topic in-depth on the basis of a theoretical foundation, we present various recognised service life cycle models. In a next step, a comprehensive service life cycle model based on a cooperative research project is introduced. This research project with a duration of three years is funded by the Federal Ministry of Education and Research (Federal Ministry of Education and Research, 2014) and focuses on the “Dynamic, phase-specific management of services productivity (ServUp)” (ServUp, 2014). It consists of several subprojects. The subproject “Requirements on and concepts for a holistic and phase-spanning Service Life Cycle Management” will be presented within this chapter (support code: 01FL10087). Following the theoretical foundations in Sect. 10.2, we move on to our empirical study. In this section, we explain in detail our research methodology—sample and data collection, as well as the data analysis—and present our findings regarding the multiple requirements for the implementation of a service life cycle approach. Four propositions are derived which emphasise the importance of requirements related to the organisation itself, processes, employees, and customers. We conclude this chapter with the contribution of our results, further research, and managerial implications.

10.2 Conceptual and Theoretical Background

Before elaborating the requirements for the implementation of a service life cycle concept (see Sect. 10.3), various service life cycle models are introduced in this section. This theoretical framework aims at understanding the different perspectives of such a concept. In a second step, the service productivity life cycle will be introduced. Due to the focus of our research, this life cycle is appropriate and serves as basis for our empirical study focusing on requirements on a SLM concept (see Sect. 10.3).

10.2.1 Service Life Cycle Models

Current studies offer various recognised service life cycle models. These models have some overlaps, but do also differ regarding their focus which can be on customers, the company itself, or the market as a whole. In consequence, no model can be substituted by another model nor is a single model most qualified for all strategic intentions. The use of a specific model strongly depends on the

intentions and objectives which should be reached by using a service life cycle model. In the following, for each focus (market, customer, and company) a renowned service life cycle model will be introduced.

Potts (1988) considers the market perspective regarding his service life cycle model. This life cycle consists of the four phases of rapid growth phase, transition phase, maturity phase, and end of life phase. In his work, a service life cycle is presented together with a product life cycle in one model. Moreover, in order to visualise the profitability of a service depending of the phase of the service life cycle, revenues are indicated over the whole life cycle.

Ives and Willinger (1999) focus on the life cycle from the customer's point of view, i.e. each phase should be looked at through the customer's eyes. This "Customer Service Life Cycle" consists of thirteen subphases which belong to four phases. It presents the customer's activities while making the purchase decision, the acquisition of the good or service, followed by ownership and ending with retirement of the product or service when it is no longer serving its purpose. Concentrating on this life cycle leads to an enhancement of customer relationships.

Katzan (2008) includes the management and customer perspective into his service life cycle model. This model consists of five elements, representing a forward cycle. The inclusion of feedback processes leads to a full circle. The model starts with a service strategy as main element, which is essential to ensure sustainability in service operations, and is followed by service design, service transition, service operation, and continuous improvement of the service. Through customer feedback, this closed loop information flow leads to constant optimisation of the service life cycle.

10.2.2 ServUp Approach: Service Productivity Life Cycle

Based on the previously described service life cycle models (see Sect. 10.2.1), Janeschek, Hottum, Kicherer, & Bienzeisler (2013) developed a new service life cycle model in the context of the cooperative research project "Dynamic, phase-specific management of services productivity (ServUp)" (support code: 01FL10083-88) which was funded by the Federal Ministry of Education and Research (Federal Ministry of Education and Research, 2014). The research project focuses on product-related services primarily of mechanical engineering companies, and aims at developing scientific principles and practical solutions for the dynamic, phase-specific management of services productivity along the service life cycle (ServUp, 2014).

While PLM and in this context the optimisation of a product from a life cycle perspective is in the mind of the majority of researchers and practitioners, many researchers and companies are still not fully aware of the relevance of a corresponding SLM. On the one hand, this is due to the fact that not enough focused and specialised studies regarding this topic exist, and on the other hand due to the difficulties companies are faced with while trying to implement such an approach. Therefore, the focus of the research project lies on SLM, and in this context on

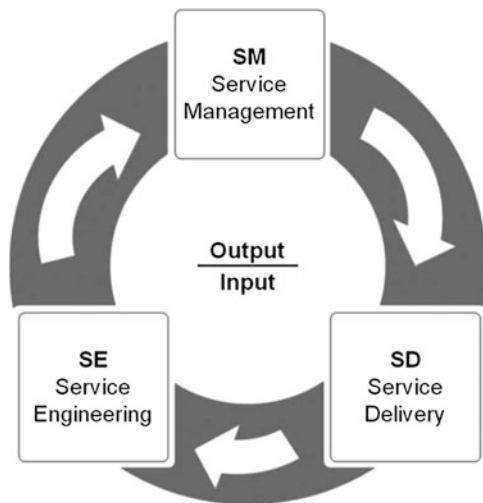


Fig. 10.1 Service Productivity Life Cycle (Source: Janeschek et al., 2013)

means in order to increase the productivity of services in each phase of the service life cycle as well as throughout the whole service life cycle (ServUp, 2014).

Based on an intensive project work and on recognised service life cycle models (see Sect. 10.2.1), a service productivity life cycle model was elaborated. This service productivity life cycle consists of the three phases service engineering, service management, and service delivery (see Fig. 10.1).

Faced with imperfect service situations, companies have to start developing new services or reengineer existing services in the service engineering phase. In order to increase productivity in this life cycle phase, process design aspects, characteristics of necessary resources, and customer requirements have to be considered. In the service management phase, companies gain an overall view of the services provided in a given period. The demand for a service on the one hand, as well as the actual number of service deliveries on the other hand, can be monitored. In order to judge whether a particular service offering is worthwhile, aggregated data are used. In this context it is necessary to have a closer look at key performance indicators (KPIs). Such KPIs can help to monitor the appropriate resource allocation and process performance of a company. In the service delivery phase, the service is finally delivered. During this delivery process, interactions between the involved partners, namely the service customer and the service provider, are relevant in order to share information which would be otherwise unavailable. For the service provider, this information is essential to assess service productivity and has a direct influence on the preceding and following phases of the service life cycle. To sum up, it can be stated that these three phases are interdependent. Data from the phases of service management and service delivery give valuable insights regarding service productivity in the engineering phase. Moreover, the service

engineering phase is a valuable source regarding service management and service delivery (Janeschek et al., 2013).

The presence of service life cycle models demonstrates the growing importance of this topic. So far, the existing literature focuses primarily on the characteristics of the single phases of a particular life cycle. However, a detailed and in-depth analysis of the requirements for the implementation of a SLM concept is required. This will be elaborated in the following section.

10.3 Methodology and Findings

In addition to a PLM, a corresponding SLM approach, which is implemented in a structured way in a company, can lead to increased profits in the long run. But until now, there does not exist a uniform understanding on how to implement such an innovative service management approach. As a consequence—based on the Service Productivity Life Cycle (see Sect. 10.2.2)—this chapter aims at elaborating requirements for a structured implementation of a holistic and phase-spanning service life cycle concept. We therefore chose a qualitative research approach. Through the use of qualitative research, we aimed to gain a rich understanding and answers to our research objective, and furthermore practical implications through valuable information gained in the course of our in-depth interviews. Qualitative research is an appropriate method studying the requirements for the implementation of a SLM concept, as this flexible approach allows modifications and adjustments of the research focus and design in the course of the interviews (Malhotra, Birks, & Wills, 2012). This leads to an open nonbiased research (Maxwell, 2005).

10.3.1 Sample and Data Collection

Using a criteria-based approach, our interviewees were selected under the conditions, that they offer product-related services and have a strong service orientation embedded in their company. We focused on mechanical engineering companies to build up a mostly homogeneous group. In order to generate a qualified group of interviewees, we presented our research on the one hand at a conference of the largest engineering industry network in Europe and one of the key association service providers in Europe. On the other hand, we participated in a workshop of a benchmark group on “Operational Excellence”, whose participants belong to mechanical engineering companies in Germany. Out of these two meetings, suitable partners for our research project could be identified. Furthermore, we asked our interview partners for further experts to interview (snowball technique; Malhotra et al., 2012). In sum, thirteen interviewees participated in our study concerning the requirements on a SLM approach. With a high service orientation in addition to product offerings in a business-to-business environment, the interviewees possess perfect requirements for our research. They were primarily directors of the service or sales department, CFOs, and CEOs of large mechanical engineering companies.

We conducted in-depth semistructured interviews between March 2013 and June 2013. We conducted the interviews face-to-face or via telephone. The interviews lasted between 30 and 60 minutes, were digitally recorded and transcribed verbatim afterwards. We used an interview guide which enhanced internal validity. As the researcher was the interviewer of each interview, consistency could be assured as well. We started the interview with an introduction of the topic and then asked our interviewees about their background, their work relating to services, and then continued with their usage of a SLM, explicitly the concrete requirements implementing and using a SLM concept in a company.

10.3.2 Data Analysis

We interpreted each interview as a single case. Using this method, the cases serve as independent experiments. In consequence, emerging insights can either be confirmed or disconfirmed by these independent experiments (Eisenhardt, 1989). We started our analysis and structured our data in this context by making notes. Then we analysed our collected data starting with a very detailed microanalysis and resulting in greater generality of the data (Strauss & Corbin, 1990). Throughout the analysis, we concentrated on various requirement categories regarding the implementation and usage of a SLM approach. We also tried to understand how these requirements are interconnected, and in general the importance of such a concept for a company. Through the identification of key narratives which were repeated by the different interviewees, we identified four groups of requirements.

This process of data analysis was conducted by three researchers who have an in-depth knowledge regarding the topic SLM. In a first step, these researchers analysed the data independently of one another. In order to guarantee well-grounded results, the findings were discussed in several workshops in detail afterwards, and finally four groups of requirements were elaborated in a second step. The requirements are illustrated in Fig. 10.2.

10.3.3 Findings and Discussion

The importance of a holistic approach in order to implement an innovative service management approach in a company, and in this context the necessity to concentrate on several areas in a company in order to be successful with the implementation of a service management approach is also supported in literature. As Bettencourt (2010) states, a company has to consider potential causes of service failures with the goal to avoid them. There exist four areas where service failures could have its origins and therefore, these areas have to be carefully elaborated in detail. At first, it is essential to have a closer look at an organisation as a whole: how are the strategy, structure, values, and resources in this organisation? Furthermore, processes have to be taken into consideration. “Who is doing what at what time (when) in which place (where)” has to be answered. Thirdly, employees are an

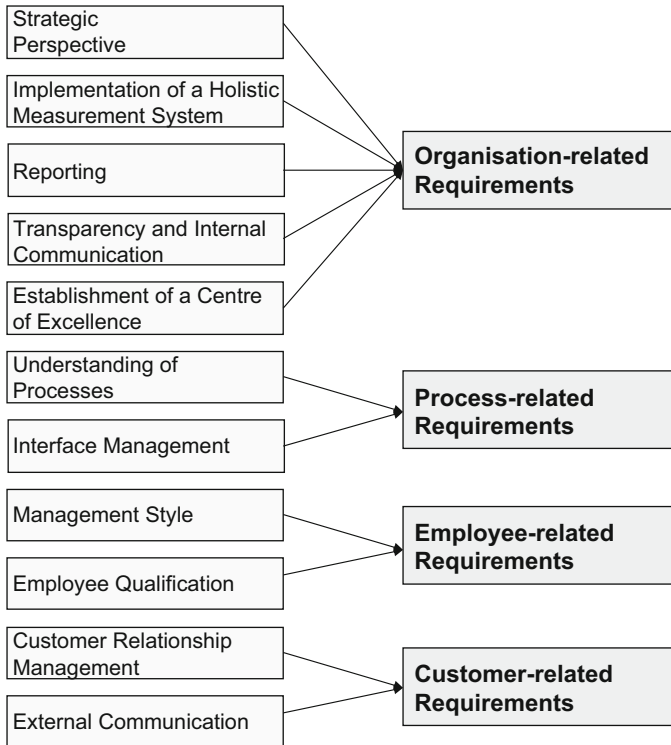


Fig. 10.2 Research Framework: Requirement Dimensions Leading to Meta-Groups of Requirements (Source: Own Illustration)

important element: factors regarding their role clarity, motivation, ability, and work environment have to be considered. Fourthly, also the role clarity, motivation, ability, and environment of customers have to be investigated. Keeping all four areas in mind and trying to control them enables a company to identify innovative service approaches which is in line with our results. This is an outcome which is essential to our strategy regarding the implementation of a SLM concept, which emphasises that a company has to focus and elaborate on different areas in a company to be successful.

In the findings and discussion section of this chapter, we elaborate in the following the requirements on a SLM based on the conducted qualitative interviews and current studies in detail. We start with a general framework and answer the following questions (see Sect. 10.3.3.1):

- How do the interviewees define SLM?
- In which area of the company is such a management concept valuable?
- Who is the user and under which conditions?

Building on these first findings, meetings with research partners, our conducted qualitative interviews, and based on an extensive literature review, we provide

evidence and identify four meta-groups of requirements with the focus on “organisation”, “processes”, “employees”, and “customers”. Each meta-group consists of several dimensions, which will be explained in detail (see Fig. 10.2 and Sects. 10.3.3.2–10.3.3.5). The understanding of this complex topic, the structured elaboration of the right and uniform requirements as well as finally the implementation of a SLM concept in a company lead to an increase in value for the company. Such a structured treatment of all service-related information through a SLM induces internal and external value-creation, i.e. additional value for the company itself as well as for the customer.

10.3.3.1 General Results

So far, there does not exist an all-embracing understanding of the concept “service life cycle management”. Therefore we asked our interviewees how they define a SLM. The following statement represents well the view of our interviewees: “*SLM is a strategic direction of a company. It supports the company that everything [all actions regarding the product and especially the product-related service] goes well. And in this context it is of major importance, KPIs are involved. A SLM concept is useless, if it does not create any KPIs [which provide valuable hints for further strategic decisions].*” Consequently, this concept can be seen as a “medical file” of the product and related services; through the identified KPIs a company can observe the life cycle, and in this context actions corresponding to the product and related services. Moreover a company is also able to detect problems which give hints of great value regarding potential areas for action. Furthermore, it is possible to talk about “service prevention” in this case as well. An effective interpretation and usage of the KPIs can help to proactively identify relevant and useful services in addition to a product, and in this context strategic areas of action; the right interpretation even enables a company to work in an anticipatory way, which might in turn lead to a reduction of areas of actions.

The field of application ranges ideally through the whole company. Our interviewees confirmed that “*such a concept should be used and implemented in the whole company, integrating all processes.*” This concept should be implemented in order to serve as a strategic platform, from which different departments can pull data; these data should be used to make strategic decisions for the respective department as well as for the company as a whole. Obviously, the service department profits the most from this concept, but the information is still of interest to the marketing department and the quality management department. It supports the employees in order to draw conclusions regarding the quality of the product and service, and moreover facilitates the implementation of a customer relationship management with the goal to manage interactions with customers in a more efficient way. Such a SLM approach is furthermore an advantage for the area of research and development (R&D) (in order to disclose problems relating to service history), and to the sales department. That data is also of relevance for the management of the company as it can support the strategic orientation of the company.

Consequently, various people will use this tool and profit from it. The service technician will push data into the tool. The service planner can use the data for the evaluation of the results. In R&D, the developer can benefit from this concept to gather relevant information about developed products and related services. In the sales department, the salesperson can take advantage of that data for better negotiations with customers. As emphasised by the interviewees: *“This tool is an application with a push function [data are pushed into the tool] and a pull function [data are pulled out].”* It was elaborated that the best solution for this concept under these circumstances should be a multi-user application which is in use all day long.

Due to the complexity of the requirements on a SLM, it is hard to make this topic tangible immediately. Nevertheless, it was possible to elaborate four areas (focus on the organisation, processes, employees, and customers), which we want to concentrate on now.

10.3.3.2 Organisation-Related Requirements

The first area of requirements focuses on the organisation itself. It represents the broadest area, as it consists of five subdimensions (strategic perspective, implementation of a holistic measurement system, reporting, transparency and internal communication, and establishment of a centre of excellence).

The following findings were elaborated in the context of our interviews. Regarding the *strategic perspective*, a SLM concept can only be implemented, if the current company strategy highlights servitisation (Baines, Lightfoot, Benedettini, & Kay, 2009). This is a strategic perspective in which a concept, which mainly focuses on services, can be embedded. Furthermore, *the implementation of a holistic measurement system* is seen as an essential part for the success of a SLM concept. *“Without a holistic perspective, such a system can’t be integrated. All departments have to be involved. To find an ‘island solution’ does not make sense. It is important to transport information from department A to department B. An island solution would lead to retention of all information in department A.”* In order to be able to measure all relevant and complex issues, the integration of cross-department information is necessary. For the *reporting* of all relevant and complex issues, KPIs are mentioned to be very useful. *“Certain KPIs have to be elaborated and documented.”* At first, management KPIs have to be worked out. Based on these KPIs, all department-relevant KPIs can be identified. This one group of KPIs is not possible without taking into account the superordinate ones and vice versa. In this context it is important, that such a KPI system has to be implemented by the management. To successfully implement an innovation like a SLM approach in an established company, the internal resources—the internal customers: the employees—have to be considered and integrated in this process. *Transparency and internal communication* are crucial factors throughout the implementation. *“At first, there exists a defensive attitude towards innovations. That has to be overcome.”* There are, on the one hand, always employees (as promoters) who are in

favour and like innovative ideas. On the other hand, there are also careful ones. Therefore, the management has to become active and should explain the exact reasons for the present change. The different goals of the various stakeholders have to be considered as well in this context. *“You have to consider carefully what to say to which stakeholder at which time.”* An internal communication and even an active change management are must-haves. The integration of internal customers in the implementation process through the *establishment of a centre of excellence* was also supported to be strategically important. *“The creation of an expert team which feels responsible and has the concrete knowledge about the new system is necessary.”* At first the management has to fully support the implementation of a SLM concept. In a second step, a team of employees from different strategic important departments has to be established. This is the centre of excellence. This team has to be trained in order to become a specialist on the new concept. In a next step, each expert has to pass on this knowledge to his specific department with the goal to make the information available for all employees. The multiple organisation-related requirements demonstrate the evident importance of a stable organisation. Thus, this chapter implies the following proposition:

Proposition 1 The implementation of the organisation-related requirements is a fundamental prerequisite for a successful implementation of a service life cycle management concept.

10.3.3.3 Process-Related Requirements

Throughout our qualitative study, our interviewees emphasised that *“processes have to be defined. In order to integrate an innovative system [in an established company structure], processes have to exist. This is the main criteria for a successful implementation and a proper functioning.”* The understanding of processes as well as an effective interface management represent two main process-related requirements. At first it is crucial that the processes are comprehensible, i.e. the *understanding of processes* is of major importance. It is not about the amount of information which is integrated in the processes, but about the understanding. The users of the innovative concept have to fully understand what they should do, and this is only realisable if the processes are well described. Furthermore, it has to be considered that the processes will be expanded through an additional process step in the short run. But in the long term a company benefits from this development, because some processes become useless and other become easier in the execution. Therefore, it is important that the management emphasises the goals and relevance of the implemented concept. The active collaboration between the departments has to be promoted. Such an *interface management* only works if all relevant data will be shared across all departments (see also Sect. 10.3.3.2) and the customers will be integrated as well (see also Sect. 10.3.3.5).

Our results confirm findings from literature which stress that companies have to focus on processes in order to be successful in the area of services. Due to the characteristics of services, service research underlines that in addition to the established and well-known four Ps of the marketing mix, namely product, price, promotion, and place, three further components have to be added while concentrating on services. These three components focus on personnel, physical facilities, and process management (Magrath, 1986). Supporting our empirical results, processes are highlighted as one essential component of the service-oriented marketing mix.

In this context, the focus is on the effective elaboration of the single steps of the service processes, and on the allocation of the responsibilities to either the employees or the customers during the service processes. Moreover, a high degree of flexibility of the processes should exist. The needs and requirements of the customers have to be taken into account, even if this leads to slightly changed processes. Furthermore, the level of transparency of processes influences process quality. The higher the level of transparency, the better the employees as well as customers understand service processes (Homburg & Krohmer, 2009; Magrath, 1986).

Based on findings from literature and the results from our qualitative interviews, we conclude that processes are seen as one essential element in the implementation of such a new concept. Therefore we propose the following:

Proposition 2 Structured and strategic well integrated processes are positively related to a successful implementation of a service life cycle management concept.

10.3.3.4 Employee-Related Requirements

In this section, we will analyse the following two employee-related requirements: management style and employee qualification. Regarding the *management style*, the interviewees stated the following: “*The implementation of such an innovative concept—like a SLM—must be pushed and supported from a central and influential position in the company.*” In this way, employees will accept and support the innovation. On the one hand, it is possible that employees will feel left out by the management and will therefore not be in favour of the new concept at first. But the fact that the concept would not be pushed by a central position on the other hand, could lead to the implementation of different concepts by various departments. This could end up in many competing approaches in one company, and this would in turn minimise the financial resources in the long run.

In this context, findings from literature have to be investigated. Bettencourt (2010) states that employees hold at least two different roles which are relevant to service innovation and about which the management should be aware of. On the one hand, employees have to be treated as internal customers of the company. On the other hand, they are an essential part of the service solution which directly

brings value to the customer. Taking this relevant role of the employees into consideration, service employees should definitely not be ignored and have to be included in the process of service concept creation, development, and design. Therefore, a company has to find a good solution regarding the management style, and find the balance between including employees, but at the same time not giving them too much power.

Moreover, the additional employee-related requirement *employee qualification* which was identified in the course of our interviews constitutes a very important aspect in this context. “*The employees have to be taught how to use this concept. If they do not understand why and how they should handle it, they will do it the wrong way*” (see also Sect. 10.3.3.2, establishment of a centre of excellence). The employees have to become aware that this concept is beneficial for every single employee who is in touch with services. This awareness leads to the willingness of training and to a conscious handling, which in turn leads to a correct interpretation of the output of the concept. As a consequence, the employees will be able to solve customer complaints in a more effective way.

Our results support the implications of the extended marketing mix. As elaborated in the context of process-related requirements, personnel (or employees as used in this chapter) together with physical facilities, and process management also represents an additional component to the classical four Ps marketing mix. Regarding the personnel in a company, it is of major importance to ensure employee competence. In order to implement an innovation and furthermore to handle customers’ concerns and wishes, professional and social competence of the employees is crucial. Moreover, a high level of employee motivation is indispensable. Being confronted with motivated and open-minded employees facilitates the acceptance of an innovative concept—like a SLM approach—and in consequence its implementation. Therefore it is essential for companies to qualify and motivate employees (Magrath, 1986), which is in line with our qualitative interviews.

Combining the findings from our empirical study and literature, the elaboration of the employee-related requirements leads to the following proposition:

Proposition 3 The integration of employee-related requirements is positively related to a successful implementation of a service life cycle management concept.

10.3.3.5 Customer-Related Requirements

Our empirical study highlights that in the area of customer-related requirements a company should have a closer look at the factors customer relationship management and external communication. *Customer relationship management* seems to be inevitable for the implementation and integration of a SLM concept. Closely linked to this factor is customer integration. “*Towards particular strategic customers, there exists a close relationship and an open exchange of information.*” The

relationship is regarded as a collaboration between the service provider and the customer. Throughout this collaboration, the customer is integrated in the development and implementation process of the SLM approach. As the customer is a part of the service process itself, he can give valuable information in order to make this concept even more useful and successful and to solve problems the service provider is even not aware of. The *external communication* of the benefits of such a concept towards the customer is also a complex factor. As this concept represents a competitive advantage, the service provider can actively promote this concept, which could lead to customer loyalty. But as a consequence, the customer would maybe like to gather some information from the implemented tool which the service provider is not willing to disclose. This is a dilemma and therefore the service provider has to decide depending on the significance of the customer if he will share his information.

The role and inclusion of customers in the context of the implementation of an innovative service management approach is also a crucial topic in research. "The best guide to discovering service innovation opportunities is knowing how customers define value and the types of customer needs that can direct meaningful service innovation" (Bettencourt, 2010, p. 1). As many companies do not know the service customers' definition of value, they are missing an essential ingredient to service innovation success. As a consequence it is essential to have a closer look at the customers in the implementation process of an innovative SLM strategy. Only by knowing their needs and definition of value, a company can create entirely new service concepts and can improve current services (Bettencourt, 2010).

Furthermore, our findings validate the concept of customers as co-producers; as many authors highlight that customers should be seen as co-producers of value in the service context, our research goes in the same direction. According to Vargo and Lusch (2004), there is a shift from the dominant logic with the focus on the exchange of goods to a new perspective on services, which primarily means on intangible resources, the co-creation of value, and relationships. In contrast to the perspective on goods where producers and consumers are viewed as ideally separated, consumers are involved in the production of value when concentrating on the service perspective. The consumer is seen as a co-producer of value. Spohrer and Maglio (2010) support this view. They state that value co-creation arrangements among distinct entities are the main characteristics of service systems. These entities create value together in a service system. Also Rust and Bhalla (2010) emphasise that "without a customer there is no business! What could be more obvious than that? Yet, merely because something is obvious doesn't mean it's easy to act on" (p. 62). Companies have to change about how they think about customers. Customers have to be seen as partners, a source that can create value and also revenue in the long run for the company. But therefore, a company has to be aware of the potential of customers and treat them accordingly (Rust & Bhalla, 2010). There has to be "a transition to the 'customers as assets' way of thinking" (Rust & Bhalla, 2010, p. 63). The integration of customers, i.e. customers as co-producers of value, enhances the success of a company.

It becomes obvious, that it is indispensable to integrate customers while elaborating and implementing a new service concept, like the presented SLM

concept in this chapter. Based on the literature and our empirical results the following proposition is stated:

Proposition 4 The consideration of customer-related requirements is positively related to a successful implementation of a service life cycle management concept.

The contribution of the four propositions, as well as managerial implications and the identification of further research are elaborated in the following.

10.4 Conclusion

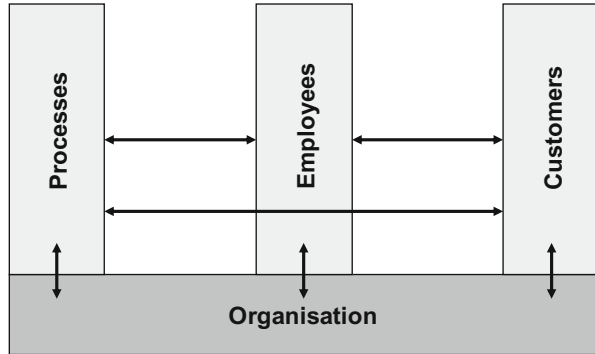
10.4.1 Contribution

The primary aim of our study based on qualitative interviews was to elaborate the requirements for the implementation of an innovative service management approach, namely a SLM. As industrial services are often embedded in the company strategy with a focus primarily on products and are often not seen as an interlinked area, the implementation of a supportive concept with a focus especially on industrial services in addition to a traditional PLM approach constitutes an innovative strategic reorientation for companies. Our study contributes to the insufficient research with a focus on industrial services, where a structured elaboration of the requirements for a successful implementation of a SLM concept is missing, and gives valuable practical and academic insights.

Based on existing and respected service life cycle models and a newly developed service productivity life cycle model (see Sect. 10.2), we elaborated in a first step in the context of our qualitative analysis a framework for the implementation of a SLM concept. First of all, this strategic approach was described and defined, the field of application was determined and the users, who profit the most from it, were identified. On this basis, we developed four groups of requirements, each with a focus on the organisation, processes, employees, and customers (see Sect. 10.3). Furthermore four propositions in relation with the four groups of requirements were derived. The findings show that there exist numerous organisation-related requirements. We learned that these requirements are of central significance. A well-structured and organised company with a clear focus on services is necessary for the implementation of an innovative service management concept. Therefore, these requirements create the basis and are indispensable for a SLM concept. Without such a basis, the implementation will not be a success. Based on this group of requirements, three further groups of requirements were elaborated, namely requirements with a focus on processes, employees, and customers. We showed that these requirements are not only interdependent with the organisation, but they also influence each other (see Fig. 10.3).

This elaboration of requirements can be seen as a guideline and facilitates the implementation of such an innovative service management approach. As our

Fig. 10.3 Interdependencies Between Requirements for the Implementation of a Service Life Cycle Management (Source: Own Illustration)



interviews revealed the importance of these groups of requirements, companies should try to concentrate on these in order to be able to implement such an innovative concept in a structured and successful way.

10.4.2 Limitations and Further Research

Our elaborated four propositions extend the current literature regarding the requirements for the implementation of a SLM approach. Nevertheless, the findings are limited and further research is indispensable. As our data is grounded on mechanical engineering companies, generalisability is limited. Although our results give a structured overview of the requirements, it is necessary to investigate this complex area in different contexts to ensure generalisability. Solely the investigation of this research topic in different contexts can lead to representativeness of the results.

Furthermore, our research is limited to one country. In Sects. 10.3.3.4 and 10.3.3.5 we investigated employee-related requirements and customer-related requirements and highlighted, that employees as well as customers play an important role in the service life cycle; they act e.g. as co-producers or share valuable information with the management of a company. As services are obviously influenced by people, it would be therefore also of great interest to repeat this study in a different cultural environment.

In order to support and concretise the results, a quantitative study should be conducted. This would support the generalisability of our results. In addition, the inclusion of further variables as moderators would be of interest. Such moderators could be the size of the company or the corporate structure of the company, i.e. the number of hierarchical levels in a company.

To summarise, the existing research on SLM and in a first step on the requirements for a strategic and structured implementation of a corresponding management concept is still in its infancy. Until now, there is just limited knowledge and experience available in this research area. But as this chapter clearly shows, this topic holds significant potential for academics and practitioners and should therefore be investigated in greater depth.

10.4.3 Managerial Implications

Despite the potential to increase revenue, gain a competitive advantage, and create value through the sales of services, many companies are still not conscious of the relevance of a SLM concept. As the development and structured implementation of a SLM concept—in addition to an integrated PLM perspective—is directly linked to financial success for companies in the long run, it is of high importance to raise awareness for the potential of this new strategic orientation for a company. Not only academics, but also practitioners in particular, should not underestimate the relevance and potential of this topic.

Regarding the implementation, it is very important to consider the elaborated four groups of requirements. In this context, a structured integration and an in-depth investigation of all four groups is essential. The focus on only one group is not sufficient. Before starting to implement such an innovative concept, a company has to be aware of the complexity of such an implementation, and has to have enough capacities to focus on all four groups of requirements. In case that a company does only have limited capacities, the implementation is faced with severe difficulties, as the single groups are interdependent.

In this respect it is crucial to integrate employees (as internal customers) as well as customers (as external customers) in the implementation process, as they have a huge impact on its success. Therefore, the management board of a company has to communicate to its customers, i.e. the employees, and make them aware of the importance of this concept. The success of the implementation of an innovative approach can only be guaranteed, if employees have a positive attitude towards this innovation and are willing to be an active part of the implementation process. Furthermore, the influence of the customers for a successful implementation of a SLM approach has to be considered. As customers are a part of the service process, their needs and requirements have to be taken into consideration. Only through the integration of customers and the exchange of information between the service provider and the customer, an all-embracing understanding and implementation of this concept can be ensured. A professional customer relationship management is indispensable in this context.

Furthermore it can be stated that a company has to pursue a two-stage process in order to implement such an innovative service management approach. At first, a project management for the introduction of a new innovative concept like a SLM is of major importance. In a second step, a structured change management for a successful implementation is indispensable. Confronted with a radical innovation, there often exists a resistance to change. This resistance has to be addressed (Lovelock & Wirtz, 2010).

In summarising it should be highlighted that the implementation of a SLM—in comparison to a PLM—is due to the nature of services a special challenge for traditional companies with a primarily focus on technical products. But despite all the challenges a company is faced with, this study makes very clear and highlights, that the implementation constitutes a task a company can solve if the elaborated requirements are taken into consideration. It is a challenge which results in multiple benefits for the company itself.

Expert's View**Dr. Ralf Gitzel***ABB AG*

Question: How and where will innovation in services increase productivity?

Ralf Gitzel: Process industry (i.e. chemical, pharmaceutical, food & beverage etc.) will profit from technology-centered support services provided by the asset vendors which allow those companies to focus on their core competencies. Currently, the complexity of process automation assets (sensors, actors and especially the control system) is increasing due to accelerated technological progress.

Companies who use these assets can no longer afford to develop the required knowledge in their own companies—it is too much and changes too fast. As a result, they prefer to rely on specialists in the employ of the asset vendor. Thus, they can concentrate more on their core competency (e.g. refining oil) which means increased productivity for them.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Ralf Gitzel: Creating new services is hampered by the fact that they are essentially crafted as unique items. Originally, hardware design and software engineering faced the same challenges. The introductions of modules, templates and standardised components has helped to increase the speed of HW/SW design. If a similar level of maturity can be reached on service design, this will increase the pace of change. On the other hand, if such developments are not possible, this will inhibit faster service developments.

Part IV

Future

John Bessant, Claudia Lehmann, and Kathrin M. Möslein

The challenge of service productivity is more important than ever. As services become an increasingly significant part of most economies, so ensuring their health and ability to make an effective contribution to employment and economic growth becomes a key issue. At the same time, there is increasing convergence as we have seen in this book between manufacturing and services. ‘Servitisation’ means that increasingly core businesses like engineering are drawn towards models which stress closer interaction with customers and the delivery of services wrapped around physical products. The growth in the technologies enabling 3D realization of design ideas allow ‘mass customization’ to become a reality—but in the process shift emphasis again on to close links with end users and the development of a service orientation.

And behind this is the increasing challenge of public service delivery. Meeting the needs of an ageing and diverse population for healthcare, education, security, energy, etc. will require close attention to productivity in a climate in which resource availability is increasingly constrained whilst demand is growing. ‘Doing more with less’ has become a key question in many economies whilst new social structures and the increasing availability of online connectivity open up options for radical new service delivery.

All of these concerns point towards the need for *innovation*—changes across the spectrum from incremental to radical. The targets of service innovation involve the service offering itself (analogous to product innovation), the underlying process

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whereby the service offering is created and delivered (process innovation), the target market and underlying ‘story’ (‘position innovation’) and the dominant business model underpinning the service value proposition (‘paradigm’ or business model innovation). Managed effectively service innovation can improve and enhance productivity (‘doing what we do but better’) and also open up radical new ways of meeting societal needs.

11.1 . . . and What We’ve Learned

We’ve tried to explore these themes in the book and have looked from a number of perspectives—from a wide-angle historical lens, through to similarly broad coverage of sectors and down to micro-level case studies. It is worth picking up some of the broad trends which we have tried to highlight:

- First, innovation is much more than technology although that can be a powerful driver. Services above all are constellations in which people—creators, consumers and increasingly connectors—interact to create value and the scope for changes in those relationships and the ways they are organized and operate are significant.
- As waves of change (driven by technology or social norms) shift so there is a two-step pattern to innovation. In the early phases there is a trend towards substitution—replacing what already existed with a version which does the job better—for example, moving from physical to online banking or retailing. But there is a second stage in which completely new models begin to emerge, as a product of the interaction between needs and means and eventually radically new alternatives are created. The shift from email and instant messaging towards the creation of communities is a good example here and arising from the latter are many completely new service ideas or delivery pathways.
- Just as there is wide variation in manufacturing innovation depending on sectoral context so we are seeing a broad spectrum of different applications and challenges across different types of service sectors. High volume fields like retailing and banking are significantly different in the innovation patterns when compared, for example, with professional services. Public sector and social entrepreneurship innovation are likely to follow very different patterns from those driving commercial operations—although, as we have seen, there may be valuable learning opportunities in reading across between different models. We need to look for a contingency view of how best to manage service innovation built on deeper understanding of specific contexts, drivers and enablers. Keith Pavitt, a famous innovation scholar, developed an influential taxonomy for innovation back in the 1980s and it would be useful to extend this kind of model to take closer account of the growth of services and the emerging challenge in managing innovation in these contexts.

- One of the most powerful emergent trends has been the rise in ‘user-led’ innovation patterns over the past 25 years and this has particular relevance for services. Since by their nature services are created and consumed often simultaneously the scope for user engagement has always been there. But social and technological conditions are now opening up this challenge and finding ways to co-create value will be a key theme in managing service innovation in the future. But this raises questions of which users? Service contexts—for example in airports—actually involve a number of different stakeholders, all of whom could be considered as ‘users’. Co creating solutions with one of these groups runs the risk of moving against the aspirations and needs of others—and so service innovation is likely to become an increasingly contested space within which new forms of innovation management able to work with complexity will be needed. The case of healthcare already demonstrates this kind of challenge.
- Much of the innovation discussion remains focused on a highly industrialised and developed set of countries and the organisations within them. But another key shift in the innovation landscape has been the growing importance of ‘emerging markets’ as setting the pace and increasingly pointing the direction for change. Meeting the needs for services—public and commercial—across the vast populations of Africa, Latin America, rural Asia and beyond will undoubtedly bring very different ingredients to the innovation mix. New models for service provision may involve radical alternative approaches to deal with different conditions—for example, providing healthcare in contexts where there is little money, scarce skilled labour and wide geographical dispersion is forcing a fundamental rethink. In the process, it forces radical innovation thinking along very different lines which may not only have relevance in the context in which it emerges but also offer possibilities for ‘reverse innovation’ back into advanced economies.
- Manufacturing poses some interesting challenges in the field of service research. Whilst it remains important as a source of wealth generation within economies its role as an employer has been in decline, a trend accelerated by the shift to low cost locations like China. But recent years have seen two powerful modifications to that trajectory. First the rise of design and manufacturing technologies and problems with long-range logistics is creating new possibilities for bringing manufacturing operations back onshore; this move is accelerating with a rise in labour costs in formerly cheap locations. But at the same time those formerly low cost nations have invested heavily in education and are raising the game away from mass production of low cost goods towards higher value products with a stronger quality and design component. In such an environment the challenge for former manufacturing players is increasingly revolving around the provision of services—a process called ‘servitisation’. Here the argument is that long-term relationships with customers provide a better and more stable source of revenue and growth than simple provision of products—but in order to build such relationships remanufacturers are having to learn the ‘game’ of service provision and management.

- Much of the emphasis in service research has been on the ‘big beasts’ of the sector—banking, insurance, retailing, healthcare, etc. But this is to ignore some other areas where there is considerable scope for innovation and where productivity challenges are now emerging, in some cases for the first time. Professional services are a case in point where activities like legal advice have been carried out in the past via simple structures and strong personal interactions. The growing complexity of the legal environment coupled with trends towards liberalisation and deregulation have opened up the innovation opportunities for new entrants but also challenges existing payers to rethink their approaches. Significantly these sectors have begun moving from direct productivity improvement through efficiency gains via process innovation towards more radical product and business model innovations. But the chapter dealing with this issue also touches on a key point—the difficulties of bringing about such radical change from within. Its research suggests that most companies have a medium level of innovation maturity, with pockets of innovation led by a few partners, rather than company-wide engagement. More than two-thirds of the respondents consider the innovation efforts in their companies to increase at least ‘a little’ in the next few years. Cultural change will likely be the toughest change to make, as law firms have enjoyed a culture of comparative stability in the past. But the experience of ‘disruptive innovation’ in so many sectors suggests that these conditions create a state of high vulnerability for existing incumbents.
- Another important theme is that services business often have large spill over effects on the rest of the economy since these services are used as inputs in other businesses. Knowledge centric services such as lawyers, as well as accountants, engineers, architects and consultants become a central factor in company competitiveness. For this reason the transfer of knowledge, for example from academia to practice, is one of the core challenges for knowledge based business services firms, because these services themselves are catalysts of productivity improvements into other businesses through the services and advice they sell. Ensuring good regulation and effective competition in these services are thus important not only for the sake of productivity improvements within these sectors, but also because of the significant benefits for the rest of the economy from a well-functioning, innovative and productive business service sector.
- Much of the empirical data in our case study chapters underlines the need for a shift in the lens through which we see ‘services’ moving towards what Vargo and Lusch (2004) call ‘service dominant logic’. They argue that all economic activity depends on value co-creation between different entities, and further more all economic activity are fundamentally an exchange of service for service. Bo Edvardsson goes further, predicting that in 20 years service will be the norm and goods a special case. Service will be a widely accepted perspective on value creation and customers and other engaged actors will integrate and use different resources such as goods, services, information and knowledge to co-create value for themselves and others. Under these conditions ‘service productivity’ will be related to smart resource integration and utilization and outcomes rather than the relations between input and output. Linked to this is the need to move to a

service life cycle perspective which brings such a service-orientation together with a time dimension.

- Part of the problem in managing service productivity lies in the difficulties in defining it and the different approaches, tools and methods used to work with the concept. There is a gradual emergence of new and powerful approaches which recognize the complexity of the area and bring new methods and tools to bear—for example Data Envelope Analysis (DEA). The difficulty here is balancing the power of complex tools with the need for something robust and comprehensible enough to be applied by a variety of actors in research and policy-making. And if we are moving towards an era of service-dominant logic then we need new tools for working with the concept.
- The measurement problem is complicated further by the lack of comparability—as the chapter on airports underlines. For example, trying to compare ‘total operating costs’ between airports is complicated by the fact that they may use very different business models. Some airports outsource services and thus do not include those personnel costs into their calculations while others provide those services directly and so have significantly more employees on their payroll. Our bigger goal of service productivity improvement through innovation may well be possible through adoption of more effective business models—but in order to do so we have first to resolve the problem of comparability.
- Much of the discussion in our book has focussed on balancing incremental efficiency improvements to service productivity with more radical novel approaches where the gains come from rethinking the entire concept of service and its delivery. This focuses our attention on the ways in which particularly established systems can learn to ‘think outside their box’. But exploring at the fringes of the mainstream needs an entrepreneurial approach and managers have to learn to deal with higher levels of experimentation and failure. One source for this can come from ‘vicarious learning’ in which radical ideas are originally developed elsewhere and then transferred in when they have some proven validity. The challenge then is one of building mechanisms to carry out this transfer—and in the context of healthcare we propose one such model, involving four sequential functions moving from observation through laboratory experimentation, piloting and prototyping before moving to full-scale diffusion.

11.2 Looking Forward . . .

We began the book with a look back at thinking around services in the context of what were the significant emerging opportunities (and challenges) around information and communication technologies. Twenty-five years later it is clear that some of these predictions were wildly inaccurate—but some, especially around the emergent trends have proven robust. Perhaps the most important point about that attempt at large-scale forecasting was that it provided clues and early warning signals about emerging themes which did become important later. For practitioners and policy-makers it is sometimes valuable to have even a broad hint about future

direction to enable some kind of policy response to deal with key issues, especially those which have a long lead time. Examples would include changes to the structure and content of employment; creating alternative career pathways, improving mobility and matching skills portfolios and provision are all important but not easy to switch on and off in the short term.

As Bo Edvardsson suggests 20 years from now, service will be the norm and goods a special case. Service will be a concept that denotes what goods, services and systems do for customers. Service will be a widely accepted perspective on value creation and customers and other engaged actors integrate and use different resources such as goods, services, information and knowledge to co-create value for themselves and others. Value is assessed on the basis of value in use in specific contexts. Thus, value in use for the involved customers and other beneficiaries will be focused on. The meaning of service productivity will most likely be related to smart resource integration and utilisation and outcomes rather than the relations between input and output. We will have a shift in focus from providers and output to customers and users and their realization of value.

This is a challenging but plausible scenario—but one which is of limited help to policy-makers unless we can elaborate and explore a little further. For this reason we conclude the book by inviting our reader to look forward, accepting that specific predictions might be wrong but that there may well be important clues. We have invited experts from business and academia to provide their views as an inspiration. Their viewpoints and forecasts—presented in boxes throughout the book - mainly deal with two key questions:

- How and where will innovation in services increase productivity?
- What will affect the rate of change? What are the accelerating and inhibiting factors?

Now it is your turn to take the lead in driving service productivity: look forward, think about the future and make it happen. Drive service productivity in your area of expertise!

Expert's View**Dr. Gunnar Brink***Fraunhofer IOSB*

Question: How and where will innovation in services increase productivity?

Gunnar Brink: Let's think about the New Prosumer Service Economy! When was the last time you sold used books through an online bookshop or auctioned off treasures from your attic through an online auction service? Have you already helped further develop software through an open-source community or submitted a contribution to Wikipedia?

Future consumers will progressively find themselves acting as the producers of goods and services for other people. Growing numbers of households are installing photovoltaic panels and wind turbines. Particularly in Germany where feed-in tariffs are high, consumers can contribute power to the grid for a good return, more than offsetting investment costs. Anyone who owns or leases a dwelling today can rent it to business travellers or vacationers during their own absence through specific Internet marketplaces. Freelancer exchanges make it possible for people to earn good money on evenings or weekends working as a graphic designer or translator.

There is growing discussion about the fact that as employees, we can become entrepreneurs on our own behalf, and cultivate our employability, whether in the form of 'super-temps'—as Harvard Business Review recently referred to highly paid temporary managers—or as a modern 'precarious' work force. What is often overlooked is that in our private lives as well, we are not only functioning as consumers but increasingly becoming producers, acting as sellers of used merchandise, generators of electricity, real estate lessors, and service providers. Thanks to modern communication technologies, we can fulfill the needs of others quickly and effectively, whether this means assisting local young people with their homework or taking a neighbour's dog out for a walk. In the future, we will deliberately pick up foods at those times they are in surplus supply and be compensated for giving up certain foods we have ordered when they are unusually in high demand, on a small scale, exactly the same way as we are now paid a large premium for giving up our seat on an overbooked airline flight. Our freezer will buy electricity during times that there are surpluses on the grid and will cool its contents 5° lower so as not to need power when the price rises again.

Question: What will affect the rate of change? What are the accelerating and inhibiting factors?

Gunnar Brink: Naturally, software technology will play a large part in helping develop the sharing economy. It will make the prosumer model technically feasible with cloud computing infrastructure, big data analytics,

(continued)

and security technologies. Presumably, as the market becomes more mature and consumers become increasingly competitive with providers, security software will require continuous improvement in order to protect the private sphere. Human-computer interaction research will lead to ever more intuitive and compelling user interfaces. Brand development will play an important part for the new intermediaries amidst the ever more complex diversity of services. However, this change involves more than just technology and marketing.

The Tobin Tax aims to impose small taxes on every financial transaction, and, if adopted, would presumably restrict the volume of trade. If this principle were applied to the prosumer service economy, it could sharply curtail growth. Small taxes on every private transaction could put individuals at a disadvantage in comparison to corporations, which are only taxed on the difference between their costs and revenues, and could burden many transactions with needless red tape. The nations that successfully create the means to enable their citizens to pay such taxes on private transactions simply and credibly, perhaps in the form of a flat-rate, will be helping to promote the modern prosumer service economy and will directly profit from it. By contrast, those nations that make their citizens' life difficult through excessive bureaucracy or force the prosumer onto the black market will lose ground in the new prosumer service economy.

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