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METHODS IN SERVICE INNOVATION
CURRENT TRENDS AND FUTURE PERSPECTIVES

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CONTENTS

1 FOREWORD

In recent years there has been a growing tendency by those working in the field to regard service research as an independent academic discipline. This perception has been strongly reinforced by service-specific research programs and initiatives such as Service Science, Management and Engineering (SSME) and Service Research & Innovation (SRII).

However, the establishment of an academic discipline is closely intertwined with methodological issues. It is essential to clarify, for example, what kinds of methods are suitable for a particular type of application or why particular methods should be applied to the exclusion of others. The question which therefore immediately arises in the context of service research is what methodological foundations is the discipline built on? Is it enough simply to apply methods borrowed from "neighbouring" academic disciplines? To what extent must such methods be modified to take account of features which are specific to services? Will greater emphasis need to be placed in the future on developing methods which are unique to service research?

When searching for answers to these questions it very quickly becomes apparent that service research needs to be approached from a number of different angles at the same time. Service research is a generic term which covers a multitude of research fields as diverse as service marketing, service quality, service operations management and service engineering – all of which bear the hallmarks of quite different scientific influences. The "Service Innovation and Methods" project, which focuses on the field of service innovation, was launched by the Federal Ministry of Education and Research (BMBF) precisely in order to study the discipline's methodological foundations and the need to develop and modify specific service research methods in the context of concrete examples. The focus of the project is grounded in the growing importance of innovation. At the same time, the project is based on the assumption that this field brings together a broad range of academic disciplines and offers an interplay of methods, as well as the potential emergence of new methodologies, which it would be particularly fruitful to study.

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2 INTRODUCTION

WALTER GANZ, GERHARD SATZGER, CARSTEN SCHULTZ

In the last decade there has been a marked upsurge in interest among academics and practitioners in issues relating to service innovation. On the enterprise side, the permanently accelerating pace of innovation dynamics is due not least to the deregulation, liberalization and internationalization of service markets and the use of new technologies (OECD 2005; Fähnrich and Meiren 2007). Efficient and purposeful innovation management for services is therefore more important than ever, particularly when it comes to maintaining long-term business competitiveness.

Scientists only began addressing issues relating to service innovation in greater depth at a relatively late stage. Although service development is now a high-priority topic (refer to the findings of an international expert survey in Spath and Ganz 2008), for many years it was anything but a prominent focus of research in the service field. In contrast, today the number of publications, conferences and academic chairs in the field of service innovation is growing steadily.

At the same time, however, leading representatives of international service research are critical of deficits in the availability and use of supporting methods for service innovation, as demonstrated by the findings of the "International Monitoring of Activities in Research and Services"[1] study and the concept paper on "Service Science" published by the taskforce "Evaluation of Service Science" (Satzger et al. 2010). It is clearly the case that service research stretches many established development and innovation methods to their limits. One of the reasons for this is the growing complexity of innovation processes and projects. This degree of complexity is largely due to increasing technical, organisational and human resource requirements and the progressive integration of customers in these processes. This is also why researchers are dedicating more of their time to studying barriers to service innovation.

The challenge for service research and related research disciplines is to develop new tailored concepts, methods and tools which meet the special requirements of service providers. In this context, the purpose of the "Service Innovation and Methods" project was to analyse selected fields in which innovation management for services is applied, to identify methodological deficits and to derive the resulting need for scientific developments and modifications.

The project primarily sought to answer the following questions:

1 The "International Monitoring of Activities in Research and Services" project is funded by the German Federal Ministry of Education and Research under the project number 01FD0637

- What barriers to innovation and methodological deficits can be observed in innovation practice?
- What opportunities and limits facilitate or restrict the use of available innovation methods by service providers?
- What role does the transfer of established innovation methods from the goods sector to the service sector play?
- What specific research and development work needs to be undertaken with regard to service-specific methods and instruments?
- To what extent are new methodologies required in service science and service research?

This book presents the main findings of the "Service Innovation and Methods" project. The report endeavours, in particular, to present an initial review of the state of play in research and practice and to lay the groundwork for a discussion of action which needs to be taken.

Approach of the study

In recent years innovation has been a growing topic of interest in the service field. In their turn, discussions of innovation have been increasingly shaped by ever closer interplay between researchers and practitioners (Satzger 2008). Successful service companies have always been sources of innovation, of course, and have exercised a powerful influence on research in the field of service innovation (in the guise of "best practices", for example). At the same time, the growing intensity of scientific work has also raised awareness of the importance of innovations in the service sector and has produced a plethora of findings (e.g. service engineering, service design) which are increasingly being adopted in companies' practical innovation work.

This study adopts a scientific stance while simultaneously including the perspectives of actual practitioners in order to capture the interplay between theory and practice referred to above. However, given the sheer diversity of the service sector, it is legitimate to ask whether any one study can actually do justice to all aspects of everyday practice. In order to facilitate an empirical focus on the heterogeneous service sector, the practice-related questions concentrated on three fields of application which are of key importance for the German economy as a whole and which also appear to allow different approaches to be taken to the topic of service innovation:

- Industrial services,
- Information-based services and
- Health services.

After an initial phase in which the objectives of the study were formulated, the core phase of the study was undertaken by expert workshops comprising scientists from various disciplines and practitioners from the three fields of application. These activities were supplemented by accompanying literature analyses and case studies. As a result, the report's recommendations on the development and modification requirements of current methodologies are derived from a wide variety of sources.

Eighteen German-speaking experts took part in the research workshop in September 2009, all of them from different fields of study. The workshop focused on the following issues:

- Identification and discussion of innovation patterns and barriers,
- Collection and evaluation of innovation methods already applied in the industry,
- Formulation of recommendations relating to development and modification requirements.

The practice workshops which were held in October 2009 were attended by 38 experts working in the

fields of industrial services, information-based services and health services. In order to ensure that each of the workshops produced reasonably comparable conclusions, and also to facilitate the evaluation and summary of findings, the workshops were based on the same underlying methodological concept as the previous research workshop.

The recommendations concerning methodological development produced by the study were summarized and discussed with fifteen international experts. The entire process is illustrated in Figure 2.1.

It is also important to note that an interdisciplinary approach was adopted from the very start to ensure that service innovations were analysed from different angles. The methods used in the development of innovative services were deliberately analysed from technical, business management and social science perspectives.

Overview of the chapters

This book presents the main findings of the project. The innovation patterns and innovation barriers that have been identified in the expert workshops will be described in chapter 3. In particular, differences between the scientists' and the practitioners' perspectives will be analysed.

Chapter 4 will reflect the methods for innovation that have been collected in the workshops, e.g. an analysis will show to what extent the methods are innovation-specific or service-specific. Moreover, a "maturity level" of the methods will be presented.

The fifth chapter will show an industry-specific view on innovation methods, whereas chapter 6 will include some examples for innovation management and innovation methods from project-external scientists. The book will close with an overview of recommendations that have been derived from the project.

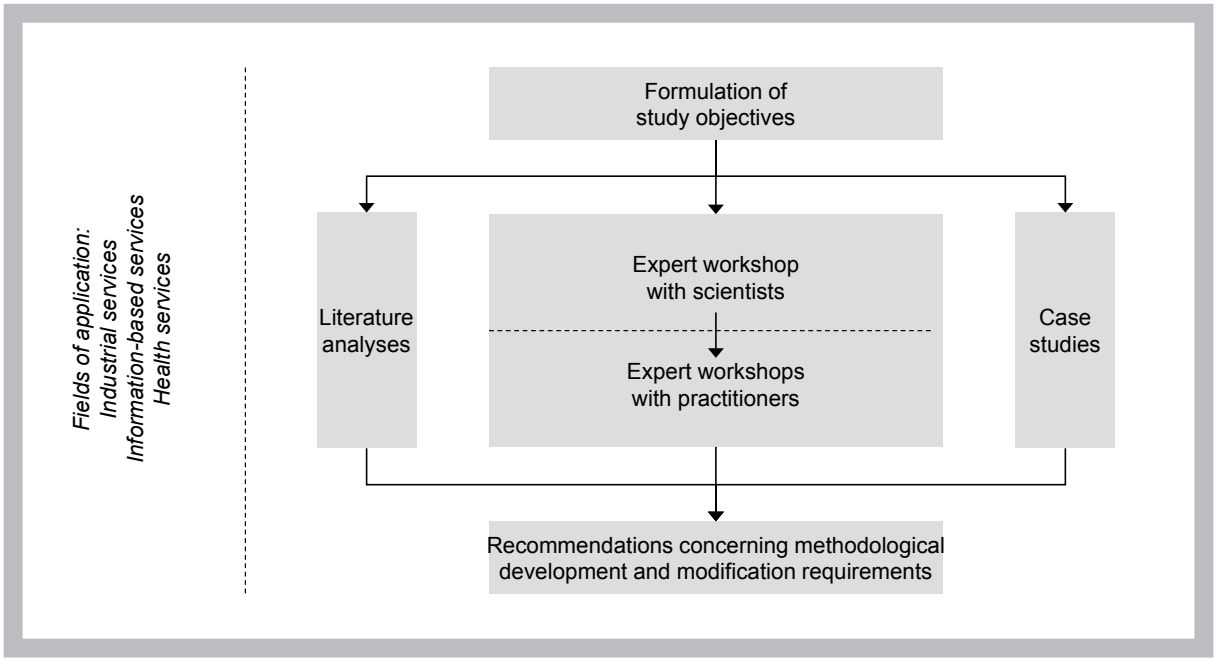


Figure 2.1: Approach

3 INNOVATION PATTERNS AND BARRIERS

PETER HOTTUM, ROBERT LORENZ, ANDREAS NEUS, CARSTEN SCHULTZ

For the purpose of understanding relevant methods in service innovation, we have a closer look at the characteristics of service innovations. Additionally, the differentiation by industry and type of innovation allows us to capture the variety and heterogeneity of services. In this regard, analysing innovation patterns are helpful to find the right conclusions to successfully develop new services.

While going through this chapter the reader will receive a clear picture about the dimensions of service innovation's barriers. From these barriers, challenges about the development of new services emerge. Related to the innovation patterns, barriers open up a new field of finding the corresponding methods to tackle these challenges. Bearing in mind the barriers and related challenges, organizations can strive to overcome these by using the proper methods and actions. In this manner, the view on innovation patterns and barriers form the basis for the next chapter on service innovation methods.

3.1 THE CONCEPTIONAL FOUNDATIONS OF THE INNOVATION PATTERN

The rich diversity of services extends from services for plant and machinery maintenance through to training courses, information and telecommunications services and health services. The heterogeneous nature of such services means that the methods used for innovation purposes may differ depending on the type of service in each case. Potential differences in the application of methods also depend on the innovation process or the degree of newness, called innovativeness, of service innovation.

Type of service

Within the study, the type of service consists of three dimensions: use of technology (vs. human resources), share of value added by customers during service operations from the point of view of the service provider and the location dependency of service delivery. Online retailer Amazon, for example, is a high-tech company which is able to provide its services anywhere given basic infrastructure and to which customers contribute a very small share of added value. Types of services also vary within an industry and have a major influence on innovation activities (Hipp and Grupp, 2005). Two examples in brief from each field of application are described in the following.

Type of innovation process

Service companies rarely have their own research and development departments and in many cases innovation tasks are consequently entrusted to operational functions (Djellal and Gallouj, 2001) or

Industrial services	Intensive use of technology	Customer's share of added value	Location dependency of service delivery
Supplies of spare parts for household appliances	Medium	Low	Low
Remote diagnosis of a power station transformer	High	Low	Low
Information-based services			
Microblogging service Twitter; messages of 140 characters	High	High	Low
Broadcasting news at specific times on television and making them available at any time online	Medium	Low	Low
Health services			
Teleradiological readings of x-ray images sent digitally to external experts	High	Low	Low
Out-patient treatments (e.g. in medical centres)	Low	High	High

Table 3.1: Examples two different types of service for each field

project teams. Basically, three typical innovation processes can be distinguished (Gallouj and Savona, 2009).

The R & D-driven innovation process is relevant whenever service companies transfer innovation tasks to a separate, possibly even a temporary, organisational unit. Development and prototype implementation tends to take place off the market. The service innovation is then launched in the market in the same way as a new product (Cooper, 2008). As these projects often consume substantial resources, top management usually needs to be actively involved.

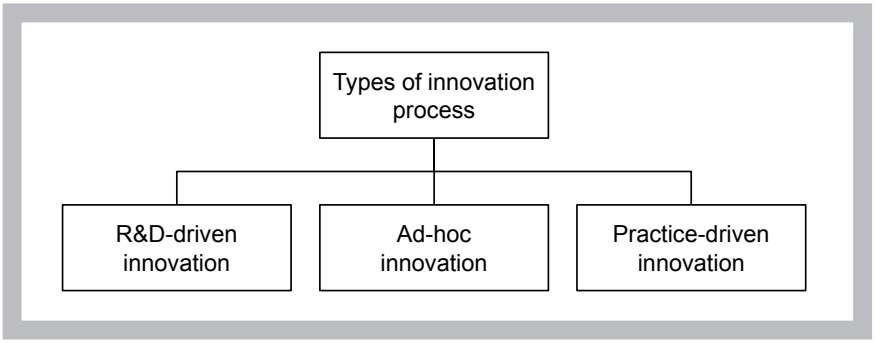


Figure 3.1: Type of innovation process

The second type describes ad-hoc innovations (Gadrey et al., 1995) where an idea is immediately launched and then continually developed once it is on the market. These projects are integrated in operational business units and their development typically involves the active participation of many different employee groups and customers.

Practice-driven innovations (Toivonen and Tuominen, 2009) are not usually immediately recognised as such. These innovations only manifest themselves ex post as modifications to existing services made as part of customised offers. They are subsequently integrated in the general service portfolio and, after further development, are consistently marketed as new services.

Innovativeness

The innovativeness is a multidimensional construct which reflects changes which the innovation causes in the market, in the technology and knowledge base, the organisation, value creation system and in the business environment (Schultz et al., 2011; Salomo, 2003; Garcia and Calantone, 2002; Avlonitis et al., 2001; Danneels and Kleinschmidt, 2001).

Significant changes in the market dimension relate to aspects such as generating new customer benefits, changes in the handling of services (Schultz, 2009) and addressing new customer groups; the technology and knowledge dimension, in contrast, relates to the use of new technologies and competences. Service innovations may elicit strategic, structural or process changes in the company which come together in the organisational dimension. The integration of new value partners and the establishment of new external processes are also important in this context. Creating new infrastructure and modifying regulatory constraints are part of the environment dimension. The bigger the changes are for the company in each dimension, the greater the innovativeness along the continuum from incremental through to radical innovations. The distinction between incremental and radical innovation is complemented by a description of modular and architectural innovations. While modular innovations involve modifying individual product or service components, architectural innovations focus on changes in the way components are linked together (Gatignon et al., 2002; Henderson and Clark, 1990).

Service type, type of innovation process and innovativeness combined produce the innovation pattern and its specific features and methodological requirements. Innovation patterns show specific characteristics of service innovations and are described by the following three dimensions: (1) the type of service, illustrated by the use of technology/customer contribution/location dependency of service delivery, (2)

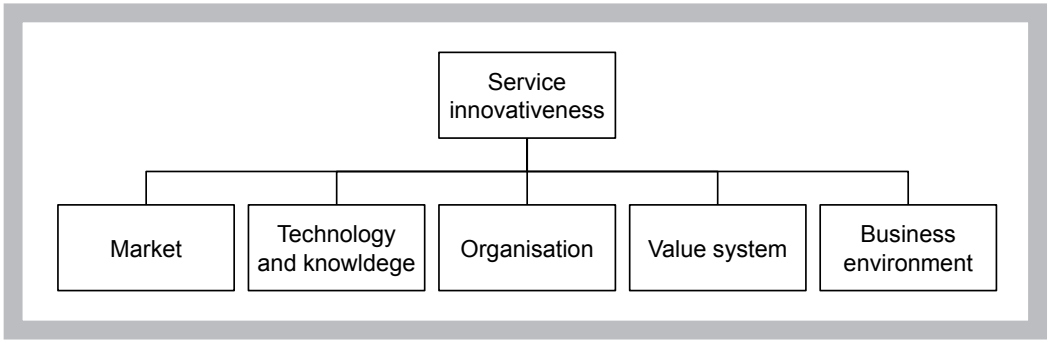


Figure 3.2: Innovativeness dimensions

the type of process, which is defined by R & D, ad-hoc, and practice driven, as well as (3) innovativeness, which shows the extent of changes the innovation causes internally and externally. Depending on the innovation pattern and the service industry, service innovation show distinct and individual characteristics, which help to identify contextual barriers.

3.2 IDENTIFICATION OF WAYS TO OVERCOME SERVICE INNOVATION BARRIERS

New ideas often meet with internal or external resistance, both forms of which are referred to as barriers. A barrier can block, delay or distort the realisation of an innovation project (Hauschildt and Salomo, 2011). In general, barriers have negative consequences such as project cancellations, delays or additional costs, or can be demotivating for project staff. Innovation barriers can be differentiated according to whether they are occurring inside or outside the company (Olsen and Boxenbaum, 2009).

Internal barriers concern factors within the company and are of particular relevance as most service firms do not have a dedicated R & D department, and innovation activities are delegated to operational business units (Edvardsson, Hagland, & Mattsson 1995; Sandbo 1997). Also, within these units very often no specific R & D professionals exist and innovation is a real multifunctional task that involves nearly every employee (Djellal & Gallouj 2001). Due to the high relevance of the service front-end (Teboul 2006; Melton & Hartline 2010), these employees have not only diverse functional backgrounds but are also frequently organizationally separated and geographically dispersed (Gebauer et al. 2010; Oliva & Kallenberg 2003). As such, bureaucratic and risk averse cultures of many service organizations may interfere with innovation processes. This is further amplified by a weak support from top management for service initiatives and frequent conflict between employee and top management goals and expectations. The underlying reason is a frequent lack of a service oriented innovation strategy and an unclear relationship between service and product portfolios (Oke, 2004; Vermeulen et al., 2007). Barriers may also be caused by a mismatch of the existing product focused organisational structure with the need of services (Boonstra and Vink 1996) which is hard to be changed due to organisational inertia and missing professional service development processes (Drew, 1995).

In addition to internal barriers, external barriers shed light on aspects relating to the market (e.g. difficulties of customer involvement, uncertain customer needs), network (e.g. coordination conflicts with value partners) and environment (e.g. inadequate market regulation or industry standards). Although customers have become an active part of nearly every innovation process in recent years, in the case of services they are active in every part of the product life cycle. Customer involvement in service innovations therefore plays a major role in the innovations' success (de Brentani & Ragot 1996; Carbonell, Rodríguez-Escudero, & Pujari 2009). Also services are difficult to standardize because they have to reflect individual customer needs. Furthermore, they are less predictable due to the active role of customers within service production. It is almost impossible to get transparency about the various needs and usage forms of specific customer groups or even single customers and the needs and usage forms tend to be dynamic over time (Magnusson 2009). Besides customers, other external partners are involved in service innovation. Innovative services are increasingly being offered as service bundles

in a service network, together with other service providers (de Vries 2006). During the innovation process (before and after market introduction), a service firm has to coordinate its activities with these external partners. Hence, the complexity of the innovation process increases as multiple actors are integrated, with typical interface problems and challenges of network management (Sivadas & Dwyer 2000). Therefore, service firms not only have to deal with various components and multiple actors during innovation processes, but they also have to cope with a high variability of solutions. Hence, a crucial challenge of service innovations is to deal with this high degree of complexity (Chapman & Hyland 2004). While this also holds generally true for physical product innovations, this complexity is higher in service firms.

The types of barriers encountered, and how strong their impacts are, depend on the pattern of innovation. Barriers are differentiated according to different types of service, types of innovation process, and innovativeness. Barriers to the innovation process should be addressed by effective methods. Areas in which there is an acute need to take actions with regards to methods can be prioritised by evaluating the relevance of specific barriers which have been consolidated in barrier clusters. This prioritisation process can then be used to define areas in which immediate action needs to be taken to improve service innovation

3.3 SERVICE INNOVATION BARRIERS FROM A SCIENTIFIC PERSPECTIVE

The workshop with service scientists was attended by researchers from various fields of study. Psychologists, sociologists and engineers participated in the workshop as well as business economists and business information specialists. The scientists pointed out that the relevance of barriers and methodological requirements varies between different types of service and the applied innovation process. They also emphasised the difference between personal and technology-related services. Attention was paid to the differing methodological requirements of incremental and radical innovations. Highly novel, radical innovations deviate substantially from the status quo and cannot, therefore, resort to the method kit established during operational work. Finally, differences also exist between different sizes of companies. Within larger product-oriented firms more frequently specialised R & D department exist and consequently instruments developed in for new product development may be transferred to services. In summary, the workshop underlined the necessity of carrying out context-dependent or innovation pattern-dependent analyses.

The scientists derived the following eleven clusters from the identified barriers (the barrier clusters are ordered according to importance – percentages show the share of awarded prioritisation points – the experts had been asked to prioritise more than one cluster, so 50 percent for one barrier cluster is the theoretical maximum):

(1) Customer (18 percent)
(2) Culture (16 percent)
(3) Processes & organisation (14 percent)
(4) System & networks (13 percent)
(5) Service description & measurement (13 percent)
(6) Employee empowerment (8 percent)
(7) Communication (7 percent)
(8) Employee knowledge & skills (4 percent)
(9) Protection of intellectual property (3 percent)
(10) Regulations (legal) (3 percent)
(11) Resources (2 percent)

The first five barrier clusters differ markedly in terms of their evaluated importance from the remaining and are discussed in greater detail in the following.

Customer

The most important barrier cluster identified by the scientists was that of the "customer", which can be examined from the company and consumer perspective.

From the practitioner's point of view customers pose the biggest challenges in defining customer requirements as these demands a shift in perspective by companies. Service development is highly market oriented and demands that customers are closely integrated in the innovation process. The participation of customers in the development process also requires the latter to accept a difficult role change. Customers need to possess a degree of competence in the relevant matter itself; but they must also be motivated to take part in the innovation process. Thereby employees have to accept and deal with knowledgeable customers, who may surpass the fields of competence of themselves.

From the end-consumers point of view, there exists a series of challenges regarding the acceptance and handling of the service innovation. Often a new service implies a new process, whose outcome can be intangible and not transparent. The end-consumer needs to make his or her own experience by purchasing and using the service; a prior judgment is hardly possible. In some cases, a shift in usage behaviours is necessary, which may intrude into the habits of the customer.

Culture

The second most important category of barriers indicated by the scientists concerns the cultural aspects which are primarily manifested in a lack of service orientation and the integration of services into corporate strategy. Companies still tend to be dominated by product-centred paradigms and technology-driven innovation thinking. This can lead to a discrimination of the service business and its innovation activities within a company, which is expressed by a lower appreciation of the work service employees deliver. The low empowerment of employees to pursue new service ideas may result in not using front-end employee's knowledge to propel service advancements or new services.

There is a risk that services remain as an add on to the company business like sales and maintenance and do not get the chance to provide opportunities for firms to develop new business models and new forms of value co-creation with customers.

Altogether, the potential of services is often not perceived and the specific organisational requirements of services are not met. Rigid leadership systems, people's efforts to maintain their existing positions of power, or the resistance of members of the organisation to change are all factors which can make it very difficult to implement new service ideas.

Process and organisation

Barriers in organizational processes or structures also play an important role. From the perspective of the participating scientists, companies lack the systematic and formal development processes and methodological know-how needed to implement new services. The omission of process stages or even the lack of any development process tailored to services, as well as deficient knowledge about new service diffusion, all have a negative impact on innovation success. Each of the new service development stages imposes critical barriers for service innovations. During the idea generation phase the assessment of new service ideas is difficult due to the intangible character of the service. Simulation and testing is challenging for the same reason, too. After implementation of a new service and its corre-

sponding processes companies face difficulties by guaranteeing a long-lasting service process quality and measuring the service outcome.

Other challenges are inherent in services themselves. Conflict often arises from the tension between the need to customise services to enhance their effectiveness, on the one hand, and the need to standardise them to boost service efficiency on the other.

System and networks

Systems and networks are another important cluster of innovation barriers. One key network challenge is to find, select and integrate potential partners and establish suitable structures and processes for improving collaboration. New service offerings often need an interdisciplinary approach and cooperation between partners with different expertises. Companies have to overcome existing constellations and commit to new avenues of collaboration. They have to develop strong ties and to maintain a consistent exchange of relevant information. For example, technology-driven service innovations need a basis of mutual understanding and technological interoperation among network partners.

While managing networks, the aim is to master complexity and to resolve the many conflicts of interest which exist between different participants. The potential for conflicts of interest increase with the number of network partners. Network barriers will be even higher if converging markets and technologies force partners from different industries and different experiential backgrounds to work together.

Service description and measurement

The fifth most important category cited was barriers of service description and measurement. These relate to the evaluation of service benefits and price calculations. Evaluations which are based on a valued-oriented approach constitute major challenges for companies. Usually, companies are concerned with cost-based calculations and are faced now determing with the price on value-based measurements. These problems are not only caused by limited competences of the company itself, but also the customer may be unable to assess the value of a service accurately, particularly not before the service has actually been delivered. Service companies are also confronted with the challenge of using controlling information to capture in full their own service provision and thereby of identifying efficiency and quality problems. The diversity of services and the active involvement of external partners, including customers, introduce a high degree of uncertainty and therefore complicate service performance measurement and the analysis of any innovation demands.

3.4 INNOVATION BARRIERS FROM A PRACTITIONER PERSPECTIVE

Service innovations vary in each field of application according to their innovation pattern, type of service, type of innovation process and innovativeness. The following Table 3.2 outlines the typical characteristics of patterns of innovation which are relevant to industrial services, information-based services and health services. These typical characteristics stem from average cases and may look slightly different in very specific instances.

Different barriers were identified and prioritised in the three practitioner workshops which focused on specific fields of application; these are detailed in chapter 6. The following section considers the three barrier clusters which received the highest ratings across all the practice workshops – culture, processes & organisation, customer – as well as the two other preceding clusters of particular interest: business model and intellectual property protection.

	Industrial service	Information-based service	Health service
Type of service	– Technology intensive – Location dependent – Low customer share of value added	– Technology intensive – Location independent – High customer share of value added	– Person related/ personnel intensive – Location dependent – High customer share of value added
Innovation process	– R & D-driven innovations (R & D department is innovation driver)	– Ad-hoc innovations (driven by changed customer behaviour)	– Practice-driven innovations (innovation implemented by individual actors and generally adopted at a later time)
Innovativeness	– Moderate innovativeness owing to high organisational barriers despite R & D orientation	– Highly radical/ architectural innovations owing to short innovation cycles with strong impact on existing business models	– Strong tendency towards incremental innovations owing to high level of risk aversion

Table 3.2: Differences in innovation patterns in each field of application

The practitioners prioritized the following eleven clusters from the identified barriers:

(1) Culture (29 percent)
(2) Processes & organisation (11 percent)
(3) Customer (10 percent)
(4) Business Model (9 percent)
(5) System & networks (8 percent)
(6) Regulations (legal) (7 percent)
(7) Resources (6 percent)
(8) Employee empowerment (5 percent)
(9) Service description & measurement (5 percent)
(10) Communication (5 percent)
(11) Employee knowledge & skills (5 percent)
(12) Protection of intellectual property (1 percent)

Culture

Participants in the practitioner workshops accorded highest priority to the "culture" cluster. This cluster was also assigned the highest number of individual innovation barriers. Interestingly, the actual nature of the innovation barriers cited differs in each of the three application sectors.

The most common barriers to industrial services impinge on a company's ability to modify its self-perception from a supplier of products to a provider of services. This transformation process changes the present identity of the company. Manufacturing companies have particular problems because of the low value attributed to services by their product and technology-focused employees and management.
In the case of information-based service providers the barriers to an innovation culture are more likely to take the form of strategic barriers to innovation processes which pose questions such as "how are new topics promoted, who supports innovative ideas, how are the interests of different players aligned?"

In the case of service providers in the health sector, in contrast, the central issues are rigid structures between different professional groups (particularly doctors, nurses and administration) as well as the fear of changes designed to minimise the uncertainty of procedural and treatment outcomes. Apart from different cultural issues between professional groups, intra-cultural barriers hinder the ignition of new service ideas of health care providers.

A common topic in all three workshops is the form in which innovative ideas are marketed internally and how their potential is communicated within the organisation itself. The concluding consideration in the practitioners' workshops of the cluster of barriers subsumed under "culture" showed a high level of correspondence between the groups on the great importance attached to the overall field of a "company culture that promotes innovation".

Processes & organisation

The workshop participants take varying views of the relevance of the "processes & organisation" cluster. While the cluster is of less importance in the workshops on information-based and health services, it is ranked second in the "industrial services" workshop.

Providers of industrial services face formidable organisational and process-based challenges when it comes to establishing formal and structured service development processes with clearly defined responsibilities and budget assurances. The lack of compatibility between services and previously established product-oriented development processes and structures is also regarded as highly relevant. Especially the customer interaction poses great challenge to companies.. The transformation process is less salient for information-based services as this sector is not primarily characterised by a product-centred perspective and barriers are lower in this field as a result.

On the other hand, providers of health services have hardly any established innovation processes as most innovations have evolved unsystematically to date. There exist more process and organisational barriers, however, as soon as services are developed and delivered in networks; this is also reflected in the comparatively high level of importance ascribed to the system and networks cluster of barriers.

Customer

The cluster "Customer" is estimated differently by the workshop participants. In health services the cluster seems to be more important than in the other industrial or information-based service fields of application. This could be explained with the twofold role of patients in health services. As they give valuable input for the design, use and functionality of a new service on the one hand, they provide information and feedback later on during the implementation and use stage of the service innovation on the other hand.

For all the service fields the change of customer habits could enable new service offers and stresses the importance of a market assessment. With adressing new target groups an intensification of marketing activites is required. The importance of customer-related barriers for service providers is partly due to the high share of value contributed to the service by customers. While customers have a crucial share of the created value a real customer orientation of providers is necessary.

Business model

The overall assessment in the practice workshop ranked "business model" as the fourth most important cluster. This is a new barrier cluster which participants derived independently in the workshops for industrial and for information-based services. Practitioners pointed out the problem of threatening cannibalization of currently existing business models as well as the prescribed bundling of products and services. The basis of the existing buisiness model may change due to the newness and the new value of the service. Closely related to the value is the pricing system, which is mentioned by practitioners. The design of the pricing differs from products in so far as the levers of value pricing are applied.

Intellectual property protection (IP)

Policies, regulations and laws pose a predetermined factor for businesses while dealing with new services. While often discussed in academic literature, the problem of IP-protection was only cited in the workshop with representatives from businesses offering information-based services. In this context particular reference was made to the inability to protect services by patenting them.

But the "intellectual property protection" barrier cluster was assigned less than one percent of priority points across all three practitioner workshops.

Overall, this barrier was regarded as the least relevant in all the workshops, indicating that the other barriers to service innovation pose much bigger challenges.

3.5 REVIEW ON DIFFERENT PERSPECTIVES ABOUT BARRIERS

The relevance of each of the barrier clusters is shown, as determined by each cluster's priority ranking, in Figure 3.3. The cited clusters have been sorted according to their average evaluation by the

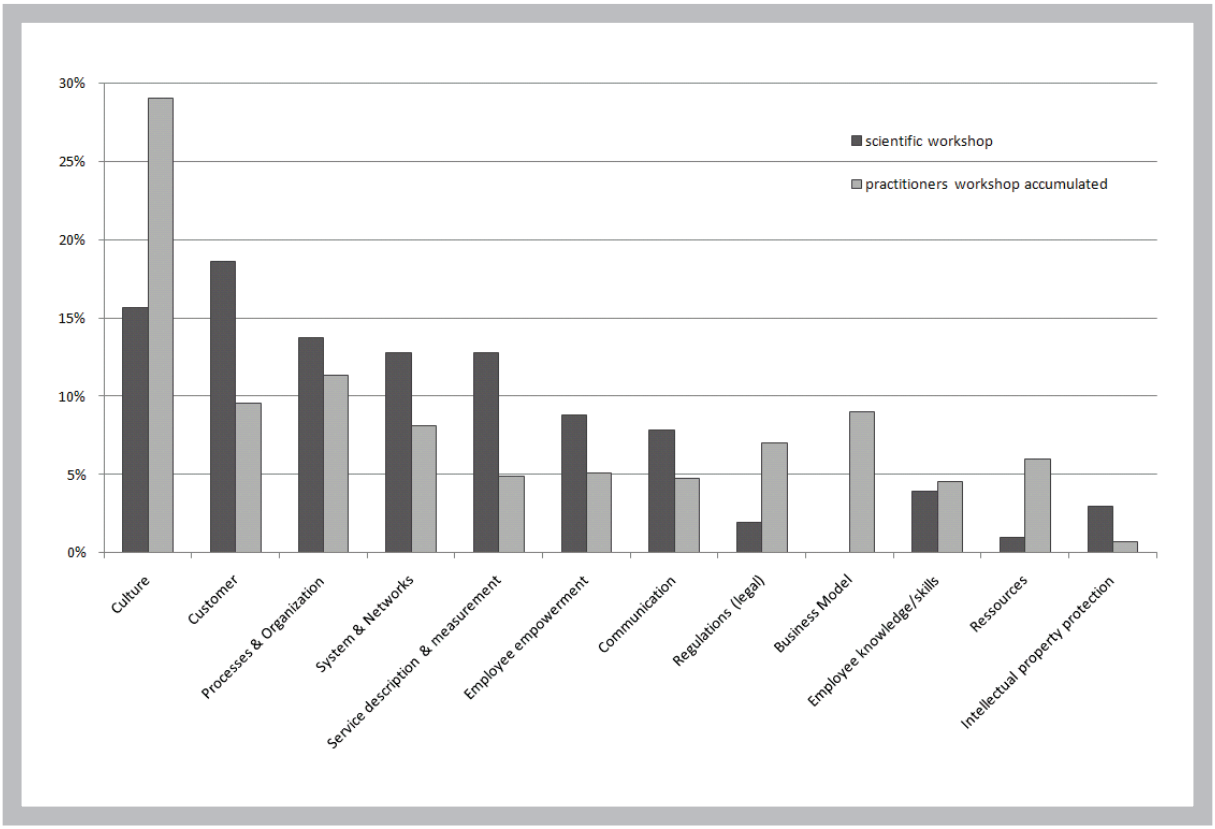


Figure 3.3: Relevance ascribed to innovation barriers[2]

2 The level of ascribed relevance was determined from evaluations given by participants in the workshops. The percentages refer to the total of valuation points which participants were able to award.

scientific workshop and the aggregated results of the three workshops held with company experts.

By conducting workshops with 18 scientists and 38 practitioners we received a clear picture about the most important barriers in service innovations and the differences in perception.

From these results we conclude that the three top barriers are nearly the same between scientist and practitioners, but in their relevance and ranking their perception differs. The top three barriers are 'Culture', 'Customer', and 'Process & organization'.

Cultural barriers for service innovations include resistance to change and a corporate mindset of devaluing services themselves, which is reflected in the corporate strategy and the missing acceptance of new service ideas.

Customer related barriers deal with the definition of customer requirements and the participation and contribution of customers during the innovation process. Process & organizational barriers mainly concern the lack of a formal service innovation process and its interference with the traditional product innovation process. Also inter-organizational challenges have been highlighted which are driven by interacting with network partners in value systems.

The biggest differences in the perception of barriers between practitioners and scientists can be seen for the culture and customer related barriers, as well as for the barriers devoted to service description and measurement as well as business model.

While cultural aspects are more stressed by practitioners, scientists assign a higher importance to the cluster 'Customer'. One interpretation could be that scientists may not be exposed to the effects of cultural barriers in the same way as practitioners are. Business models as a cluster were not derived in the science workshop. Scientific research on the relationship between business models and innovation is still in its infancy and is currently undertaken by primarily practice-oriented institutions such as the Harvard Business School and HEC Lausanne (Chesbrough and Rosenbloom, 2002; Osterwalder and Pigneur, 2009). However, business models encompass the value creation of an organisation or a service system.

The least important cluster is intellectual property protection. As far as the relevance of protecting the service and the associated innovation are concerned, the assessments made by those participating in the scientific workshop differ from the findings of representatives of business companies. The workshop's scientific experts primarily stressed the need to protect the value of the service and the general problem of protecting innovation against imitation. The view that services equipped with formal instruments of protection can only be inadequately protected against imitation can also be found in the broader literature (Sundbo, 1987; Rammer, 2003; Spath and Ganz, 2008). The barrier cluster "intellectual property protection" was assigned rank 9 by the scientific participants. It was regarded by business representatives as the least relevant barrier cluster. It is interesting that the practitioners perceive lack of IP protection as the least of their worries with regard to barrier clusters. The soft factor 'Culture' clearly warrants more research attention based on the results from both – practitioners and scientific participants.

Although, the participating experts from practice agreed in their estimation of the main barriers, their detailed valuation of barrier's importance differs (Fig. 3.4).

The experts for industrial services rated the 'Culture' barrier cluster as the biggest challenge. The 'Pro-

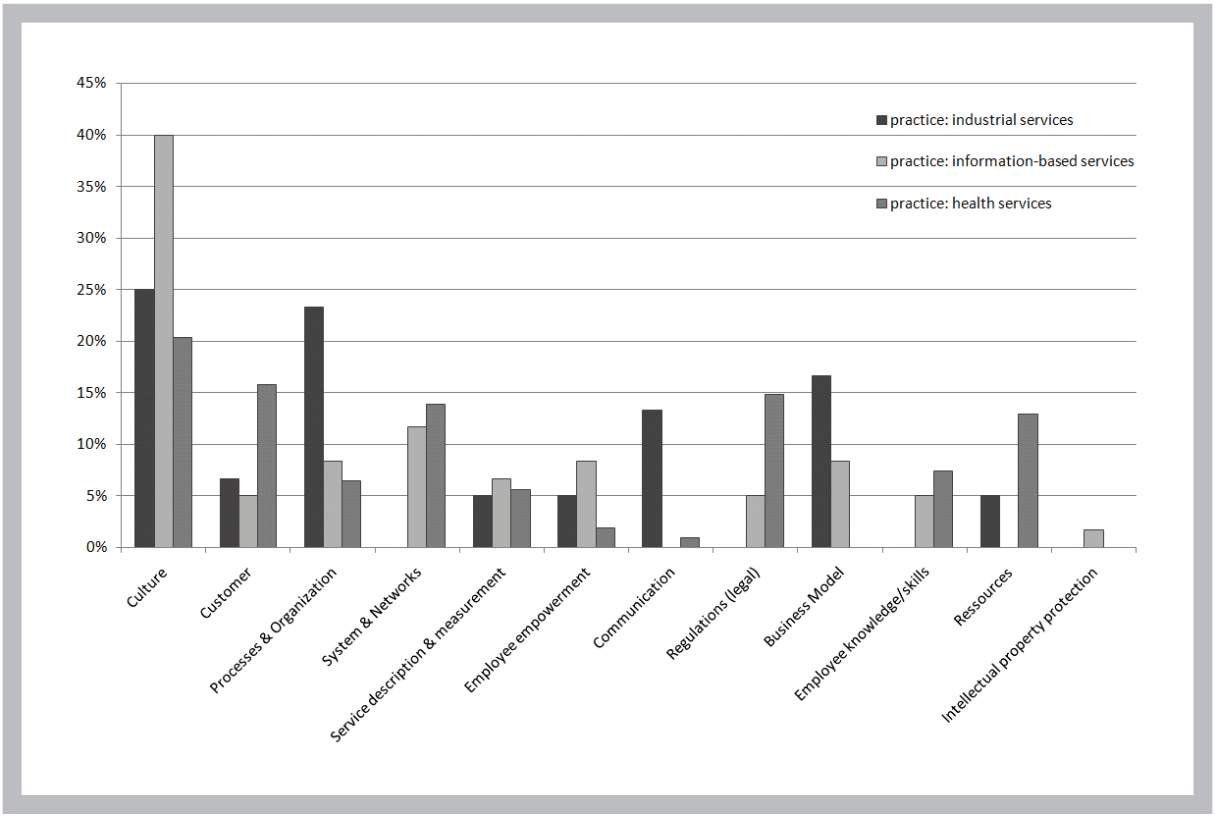


Figure: 3.4: Relevance of innovation barriers from the perspective of the fields of application

cesses & organisation' and 'Business model' barrier clusters were assessed as considerably more relevant by this group than by the representatives of the science workshop.

The experts for information-based services assigned the 'Culture' barrier cluster almost the maximum relevance (40 percent) allowed within their valuation framework (50 percent). This clearly shows to what extent it is important to take account of cultural components in an industry in which fundamental technological changes occur rapidly. Clear innovation management processes are one way of surmounting the operative issues and barriers arising in this context. Barriers at the cultural level, for example, include lack of incentives, weak top management support or a lack of a "risk-taking culture".

As in the other two practitioners' workshops, the experts for health services identified the culture dimension as the most important barrier cluster. In contrast to the other workshops, however, and to the science workshop in particular, the two barrier clusters 'Regulation' and 'Resources' were regarded as especially relevant and consequently reflect the unique challenges facing the health sector.

In summary, this section presented the different innovation patterns in relation to the relevance of innovation barriers. This new perspective is eminent to find the proper methods and actions to overcome barriers in its various aspects, which is the focus of the next chapter.

From these results and insights about barriers in service innovations, several implications for further service innovation research may be derived.

4 CURRENTLY APPLIED METHODS IN SERVICE INNOVATION

THOMAS MEIREN

4.1 CONCEPTUAL FOUNDATIONS

What methods are currently used for innovation in services? What is the role of established methods from innovation management? Are the methods specific to services or are they transferred from other areas like product development or software engineering? These are some of the questions that have been of particular interest in the workshops with scientists and practitioners.

The first challenge was to operationalize the term "method" for the purposes of the study. A glance at business practice shows that the term is used in many different ways for every possible kind of systematic procedure. *Recommendations* such as "open door policy" and "always beta" are just as likely to be regarded as methods as clearly *determined procedures* (e.g. QFD, FMEA) or even *management approaches* such as "open innovation" and "public private partnerships".

A brief look at scientific work in this field also quickly shows that the term "method" is comparatively loosely defined as well as being highly determined by the perspective adopted by each scientific discipline (Treier, 2003). For this reason a pragmatic approach was chosen and the term "method" consciously given the following working definition for the purposes of the study:

> A method is a system of substantiated rules and constraints which, when they are complied with and adapted to situation-specific circumstances, result in a planned and applied procedure for the efficient achievement of specified objectives.
> The complexity of the defined task is reduced by means of instructions and presentations.
>
> *(Based on Treier, 2003)*

This definition was intended to provide the practitioners and scientists involved the broadest possible scope for citing methods without placing them in a definitional straitjacket. As a result, the term "method" is used to refer just as much to determined procedures and instruments as to fully-fledged guidelines, heuristics and management concepts.

Around 300 different methods applied in the service innovation field were identified in the expert workshops with scientists and practitioners. While this high number illustrates the variety of methods available, it also shows the need for much deeper analyses. It was particularly interesting for the purposes of the study to discover to what extent service-specific methods are used, i.e. methods which have been especially developed for services, or whether service innovations tend rather to draw on and adopt procedures used in other disciplines (cf. Objective of the study in chapter 1). Another factor of

interest was the extent to which the methods used focus on innovations (the extent to which they are "innovation specific") or rather on other areas, such as organisational structure or human resources management.

Furthermore, the participating experts also assigned the cited methods to each of the barrier clusters (cf. chapter 3) and positioned them in the lifecycle of a service innovation. Other analyses covered the degree of customer involvement achieved by using a particular method and a subjective assessment – made by the project team – of the "maturity level" of the methods[3]. The key results of the expert workshops and ensuing analyses are presented in the following.

4.2 INNOVATION METHODS FROM A SCIENTIFIC PERSPECTIVE

Participants' first task in the science expert workshop was to collate methods which are applied in the field of service innovation. The scientists cited a total of 132 methods and in this respect were more "productive" than the participants in the later practice workshops. This should come as no surprise, however, bearing in mind that of all people scientists may be expected to be aware of a large number of different methods.

What was much more surprising was that only very few (6 percent) of the methods named could be referred to as "specific to services" (cf. Figure 4.1). Examples include service blueprinting, service level

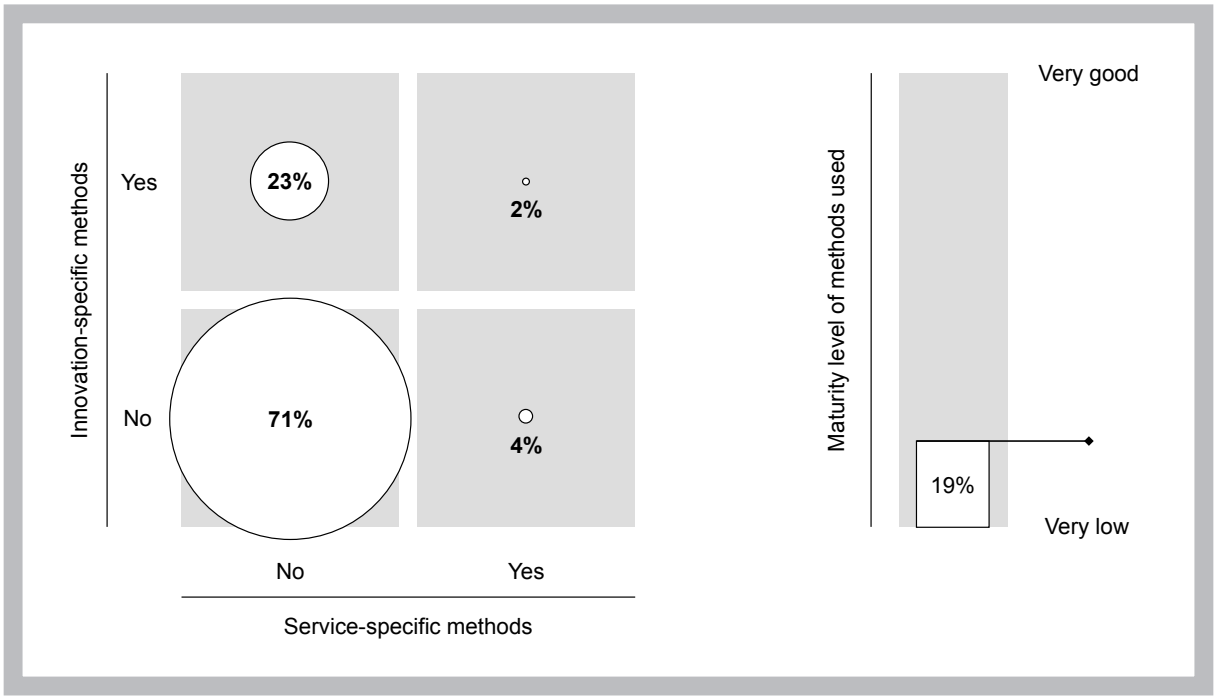


Figure 4.1: Classification of methods collated in the science workshop

3 Methods which were always classified as very mature were determined methods with a clearly described procedure – i.e. a method in the narrow sense of the term.

agreements and service theatre. The overwhelming majority of methods could not, however, be assigned to specific services and originated from many different fields. It was particularly striking, for example, that scientists mainly cited methods from their own particular disciplines (business administration, social science, computer science, engineering, etc.) and were clearly strongly influenced by their respective academic roots; this was even true of scientists who had been working intensively in the service field for as long as 15 years in some cases.

Further analysis of the methods collated reveals that only around one quarter could be categorised as methods specific to services. The explanation for this is that many of the methods cited relate to the "customer" and "culture" clusters (cf. chapter 3.3) which were assigned the highest priority. What is more, it also becomes apparent that service innovation not only concentrates on simple outcomes, but that employees and organisations, for example, are just as important factors in innovation.

The collation and analysis of innovation methods for services led to a broad discussion among the experts on the action which is consequently necessary. One proposal, for example, was to intensify the basic work undertaken in this field. This initially concerns the systematization of services, methods and the context in which they are applied. Secondly, participants called for theoretical and empirical assessments of the impact of methods and, thirdly, groundwork on the development of methods in the service sector.

4.3 INNOVATION METHODS FROM A PRACTITIONER PERSPECTIVE

Practitioners identified and analysed appropriate service innovation methods for the three fields of application (industrial services, information-based services and health services) in the same way as the scientific experts did in their workshop. The overall results are presented in brief in the following.

The results aggregated from each of the practice workshops confirm the picture which appears to emerge from the discussion so far. All in all it is surprising just how few of the methods cited are specific to services. In fact, methods transferred and adopted from other disciplines appear to play a much more important role (cf. Figure 4.2).

Comparison of the methods identified in each of the three fields of application shows that there were very few (under 10 percent) multiple citations of specific methods in the different workshops. This is probably again due to lack of familiarity with, or the sheer lack of, special service innovation methods; it does, however, also highlight the fact that the consciously chosen fields of application are powerfully shaped by the contexts of their respective disciplines.

The methods were assessed as having a maturity share of 32 percent, which suggests that many of the methods cited by practitioners are more likely to be guidelines and heuristics than specified procedures. This is consistent with the assessments of practitioners, almost all of whom believe that there is huge potential for a broader and more professional application of methods in their own organisations. However, because the experts who are needed to develop methods are often not available, practitioners expressed the expectation that the academic world should concentrate more of its energies on the development of practical methods and intensify its work on finding ways of transferring such methods into practical measures.

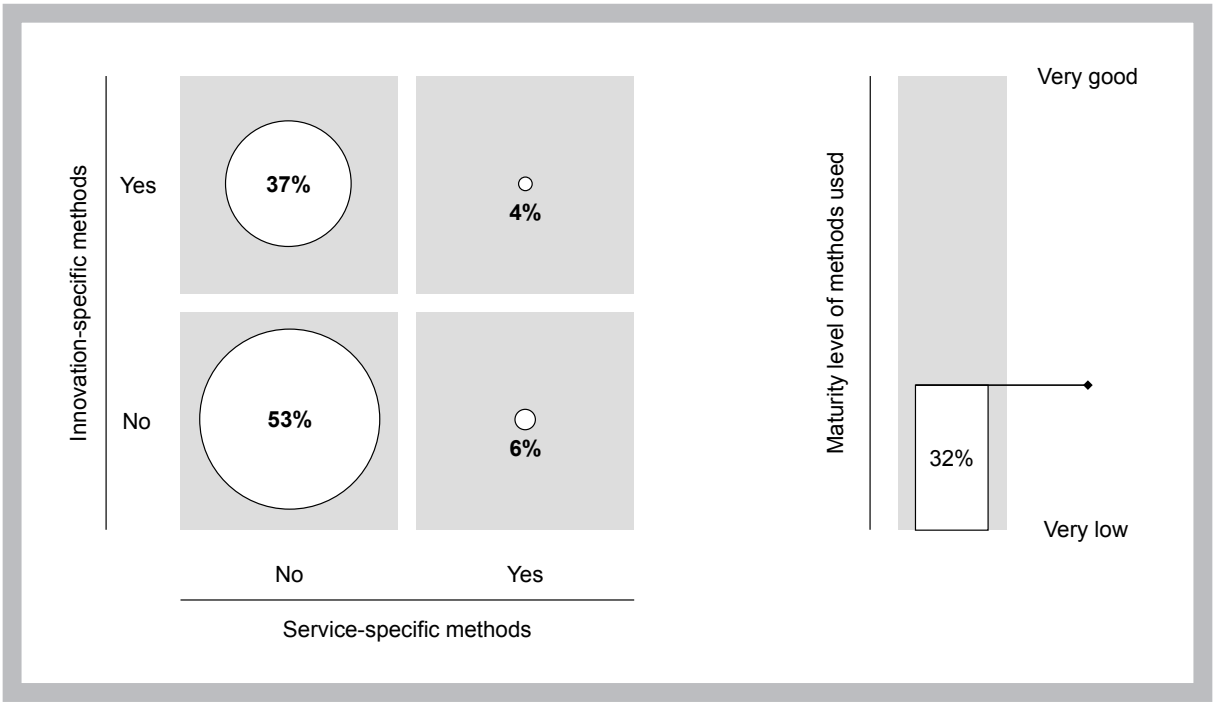


Figure 4.2: Classification of methods collated in the practice workshop

4.4 SUMMARY OF FINDINGS

One of the important tasks of the expert workshops was to produce an overview of methods applicable to the field of service innovation. This was subsequently used as the starting point for further analyses which were intended, in particular, to satisfy the key objectives of the study.

The discussion so far clearly shows that while a very large number of methods are used in service innovation, most of them originate in related disciplines, and that independent methods which are specific to services, and which do justice in particular to the important service role played by customers and employees, are the exception rather than the rule. Only 8 percent of all the methods cited fall within the category of service-specific methods (cf. Figure 4.3).

What is more, only 33 percent of the methods cited can be regarded as specific to innovation; in other words, a large number of general methods are obviously used in the process of creating new services. Discussions with the experts taking part in the workshops suggested that practitioners make action-oriented use of methods which they are familiar with and which they are able to tailor to their own needs if necessary. At the same time, it is also emphasised that this is not always effective and that, from a methodological perspective, many activities are inadequately performed when new services are developed and launched on the market.

Knowledge of methods was also extremely discipline-specific, particularly among the academics taking part in the science workshop as well as, to a somewhat lesser extent, among practitioners. The logical consequence was to call for more interdisci-

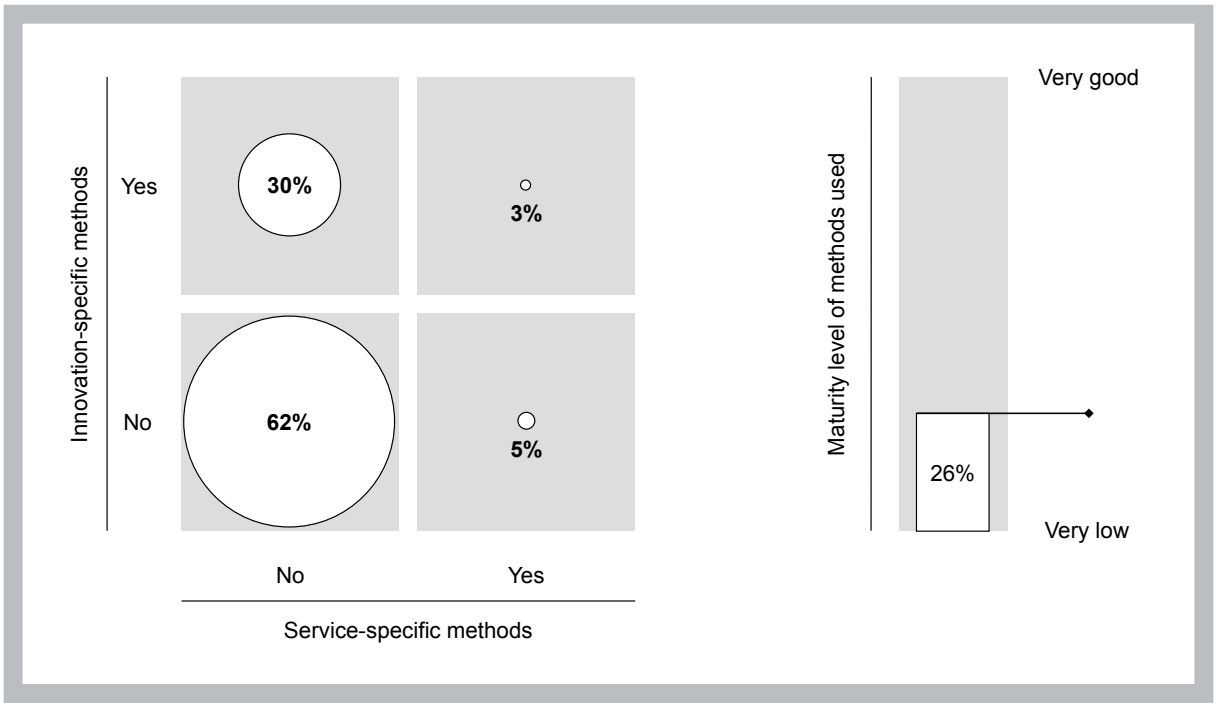


Figure 4.3: Classification of all methods collated

plinary work on the development of innovation methods for services and to incorporate such methods in service-related education and further training programmes.

Finally, the scientists and practitioners participating in all the workshops clearly expressed the view that more work needs to be invested in developing methods which are applicable to service innovation. Practitioners also expressed their wish for the academic world to do more to facilitate the transfer of service-specific methods. In addition to method descriptions, important transfer elements also include demonstrating how methods can be applied, ways of adapting methods to specific types of service and constraints, and providing supporting resources (training material, templates, tools etc.) and examples of real-life applications.

5 CHALLENGES AND SOLUTIONS IN PRACTICE

5.1 INNOVATION IN INDUSTRIAL SERVICES

THOMAS BURGER, KATHRIN SCHNALZER

Industrial services are a steadily growing industry in the German economy. Although the term itself is not consistently defined in scientific literature and is not included as a separate category in common industrial classification systems (such as ISIC, NACE), it is used in this context to refer to services which are provided in connection with capital goods – either by the manufacturer directly or by specialist service companies. Typical examples of industrial services include the installation, maintenance and modernisation of machines and plants. This chapter reviews the role of industrial services within machine and plant engineering companies and discusses trends and perspectives in general as well as in relation to the results of the "Service Innovation and Methods" project. The perspectives of practitioners are detailed and a case study is provided as an example, from which some conclusions are derived.

5.1.1 Role of industrial services

Although official statistics do not capture industrial services as such, the evidence available from studies suggests that in the machinery and plant sector alone between 15 and 25 percent of sales revenue is ascribable to services and that services in fact account for a larger share of profits than the relevant companies' core products – a trend which has become increasingly pronounced in recent years (Backhaus et al. 2007, VDMA 2010, VDMA 2001). Industrial services are of particular interest for the purposes of this study, not only because of their long-standing importance for the German economy as a whole, but also because per capita spending on research and development in this field is among the highest in the entire service sector (BMBF 2004).

Comprising over 6,000 companies, machinery and plant engineering is a "key sector" (Bienzeisler and Czabon 2010, Spath and Burger 2010) in Germany, both within manufacturing and for the national economy as a whole (Münster and Ganz 2011). In 2009, these firms, and the 921,000 employees in the sector, generated a turnover of 161 billion euros (VDMA 2010). The traditionally high export rate of the German machinery and plant engineering sector should be noted in this context. In 2009, products and services worth over 110 billion euros were exported, principally to countries in Europe, Asia and North America (VDMA 2010). German machinery and plant engineering is ahead of all other nations' machinery exports to China, with a clear lead over its competitors from the US and Japan (VDMA 2010, IKB 2009). The high demand abroad for machinery and plants "made in Germany" is principally attributed to the high level of innovation among German

firms, making German machinery and plants especially attractive to customers. Over the past three years, 70 to 80 per cent of firms have introduced product or process innovations that were well received and highly valued by customers (VDMA 2010).

Just a few years ago, service business in the sector was regarded as secondary or altogether lacking in importance (Barkawi, Baader and Montanus 2006), but this mindset among firms changed completely once the economic and financial crisis had been surmounted, if not earlier. In many companies, the service business provided a kind of safety net during this critical period. The fact that customers required services (e.g. for spare parts, maintenance or repairs), even in times of crisis, meant that the turnover they generated was sufficient to stabilize overall company turnover (Bienzeisler and Czabon 2010). In many cases, this made up for the frequently severe reductions in sales and new contracts in the primary product business.

Industrial services today are of high strategic importance, especially the following (Roland Berger 2010, Spath and Burger 2010):

1. Servicing, i.e. maintenance and inspection of production plants, repair of production plants (incl. spare-part management) and optimisation (incl. planning services).
2. Technical cleaning, i.e. technical cleaning of production plants and machines.
3. Internal logistics, i.e. goods receipt handling and control, internal provision of production factors and management of raw materials and waste.
4. Production support, i.e. provision of equipment and personnel, setup of production organisation, quality control and finishing services.
5. Industrial installation, i.e. dismantling, removal and reassembly of individual machines, parts of the operation and entire production plants (without plant rebuilding).

At the same time, the demand market expects another significant increase in the future (Roland Berger, 2010). This demonstrates the involvement of important, strategic company decision-makers in handling industrial services issues (Bienzeisler and Czabon 2010). Different strategies have emerged as a result: alongside the goal of increasing production efficiency, other such service provisions above all aim to increase flexibility, reliability and quality (Roland Berger 2010, Spath and Burger 2010).

In general, there are many convincing reasons to believe that companies in the machinery and plant engineering sector will continue to exploit the potential of their service business in the future (Bienzeisler and Czabon 2010, Münster and Ganz 2011):

- Service sales make a large contribution to overall company turnover, as experience shows. In a recent survey, nearly half the companies indicated that they generated between 10 and 25 per cent of overall company turnover through services. More than 22 per cent actually produced up to 50 per cent from services (Münster and Meiren, 2011).
- Over the total life of the primary products sold, experience shows that the provision of services can generate many times the actual purchase price in the form of service sales (Kaerner, Kasper and Mattmüller, 2004).
- Because machinery and plants manufactured in Germany are of very high quality, meaning they have a long life, service providers have a long period throughout the product lifecycle during which they can achieve service sales.
- Services seem likely to be the company sector where most new sources of revenue may be found, because the market potential of services has not yet been exhausted.
- Services are made particularly attractive by the high profit margins that can be attained. At an

average of around 13 per cent, these margins are considerably higher than in product sales.
- From the customer's point of view, good service makes the company stand out from the competition, and this may be an advantage given the generally high level of competition in the machinery and plant engineering sector.
- Because services involve close contact with the customer, it is easy for firms to identify new customer desires and requirements and fulfil these in the form of new services. The service is situated right at the information source.
- Services have the potential to satisfy customers and also tie supplier companies to the firm.

5.1.2 Trends and perspectives for industrial services

Industrial service providers are currently confronted by a wide variety of challenges. The export-oriented services of manufacturing companies in particular are currently feeling the negative effects of budget cuts, short-time working and redundancies. However concerning to the experts, who were taking part in a workshop within the "Service Innovation and Methods" project, the corresponding drop in service business is not as dramatic as the slump in companies' core product business. The underlying rationale here is that the current steep fall in volumes of new product business will mean that existing plant and machinery will run for longer and that demand for classic services such as maintenance, repairs and spare parts will expand substantially as a result.

In general, the changing conditions for manufacturing companies and the increasing significance of industrial services are leading to an increased dynamic in the service business. Manufacturing companies are increasingly beginning to consider the often-neglected service departments as a core function of the company and to invest in new strategies and concepts (Münster and Ganz 2011, Bienzeisler and Czabon 2010, Spath and Burger 2010, Brax 2005, Lay and Jung Erceg 2002, VDMA 2001):

- The complexity of many material goods increases the demands that customers are making of manufacturing companies. Customers particularly expect, for example, intensive consulting, proposal and planning services. Furthermore, customers need special software packages and training courses for their staff, which exceed the measures provided up until now. Precautionary maintenance, a service hotline and internet-based-services are further components, which secure the availability of expensive machines and systems (Münster and Meiren 2011).
- The exchangeability of material goods and the growing number of necessary services increase the costs for the selection, creation and operation of an individual problem solution, paid for by customers. Therefore, customers demand reinforced intelligence-laced packages of material goods and services in order to keep the coordination costs as low and transparent as possible. This trend is identified by keywords such as system business, solution providing and general contractorship.
- New management approaches and the total cost of ownership have made industrial customers consider whether it is economically cheaper to secure the use of the machine instead of purchasing a machine ("pay per unit"). The answers to such demands are model leasing, withdrawal and modernisation services or the complete operation of production plants by the manufacturer with or on behalf of customers. In this case, the material goods are part of the service. The ratio of material goods and services is reversed.
- New forms of labour division in the value chain between suppliers, manufacturers and customers delay service packages at the preliminary levels of the value chain. As a result, manufacturers as-

sume operators' tasks and suppliers assume retailers' tasks. Without new services, this form of labour division cannot be realised. Consequently, tool manufacturers, for example, take on tool management for their customers and suppliers become R & D partners. Studies have shown that there is high growth potential, especially for internet-based, engineering and financing services (Münster and Meiren 2011, Reinfuth 2005, VDMA 2001).

- The increase in competition, in particular from Chinese machine and plant engineers, and the expected pricing pressure on German manufacturers, will mean that innovations in terms of products, accompanying services, processes and service-oriented business models will be even more important in the future.
- At the same time, changes in the product structure can already be seen today. E.g. manufacturers of gear components are entering the wind turbine market. Overall, it can be assumed that the drastic fall in demand in many product segments will result in not only economic, but also structural, changes, to which the manufacturers must respond with new products, business models or new product-service combinations (e.g. cross-industry services) (Bienzeisler and Czabon 2010).
- Many new possibilities and forms of cooperation, which had seemed unusual to many companies up until now, are already a part of today's machine and plant construction industry (e.g. a lathe manufacturer also sells software for an international plant manufacturer). Collaborations with competitors in the same market sector, and also with direct competitors, will be seen more often in future. These can facilitate access to new markets and spread economic risks.
- Finally, it can be assumed from changes in companies' value structures. Value creation elements are increasingly achieved through service activities.

5.1.3 Practitioners' perspectives on service innovation and methods

German-speaking company representatives took part in an industrial services workshop in October 2009 within the "Service Innovation and Methods" project. The workshop results are illustrated below.

Barriers to service innovation

The path to innovation is strewn with difficulties for industrial service providers. While many manufacturing companies maintain an extensive infrastructure for their product development operations, most companies still do not have comparable structures within which to develop new services. The experts participating in the workshop also perceived a strong focus on product business and, in many cases, a failure to provide adequate support for service business. These underlying judgements were also reflected in detail in the participating experts' discussion of typical barriers for industrial services. The experts identified numerous barriers, which they subsequently gathered into clusters. Although work was based on the clusters formed in the science workshop, the participants in the practitioner workshop were able to supplement these with clusters of their own. The clusters are shown in order of importance as follows:

(1) Culture (25 percent)
(2) Processes & organisation (23 percent)
(3) Business model (17 percent)
(4) Communication (13 percent)
(5) Customer (7 percent)
(6) Employee empowerment (5 percent)
(7) Resources (5 percent)
(8) Service description & measurement (5 percent)

The first four clusters noticeably stand out, in terms of both the number of single barriers included in

each, and the evaluated importance of the remaining categories of barriers.

(1) The practitioners assigned the "culture" barrier cluster the highest importance in their workshop. Some of the innovation barriers cited related to the process of transformation from a manufacturing company to a service company. Industrial service providers continue to have a strong product and technology focus, which, in the view of workshop participants, resulted in their failure to adequately recognise and exploit the true potential of service business. This perception is also reflected in communication problems between departments and in the fact that manufacturing companies attach less importance to services than they do to their manufacturing operations.

(2) Under the heading "processes & organisation" the experts criticized the company infrastructure as being inadequate for service innovations. In particular, they were of the opinion that there was a lack of specified R & D management for services with clearly defined structures, development processes, budgets and responsibilities. In many cases, the outcome was a set of unstructured and time-consuming processes for the development of new services. In addition, product and service development processes did not dovetail as they should. At the same time, the experts referred to examples in which new services were developed using similar processes and methods to those used to create new products. The workshop participants welcomed the systematisation of service innovation, which this entailed, but were also doubtful whether such a simple one-to-one transfer could do justice to the needs of modern services, for example, when designing an interaction with a service customer.

(3) When structuring the collated barriers the participating experts expanded on the topics already included under "business model". The experts criticised companies' framework conditions for service business, which they believed could be improved with regard to strategy, market positioning and customer communication, for example. The experts also referred to the problems of setting and realising prices. There is a discernible tendency, particularly when services are offered in combination with goods, to accept significant concessions on the price of a service in order to be able to sell the related product. This makes it all the more difficult to demonstrate the profitability of the service and therefore to establish an independent service business.

(4) The barriers cited under the topic heading of "communication" referred in part to internal company communication. The experts mentioned, for example, the improvements which could be made to cross-departmental communication regarding service issues and to internal "innovation marketing" for services, both of which perfectly match the situation described under the subject heading "culture". On the other hand the experts also referred to barriers to external communication, such as when new services are launched on international markets.

Methods for service innovation

The participants in the industrial services workshop gathered methods covering the entire spectrum of identified barriers to innovation; most of these methods fitted into the "culture" and "process & organisation" barrier clusters. The latter in particular included numerous "classic" development methods of the type used in the product development field, such as roadmaps, PEP, prototyping, quality gates and modelling. This obviously suggests that industrial service providers use the knowledge they have acquired from technology and product development and transfer it to the development of new services. The experts taking part in the workshop pointed out that this works well in the case of

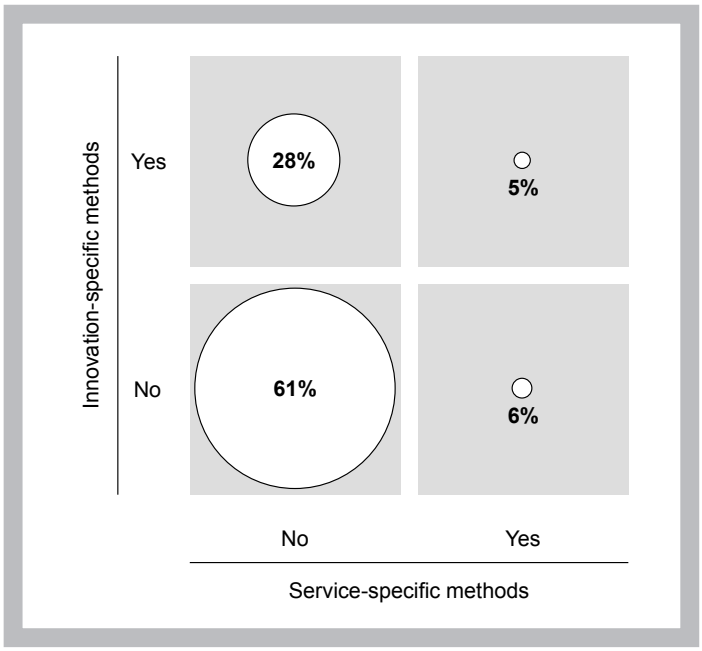


Figure 5.1: Classification of innovation methods

automated or standardised services, which, in terms of both their character and amenability to planning, share many common features with material goods. However, the applicability of this type of procedure to services, which entail a high degree of knowledge and interaction, is strictly limited.

Given that they transfer methods derived from product development and similar fields into other areas, it is hardly surprising that industrial service providers rarely make use of service-specific methods. Only 11 percent of the methods gathered in the workshops were assigned to this category (cf. Figure 5.1).

In response to the question of whether the methods used specifically relate to innovation, Figure 5.1 shows that around a third of the methods cited can be assigned to this area, while most of the methods are not primarily concerned with innovation. The main reason for this is the number of methods, which are assigned to the "culture" cluster of barriers and to other strongly represented clusters, such as communication and resources.

The discussion in the workshop also revealed that experts believe industrial service providers need considerable methodological support. The methodological repertoire which has evolved in recent years in the field of service research is not well-known – if

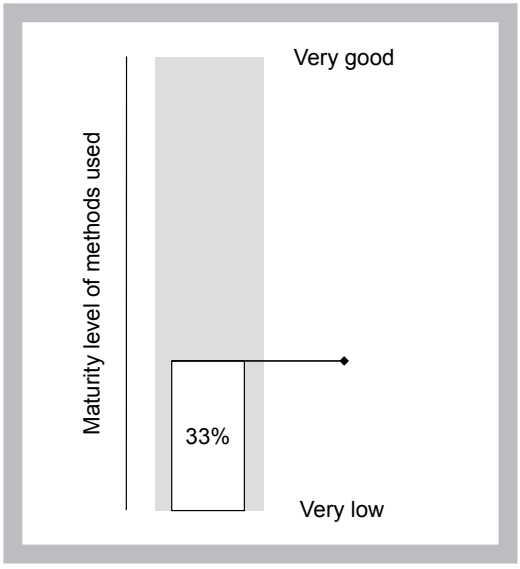


Figure 5.2: Maturity level of innovation methods

it is known at all – particularly among small and medium-sized businesses. Better transfer measures are needed to ensure that suitable service innovation methods find their way into real business practice.

Finally, the project team evaluated the maturity level of the use of methods by industrial service providers and arrived at a maturity level of 33 percent (cf. Figure 5.2), midway between the two other fields of application.

5.1.4 Case study: myFestool service

The case study shows the optimum use of systematic, service-specific procedures and methods to support the innovation process and to overcome barriers in the industrial services field of application.

Findings were transferred from service and innovation research into methodical implementation (Münster and Meiren 2011).

Company

Festool GmbH with head office in Wendlingen am Neckar is a leading manufacturer of professional electrical and pneumatic tools. The company offers a wide range of electrical and pneumatic tools, including cordless screw drivers, saws, cutters, planes, grinders, polishers and suction units. This product portfolio is rounded off with accessories and consumables. The company thus mainly targets carpenters, painters and automotive companies.

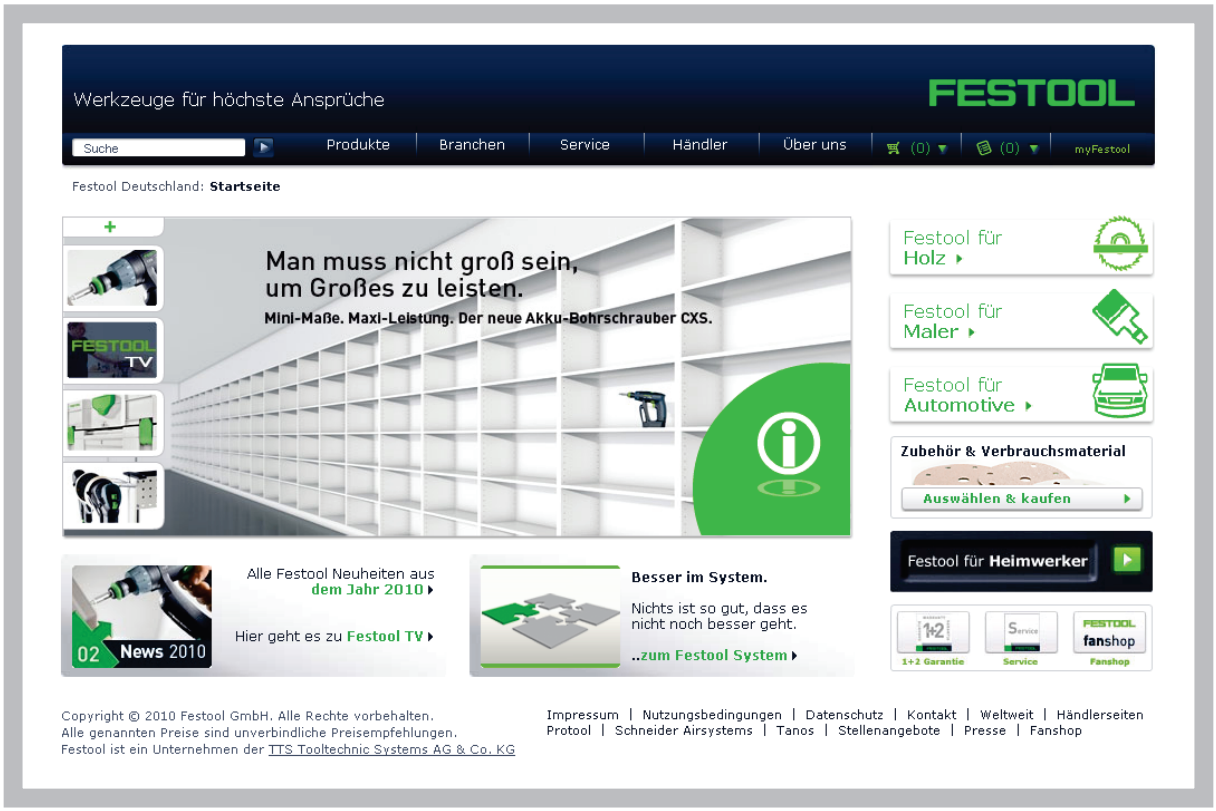


Figure 5.3: myFestool service

The service business has always been very important for Festool. Customers are offered product-related services such as repairs, spare parts and substitute equipment. In addition, added value is created for customers through innovative, knowledge-intensive services, e.g. the provision of expert knowledge and tips and tricks for product users.

In recent years, the internet has increasingly taken centre stage at Festool in the development of its service business. An important step was the creation of its own customer community on the internet. For the first time in the industry, a comprehensive platform was created with "myFestool", via which customers could directly contact the company and request a range of services. The latter were pooled together in 2010 under the name of "myFestool service."

The customer portal was designed so that different internet-based services could be linked to it. For example, customers are currently offered services such as online warranty registration, detailed overviews of machines, online shop and online appliance advice. A newly-offered service with high added value for customers is online support for repair processing, which is described below.

Festool online repair processing

The current volume of repairs at Festool is in the low six-figure range, 30 % of which is processed in Germany. Until now the repair process was paper-dependent and the goal of the new internet support is to enable an easier and more convenient repairs processing for customers. In particular, customers can now order repairs and track the current status of the repair process online.

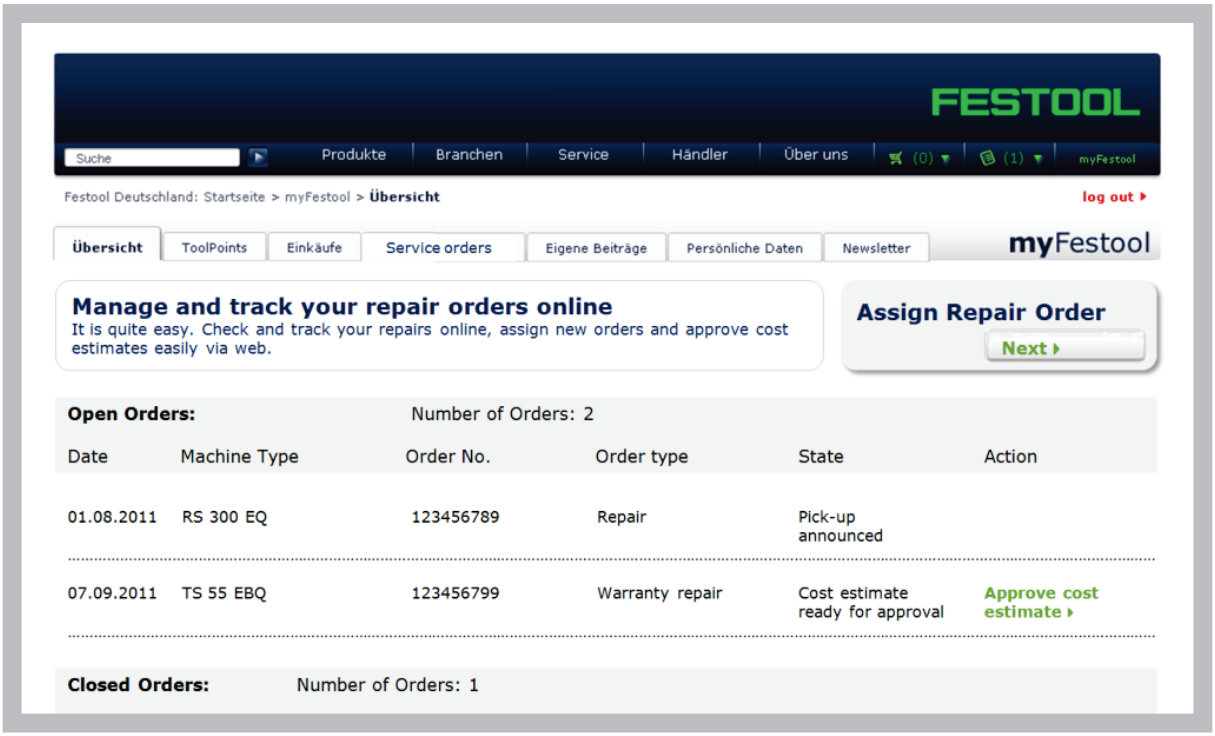


Figure 5.4: Customer screen view

For online repair processing, Festool adheres, above all, to the following objectives:

- Create a convenient, flexible and transparent process of repair services for the customer,
- Eliminate superfluous media discontinuities and interfaces in the repairs handling process,
- Improve process costs and times by processing repairs online,
- Enhance the attractivity of the myFestool customer portal and increase customer retention,
- Integrate external partners online, e.g. logistics services providers, who are responsible for the transport of defective machines (from customers to Festool and back).

Experiences in service development

Processing repairs online meant that Festool had to innovatively reorganise existing services. As it was a high-volume process with high visibility for customers, the development demands were very high and potential barriers had to be considered in advance. In particular, they had to guarantee that the new internet-based process elements functioned as planned from the start, both technically and from an organisational aspect.

The development of service innovations at Festool was supported by the systematic use of methods from service development and resulted in an effective implementation and creation of the innovative idea.

To successfully implement the idea of online repair development in practice, a structured approach within Festool was chosen. In the development process the "customer" and "process & organisation" barriers (as in the practice workshops) were identified as particularly relevant. Important experiences were gathered, an overview of which is provided below.

One of the most important questions at the start was whether customers would accept the service. Of particular interest was to what extent customers – mainly tradesmen and small businesses – were ready to order and process repairs online. For example, if an important electrical appliance were missing on a construction site and internet access were available (e.g. by Smartphone), would staff on-site use the online service and how would it have to be designed so that, on the one hand, the necessary information could be transferred and, on the other hand, the minimum ergonomic requirements were met? An important source of information to answer such questions was a customer survey carried out by Festool, which was expanded with interviews with selected customers and an analysis of customer feedback to conventional repair processing. By using these different instruments, Festool could guarantee that the required information was available from the start and the customer perspective was included early on in the development process.

Another focus during the development was mapping the organisational perspective. This was not to do with assigning responsibilities, but with defining individual processes and their associated tasks. Issues had to be clarified by internet support, such as the creation and confirmation of online cost estimates, the ordering of machine collection by an external service provider and the provision of tracking information for customers. It appeared that modelling the process was an important activity. The whole process was visible to all participants and the role of customers and their activities were particularly well represented.

Furthermore, the mapping of required IT systems was included in the illustration of the process for online repair processing. For each individual activity in the process, they clarified which form of IT connection would be required to make the service as simple as possible for the customer and as efficient

as possible internally. Thanks to these procedures, interfacing with IT could be better analysed, and information – for example relating to the creation of data flows and formulas – could be more quickly identified. The IT realisation of the new online service finally took place based on the existing platform for myFestool services and involved ERP and CRM systems used by Festool.

The importance of continually testing the development results should be noted. Especially for internet-based services, the first prototypes can be created early on in the process and feedback can then be collected from customers and colleagues. So-called wireframes and mock-ups were therefore created for Festool repair processing, which recreated the customer screen view and delivered important clues to the final design of input masks, which the customers would have to complete when carrying out the online repair process. Furthermore, before releasing the new service on the market, a finished pilot application was tested in detail by test customers and final adaptations were made based on this.

The methods used by Festool reflect in part the methods identified as relevant in the practical workshop (cf. chapter 4). The online repair processing will be available from the end of 2011 in the German market. The international roll-out should take place in 2012.

5.1.5 Conclusions

Industrial services are significantly important and relevant today and will be even more so in future, especially within machinery and plant engineering. But when it comes to the innovation and development of new services, industrial service providers do not only face challenging barriers, they are also confronted with a lack of suitable methods and tools to overcome them.

In the industrial services application field, the "culture" , "processes & organisation " and "business model" barrier categories seem to be the biggest challenges to overcome. A large number of methods exist at present in the application field, which, however, primarily arise from product development. The challenge is to match these to the respective services and their specifics and to transfer them to the innovation process. Furthermore, it is clear that the transfer of existing methods from science to operational practice must be improved.

This was confirmed within the case study. Typical development methods, such as customer questionnaires, process modelling and prototyping, were used. The service-specific and innovation-specific development process (service engineering) and the adaptation of methods were crucial for the successful implementation of the innovation idea.

5.2 INNOVATION IN INFORMATION-BASED SERVICES

ANDREAS NEUS, PETER HOTTUM, VOLKER BILGRAM

The information and telecommunications industry generates revenues of 141 billion euros (Bitkom 2009) and is an important industry sector in Germany. Information-based business models in the emerging combined telecommunications, internet and media industries or TIME sector are confronted by radical service innovations on the Internet in its function as a communication, distribution and transaction medium. These innovations are characterised by the decentralisation of the value chain, disintermediation and an accelerating shift of control over information-based services from the provider to the customer (Chircu & Kauffman 1998, Berman et al. 2007). The wide availability of information technology and the increasing number of – in many cases free – information and communication services is turning customer attention into an ever scarcer product, in contrast to the situation in the past when information and communication services themselves were scarce. As a result, many providers of information-based services are forced to make not only their offerings and internal processes but also their underlying business model more innovative. Because technical changes and their diffusion take place so quickly – the internet itself has established a reach in just a few years which it took other media decades to achieve – the human ability to absorb innovation and change is now becoming a key factor, both on the provider and the customer side.

5.2.1 Results of the expert workshops

The experts in the workshop on information-based services are currently considering the following topics in particular: Use of new communication channels (Web 2.0, open innovation), the impact of the internet on business models (rights to content, new fields of business), improvements in innovation processes (innovation management and innovation culture) and an understanding of customer requirements (microtrends, individualisation).

The workshop results unmistakably highlight barriers in the "culture" cluster, followed considerably further back by barriers related to systems and networks as well as business models.

The experts identified various barriers which they subsequently brought together in clusters. The clusters are shown in order of importance as follows:

(1) Culture (40 percent)
(2) System & networks (12 percent)
(3) Business model (8 percent)
(4) Employee empowerment (8 percent)
(5) Processes & organisation (8 percent)
(6) Service description & measurement (7 percent)
(7) Employee knowledge & skills (5 percent)
(8) Regulations (legal) (5 percent)
(9) Customer (5 percent)
(10) Intellectual property protection (2 percent)

In the following we will look in more detail on the five highest rated clusters:

(1) The experts placed great importance on the "Culture" cluster and the cited innovation barriers when discussing for the causes and potential solutions to innovation problems. It is striking that the innovation barriers referred to are the strategic and structural barriers which describe the specific innovation process in the company. The emphasis is on questions such as "How are ideas implemented?", "Who champions them?", and "Who has the power to push through innovations?"

(2) The "System & networks" cluster – with specific barriers such as distributed service delivery, the sharing of knowledge across enterprise boundaries and integration of all the participants taking part in the service innovation – is considered by the participants to be the second most important barrier cluster. In particular, the complexity generated by innovative changes to individual services in such a distributed system is regarded as a problem given the unpredictable impact of such complexity on processes on the customer side.

(3) The "Business model" cluster of barriers was introduced in the workshop independently from the results of the scientific researcher's workshop. Identified challenges include the existing business models and the problem of cannibalising these through new developments. Furthermore the consideration that tying services to products necessity was critically discussed.

(4) At the heart of the "Employee empowerment" cluster of barriers is the problem associated with employees' focus on specified targets. These are geared to day-to-day operations and do not necessarily allow for alternative actions or innovations. The participants also stressed the lack of specific incentives and a lack of strong leadership in relation to the actual freedom of scope available.

(5) The "Processes & organisation" cluster was regarded as just as relevant as the two previously mentioned clusters. This cluster focuses on rigid structures and the lack of organisation which results in a failure to carry out the necessary changes in organisations and among participants. The networking which this would require is hindered by the loss of information at interface functions and this ultimately means that information is split up among people with different responsibilities.

5.2.2 An innovation case of HYVE

HYVE is a pioneer in open innovation and co-creation approaches supporting major companies such as Audi, Beiersdorf, Daimler, Danone, Gore, Henkel, SAP, Siemens or Swarovski since 2000 as a service provider. To overcome innovation barriers, HYVE applies co-creation approaches to connect innovative people from both inside and outside the company. On the one hand, co-creation tools help companies to make consumers an integral part of the innovation process in an "outside-in" approach. On the other hand, internal innovation communities are implemented to realize the innovative potential among employees and nourish collaborative idea management across different company departments. In very large corporations like Daimler with more than 200,000 employees worldwide, skills, creativity and knowledge are widely dispersed and are a very valuable source of innovation. The following example shows how Daimler tries to tap this source of innovation and overcome critical barriers to innovating.

A cross-functional team at Daimler implemented the Business Innovation Community based on the HYVE IdeaNet in 2008 to provide all employees worldwide an internal platform dedicated to the co-creation of business innovation. The goal was to identify growth potential beyond current business with a sustainable competitive advantage.

The platform unites various web 2.0 features such as the wiki principle allowing for joint ideation, rating mechanisms and community features known from social networking sites. Daimler's Business Innovation Community exemplifies how corporate innovation management can tackle innovation barriers. In the following we will give insights into Daimler's approach referring to the major innovation barriers identified and elaborated in the expert workshops described above.

Culture

The Business Innovation Community has been described as the corporation's "gut feeling" by a member of the community (as it is also outlined in the Daimler Corporate Blog). This statement indicates the essence of the platform and emphasizes the crucial role of the platform for the innovation culture and the collective mindset at Daimler. Designed to spur the entrepreneurial spirit among employees and create an atmosphere conducive to collaborative innovation of interdepartmental teams, the Business Innovation Community has been widely accepted by Daimler's employees. More than 20,000 people of all ages and positions have registered since its implementation. 85 % feel that joint value creation of employees from different departments bears an additional value, and 59 % agree that the Business Innovation Community nourishes cross-divisional collaboration (Kuhn 2009).

Business model

With the Business Innovation Community Daimler intends to drive business innovation and identify opportunities of services which correspond well with its current core competencies, but, go well beyond "making cars". Over 1,500 ideas have been submitted and discussed. A prominent example of a service innovation which resulted from the community is the car2go mobility concept. In contrast to the focus on "making cars", the concept builds on a completely new business model with a predominant service perspective. The innovative car2go business innovation (www.car2go.com) is a free floating, fully automated fleet of self-service cars which has already been realized in several cities. This innovative "personal public transport" comprises a fleet of smart cars scattered all over cities. Registered users can simply pick up any car, drive it and leave it anywhere in the city area.

Employee empowerment

Communities and social applications are bottom-up phenomena which have proved to empower consumers all over the world and have induced dramatic shifts in the media landscape. Communities can play a similar role in a corporate context enabling employees to contribute to value creation beyond their actual area of work. In doing so, Daimler capitalizes on the skills and knowledge of its employees by connecting different backgrounds and providing a space to co-create and cross-fertilize.

Processes & organization

Due to organizational structures and hierarchies, companies often face the challenge that different departments alienate from one another and develop into "silos" within the corporation. Cultural differences between technology-oriented departments such as R & D and market-oriented units like Marketing result in obstacles at the interfaces between departments. A central platform based on "democratic" principles such as the right to read and edit known from wikis or idea evaluations serves as a central innovation hub – a meeting place that helps to overcome innovation silos operating in isolation.

Daimler's internal Business Innovation Community offers manifold opportunities to the corporation to overcome barriers in service innovation. In light of its heritage as a car maker, Daimler took a step towards collaborative service-oriented business innovation. As the example of the car2go mobility concept shows, Daimler's approach bears fruit and does make a difference – both on the market and within the corporation. Witnessing the realization of ideas which have been jointly developed and evaluated by employees from different functional units also strengthens a corporate mindset of collective service innovation.

5.3 INNOVATION IN HEALTH SERVICES

CARSTEN SCHULTZ, ROBERT LORENZ

The health market is the largest service sector. In Germany the primary health market accounts for 253 billion euros of health spending (2007; German Federal Statistical Office, 2009) plus an additional estimated 60 billion euros for the secondary health market (Roland Berger Strategy Consultants, 2008). Health services have a lasting influence on the quality of life and on economic strength, particularly when export volumes are declining and production in other sectors is increasingly being relocated to other countries. However, significant market change not only affects the size of this sector but also the relevance of innovation. Demographic trends and the associated increase in numbers of chronic and multi-morbid illnesses are generating mounting pressure for greater efficiency and quality. At the same time, trans-institutional health networks capable of addressing interface problems as part of an integrated health process, from prevention through to care and palliative medicine, are also growing in importance. The patient's role is changing from that of a passive recipient of services to an active co-architect of his or her health services. Patient involvement is also associated with greater demand for better service quality. Regulatory changes, such as the introduction of diagnosis related reimbursement systems and higher quality requirements also produce innovation pressure. Many new technological developments in medicine, and in information and communication technology in particular (such as telemedicine), also lend added traction to innovation.

5.3.1 Innovation patterns in health services

Innovation by health providers takes many forms from the development and launch of new medical preventative, diagnostic, therapeutic and care approaches through to supplementary wellness and social services. Cross-institutional process innovations which affect patients directly and indirectly are particularly important and improvements in quality and efficiency in this area are increasingly being looked for in a systematic combination of health care standardisation and individualisation. Health services are characterised by rising technology intensity and growth in the share of value added by customers (need for patient adherence, greater importance of prevention). More and more health services are provided as telemedical solutions which are not tied to a particular location and by non-medical health professionals (such as when coordination tasks are taken on by nursing staff). Ad-hoc innovations and those driven by medical practice play a particularly important role in the health sector owing to the nature of service providers and of health services themselves. Most companies are relatively small and do not have their own specialist R & D departments. This means that there is a lack of resources and organisational options for R & D-driven innovations. Health service delivery is itself subject to considerable risk as well as being time critical. This explains why strategies which use existing knowledge (exploitation) in current treatment cases play such a dominant role in contrast to the systematic generation of new knowledge (exploration). Innovations are developed directly on the health market and are iteratively improved. These factors also favour incremental innovations given that the value systems of health system providers are not congruent with highly innovative and thus risk-laden developments. Isolated innovations which are as radical as telemonitoring consequently run up against numerous barriers.

The barriers identified in the workshop were initially categorized in the following ten clusters, which are shown in order of assigned importance:

(1) Culture (20 percent)
(2) Customer (16 percent)
(3) Regulation (14 percent)

(4) System & networks (14 percent)
(5) Resources (13 percent)
(6) Employee competence (7 percent)
(7) Processes & structures (6 percent)
(8) Service description & measurement (6 percent)
(9) Employee empowerment (3 percent)
(10) Communication (1 percent)

The first five clusters differ in terms of relevance from the other barrier categories and are explained in the following.

(1) Participants identify the culture dimension as the most important barrier cluster. The main areas of resistance lie in the relevant players' lack of willingness to accept change and their aversion to experiment and risk in health services. All medical professional groups are concerned to reduce the uncertainty of medical service outcomes and prefer to use tried and tested procedures with which they are already familiar. Health service providers work within established hierarchies, both within and between professional groups (including in particular doctors, nurses and administration), which hamper the collective learning processes which are becoming increasingly important for interdisciplinary innovations. People working in this sector also identify very closely with their specific professions (e.g. doctors) and not with the organisation (such as hospitals). This is exacerbated by the high degree of autonomy doctors enjoy and their latent antagonism to organisational steering mechanisms. This manifests itself in a lack of interest in being involved in organisational improvements and the limited influence which managers have on employees working on the medical frontline.

(2) The relevance of customer interactions is apparent in the discussion of the term "customer" itself. Service providers continue to refer to patients or clients and thereby continue to suggest that the customer plays a passive role. Other barriers arise owing to the complexity of the customer role, which not only includes the patient but also encompasses members of patients' families, health insurances and providers of complementary medical services, which represent partly diverging demands as well as diverse interdependencies. Other barriers emphasise problems in the reciprocal flow of information between patient and service provider. Failure to take sufficient account of individual wishes and preconditions results in the requirements identified by service providers tending to differ from those perceived by patients. Benefits and underlying care processes are not particularly transparent for patients and this has a negative impact on adherence.

(3) Regulatory barriers in the health market have been described many times and are also extremely relevant in the context of service innovations. Medical service providers confront hurdles in the approval process and in securing settlement options in the social system. Professional, liability and data protection restrictions also come into play. Legal barriers are reinforced by latent uncertainty as regards future statutory changes. Inadequate incentives lead to the misallocation of limited resources and to the inadequate efficiency and quality orientation of the relevant players, particularly across sector boundaries. A number of problems arise in connection with the lack of trained professionals and the need, in the light of demographic change and the growing proportion of women, to set up new professional groups and establish on-the-job further training.

(4) Health services require cooperation between service providers along the entire treatment chain. Quality and efficiency problems in the health sector are mainly due to interface problems between different players. Barriers, which make up the fourth cluster, are inherent in the establishment and operation of holistically integrated health networks. The sector-orientation of health systems in particular is a cause of interface problems and prevents newly cre-

ated service networks from functioning properly. The conception of extensive regional care services is complex and is beyond the abilities of individual health providers. There is a lack of facilitative or methodological and information technology support for the networking of health and social services. Existing information technologies such as telemedicine fail to do justice to industry-specific requirements and are not sufficiently interoperable.

(5) The fifth category of barriers refers to a fundamental lack of resources for the development and introduction of services. Excessively high development costs as a result of prolonged approval procedures in combination with uncertain refinancing place strict limits on financing options. As a result systematic research and development is consequently limited to the pharmaceutical and medical technology industries. Health service providers rarely hold development budgets, especially as providers in the health market tend to operate in relatively small organisations. This is reinforced by service providers' lack of an investment perspective (innovation vs. costs) and underdeveloped controlling systems which are not capable of identifying areas in which action needs to be taken or of crediting particular innovation projects with improvements in quality and cost effectiveness.

5.3.2 Innovation in health services – The case of Vitaphone

Company background

Vitaphone was founded in 1999, to use technology intensive health services to transmit bio signals and biochemical parameters and to provide a comprehensive case and care management for chronically ill patients. The fact that the number of patients with chronic diseases like diabetes or heart diseases is accelerating makes it necessary to have monitoring technologies as well as a local service concept, so therapists can quickly react and improve the life of their patients.

Value creation through products and services

The patient is in the centre of attention to improve diagnostics and therapy issues. Thereby Vitaphone supports providers and health insurances to achieve better care and achieve higher economic efficiency. The cooperation on a technology basis together with various network partners accelerates the innovation cycle and drives innovativeness of products and services. Vitaphone offers the complete portfolio of hard and software development, through system integration and full services. For example, the telemedical service centre runs 24/7/365 to provide individual services for monitoring of patients with chronical diseases in over 20 countries. The spectrum of products ranges from functional diagnostics to modern therapy management of chronic diseases. The service centre is equipped with highly skilled staff, who communicates with the patient, analyses the data of patients like electrochardiac signals and forwards this information to the local doctor. In the case of emergency, the service centre manages the complete emergency process.

Innovation barriers

Vitaphone had to overcome several barriers during the development and market launch. The numerous health market related barriers explain the lack of diffusion of telemedical applications, despite great advancement in technology and medical science.

In order to tap the full market potential, Vitaphone has to address three main stakeholders, who are the patients, doctors, and insurance companies. Most of the players are missing a mutual understanding of the necessity for telemedical applications. Therefore, Vitaphone had to establish new organizational structures, which encourages the players to make

use of the new technology and applications. Their input for the innovation process, especially the health care professionals, is a pre-condition for a successful innovation process. As such, the skills and motivation of Vitaphone employees play an important role. They need to give constructive input during the development process and the operations of a new service. In respect to users, lack of knowledge of new systems and applications may pose a risk, too. Therefore, Vitaphone offers training programs for its employees, which encompass the whole process, starting from early diagnosis to rehabilitation.

Telemedicine services are produced at the interfaces of many actors. In this context, the constant exchange between managers of telemedicine services, suppliers of sensors, information and communication technology and software partners, health insurances, patients and the different health care providers is a critical factor. One challenge is the interaction between providers and users to implement new concepts and common standards, especially to ensure proper qualification standards. Also the limited interoperability with existing systems is an inhibitory component. The existence of several separate electronic patient records and information systems in the health care market complicates the creation of well interlinked systems. There is a lack of definition of the right standards and norms at the interfaces of sensors, data acquisition and processing and presentation.

Acceptance and rethinking on the part of the involved healthcare providers are required to exploit the potential of telemedicine services. The use of a virtual form of interaction is not always met with great enthusiasm. Furthermore telemedical providers such as Vitaphone opens up a new facet within health care markets, i.e. case and care (process) management. This requires a change of established roles, structures and processes by the established actors. Only when the entire value network – health insurance, specialists, hospitals, pharmacies, GPs, rehabilitation clinics, therapeutics and patients – are interlinked telemedicial services are able to show its true benefits. The development of such value networks induces high risks, particularly in the interfaces between the users, and makes old approaches obsolete. This clearly results in high resistance of established market players.

In the complex regulative context of the health sector Vitaphone encounters many obstacles. In particular there is still no general accepted reimbursement procedure. On the top of that, due to chances in in health policy future regulations are unclear. This is related to missing valid long-term studies and a difficult comparison of different program outcomes. Telemedical services are associated with specific aspects of quality and efficiency improvements (e.g. better patient management, guidelines loyalty, and reduced hospital admissions), which constitutes long-term effects and are of cross-sectoral nature and therefore hardly to be evaluated.

The future of telemedical services

The future prospects of the telemedicine industry look promising, not only in Germany. There will be many more potential candidates for telemedical services. This in return increases the understanding and acceptance of high technology solutions. Vitaphone already has comprehensive and high quality services. However, the complex regulations of health systems and the demanding implementation of the service within the health care market may cause serious impediments to innovation success. Vitaphone must integrate their services with the existing technology and processes at the health care providers. Further, they have to gain the confidence of all stakeholders to promote their market position. This will lay a good ground for a further development of the complete telemedical industry.

6 MULTIDISCIPLINARY INSIGHTS IN METHOD DEVELOPMENT AND APPLICATION

6.1 RUMPELSTILTSKIN IS A THING OF THE PAST: INNOVATION PRACTICES FOR CREATING SERVICE INNOVATIONS[4]

KATHRIN M. MÖSLEIN, ANNE-KATRIN NEYER, CHRISTIANE RAU

Today's organisations face various challenges, arising from the pressure of rapidly changing markets, the pressure on prices in a globalised world and shrinking margins (Shepherd and Ahmed 2000) as well as from increasing customer expectations (McGrath and McGrath 1992). To meet these challenges, organisations increasingly have to overcome the classic divide of products and services, as the customer is calling for neither product nor service, but for the satisfaction of her needs and for a solution to her problems (Sheperd and Ahmed 2000, Foote et al. 2001). Both service providers and manufacturing companies are now changing their strategy in order to meet these challenges; they are becoming providers of hybrid services (Araujo and Spring 2006) and are therefore targeting service innovations.

In order to create hybrid services successfully, the so-called "Rumpelstiltskin behaviour" must be overcome. The autors named this organisational phenomenon after the Brothers Grimm fairy tale. They argue that in order to overcome this "Rumpelstiltskin behaviour", methods must be found to persuade the "little man dancing around the fire and keeping his knowledge (= name) to himself" to share his knowledge without ulterior motives with the "poor miller's daughter" as she is called in the fairy tale. Everyone knows how the story ends. The miller's daughter, who has meanwhile become queen, discovers the little man's name at the last minute, whereupon he sinks down into the earth in a rage. This is an exaggerated description of behaviour which may arise as part of the process of creating hybrid services. Particularly as key actors, such as customers and service providers, become more important. Interlinking these actors is essential for the development and provision of hybrid services. Most importantly, an environment needs to be created, where knowledge transfer is not only possible, but is actively promoted by all actors. With complex solutions in particular, it is necessary to actively support the communication process and optimise the cooperation among the actors. In this regard, a variety of specific problems have been recognised in the interactive creation of hybrid services. These include for instance the issue that customer feedback cannot adequately be integrated in the design process

(Lasshof 2006) or that conflicts of interest exist between the cooperation partners (Mont 2002). Based on design and innovation literature (Thomke 2001, Schrage 2000), a deeper understanding of so-called innovation practices[5] must be developed to avoid two key barriers to the development of hybrid services: interaction barriers and communication barriers.

Interaction barriers arise from the huge complexity of hybrid services. In contrast to traditional product development, the creation of hybrid services requires the cooperation of a multitude of different actors, who do not always have a track record of working interactively (Neyer et al. 2009). In other words, colleagues from the R & D department must constantly interact with colleagues from sales or marketing entities and must also thoroughly come to grips with external actors, such as e.g. customers or suppliers. It can result in both contextual and spatial interaction barriers (Reichwald et al. 2005). Furthermore, given the inherent synchronicity of service components' production and consumption, both internal and external actors must continuously and (in part) simultaneously communicate with each other (Burr and Stephan 2006, Haller 2005) to gain additional experience in creating hybrid services. A synchronous integration of all participants' experiences and needs can lead to an increase of productivity. If interaction barriers exist, this potential cannot be exploited fully.

Communication barriers can arise due to actors' varying mental models of their corresponding environment. These mental models are a result of actors' different ways of thinking, which arises from their education background, indivdual experiences and diverse interests (Mumford, Feldman, Hein and Nagao 2001, Star and Griesemer 1989). In particular in the context of hybrid services creation, employees from diverse parts of the organisation have to cooperate in order to exchange new and mostly highly abstract ideas and concepts. As a result, problems of understanding are likely to arise. The same applies to communicating with external actors, such as customers or suppliers, when their knowledge has to be integrated. In this regard, Lasshof (2006) emphasises the importance of involving customers in the process of creation to reduce the customer-based uncertainties in the provision of services. She argues that, by involving the customer's knowledge in the creation of the service, the provider's resource planning is alleviated. If communication barriers arise in this context, they are particularly consequential. If customers' knowledge is misunderstood, it might lead to inefficient resource planning and declining productivity.

In recent years a multitude of innovation practices have increasingly been available to organisations as so-called "boundary objects", to involve various participants in the process of creating hybrid services. Boundary objects support social interaction between participants with different characteristics (Vinck and Jeantet 1995) and can thereby help to overcome identified productivity barriers. For example, Neyer et al. (2008) demonstrate that prototyping can be applied as a tool for overcoming interaction and communication barriers, with which, among other things, actors' diverging perceptions can be aligned via specific ideas. In a comprehensive interdisciplinary literature analysis, Rau et al. (2011) recognise that selected innovation practices can help to overcome knowledge barriers in innovation projects. For example, Lego™ (i.e. Lego Serious Play™) can be used in the field of interactive creation of services. The interaction between various participants is supported by the tangible and easy to

5 According to Vermeulen und Benders (2002) the term "Innovation Practices" encapsulates methods, tools and strategies for supporting interaction in innovation projects.

Innovation Practice	Description
Comicboarding	In a collaborative brainstorming session, the participants develop ideas, which are then visualised by a moderator in the form of a storyboard/comicboard. The illustration becomes the communication basis of the group (Moraveji et al. 2007).
Real-world ethnographic enactments	Participants observe the behaviour of their interaction partners in an environment which has been developed to explore specific questions (Carter and Mankoff 2005), such as "how do users react to self-service offers?"
Act out scenarios	A scenario, e.g. a provision of services, is acted out by the participants in a role-play session. In the role-play, the participants represent their semantic models. The participants can suggest alternative interpretations of the scenario or repeatedly modify it (Svanaes and Seland 2004).
Uncovering the untold story	To be able to understand particpants' perspective, they are asked to paint a picture as an answer to a question exploring their indivdual situation. Afterwards the pictures are explored together. (McCreary 2010)

Table 6.1: Examples of "innovation practices" used to overcome productivity barriers (according to Rau et al. 2011 and Rau 2012)

comprehend models. In addition, the Lego™ model provides the opportunity to simulate and manipulate service processes and their interfaces to corresponding products in quasi real-time. Table 6.1 presents other examples of innovation practices used to overcome productivity barriers.

Until now, research has primarily dealt with the effect of specific innovation practices on interaction and communication barriers. Now, increasingly another question arises, i.e. how the process of creating hybrid services can be made more productive through the conscious selection and combination of innovation practices. In relation to this, the authors have identified two perspectives which require further research: the situational and the socio-technical perspective.

The situational perspective

In the context of hybrid services it is likely that the selection and combination of innovation practices shall vary according to the level of complexity. The level of complexity is defined here as depending on the level of innovation of the service innovation (incremental or radical) and the number of involved types of participants. According to situational management principles, there is not a course of action that is generally valid; rather there are various possibilities which must be suited to the respective level of complexity. Whereas an innovation practice and a specific combination of innovation practices" may be successful to support the process of creating a particular hybrid service in one situation, it might fail to deliver the achieved results in another situation. An uncautious implementation of concepts, instruments and systems – even if they are successfully applied in another organisation – is not recommended. Every organisation has to verify, if available concepts, instruements and systems meet the demands caused by a given situation (Hübner & Jahnes, 1998: 58). Nevertheless, even though organisations systematically analyse, control and decide on the basis of a given situation in other areas of organisation, this is mostly not the case when it comes to selection and combination of innovation practices for supporting hybrid service creation as a service innovation. Hence, a situational approach to selection and combination of innovation practices in this regard is needed.

The sociotechnical perspective

Given a socio-technical systems perpective, it is critical to analyse existing innovation practices' capabilities of overcoming interaction and communication barriers. Only in doing so, innovation practices encouraging the process of creating hybrid services can be selected and combined. Equally important is the critical examination of their integration in the social system of the implementing organisation. In particular, the organisational context must be considered, if innovation practices are implemented to reduce productivity barriers and consequently to encourage the development of hybrid services. The organisation determines the conditions, which might lead to productivity barriers in the process of creation. Without adapting innovation practices to the specific context, productivity barriers cannot be reduced. Only if organisations are well aware of the conditions and their influence on potential productivity barriers, innovation practices can be selected and combined to enhance the effectivity and efficiency of creating hybrid services.

In conclusion: Although research and practice agree that the creation of hybrid services as service innovation is influenced by interaction and productivity barriers, there is neither a conceptual understanding nor practical experience how innovation practices should be selected and combined to overcome these barriers. By introducing a situational and socio-technical perspective, this article gives insights for future research of how to consciously develop methods for service innovation.

6.2 APPLYING OPEN INNOVATION FOR INNOVATING ELECTRONIC SERVICES – OPEN ISSUES FOR FUTURE RESEARCH

IVO BLOHM, CHRISTOPH RIEDL, JAN MARCO LEIMEISTER, HELMUT KRCMAR

6.2.1 Driver and Sources of Innovations – Open Innovation and Wisdom of Crowds

"Large groups of people are smarter than an elite few, no matter how brilliant – better at solving problems, fostering innovation, coming to wise decisions, even predicting the future."

In the twentieth century, many leading companies generated and commercialized ideas for innovations mainly through in-house R & D laboratories. Today, companies are increasingly rethinking the fundamental ways of managing their innovation activities and overcoming their companies' boundaries in order to open up to other sources of innovation, which has become increasingly important. In this context, customers are seen as one of the biggest resources for innovations (Chesbrough 2006, Chesbrough and Crowther 2006, Enkel et al. 2005a, von Hippel 1988, von Hippel 2005). Companies, no matter if they sell products or services, increasingly open not only their innovation process but also their production and sales process to customers and suppliers. Open innovation and crowdsourcing are thus gaining track in research and practice (Leimeister et al. 2009). Positive impact of customer integration on company success and other measures have been demonstrated in various open innovation related research (e.g. Enkel et al. 2005a, Gassmann 2006, Lakhani and Panetta 2007, Ogawa and Piller 2006, von Hippel 2005, West and Lakhani 2008).

Customer and user integration into innovation activities is a mode of value creation (Chesbrough 2007a). Companies gather ideas for innovations from customers and users by integrating them into the early stages of the innovation process. The ideas expressed by customers reflect their needs and wishes and have been described as "need information" (Enkel et al. 2005b, von Hippel 1994). Customers also express ideas which have been called "solution information". Solution information represents not only need information but also customer based suggestions describing how ideas can be transferred into marketable products (von Hippel 1994).

The underlying idea of integrating customers into the early stages of the innovation process is the following: The integration of stakeholders will open up the company's innovation funnel whereby potential perspectives or ideas for creating innovations come into the innovation process (Zhang et al. 2008). Or in other words, the amount of innovation potential that can be poured into the innovation funnel increases because more parties are actively involved. The company, therefore, gains more ideas for innovations. Open innovation is thus the renunciation of the classic innovation process that can largely be located within a company and that exclusively commercializes ideas developed by the internal R & D department (Chesbrough 2006).

One of the underlying principles of open innovation is the utilization of the "wisdom of crowds" (Surowiecki 2005). According to this principle of collective intelligence, the quality of a decision that is jointly made within a community, involving the contribution of every single member, can be superior to decisions made by single individuals or experts (Leimeister 2010; Malone et al. 2010). This point is exactly where Open Innovation is rooted in order to integrate external influences and actors with specific skills and knowledge into innovation development. Doing so companies can benefit in various ways: shortening innovation cycles, reducing costs of innovation development, gaining innovative strength,

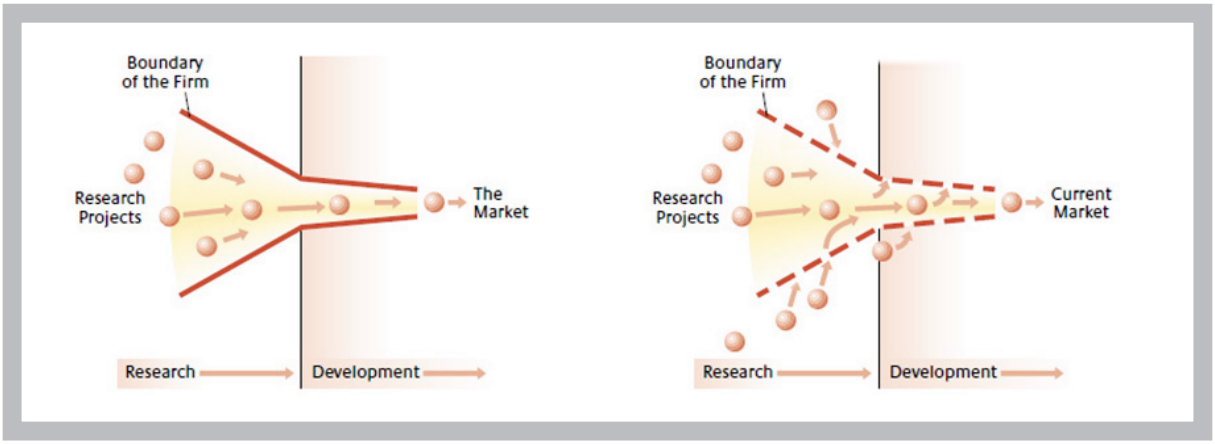


Figure 6.1: Open vs. closed innovation process, adapted from Chesbrough (2003)

accessing new markets and revenue sources as well as reducing market-based and technological uncertainty in the innovation process (Chesbrough 2007b, Chesbrough and Schwartz 2007, Gassmann and Enkel 2004, Reichwald and Piller 2006).

6.2.2 New Service Development for electronic services

Electronic services have become extremely popular in recent years and the success of business models centred on these services such as Amazon, Google, and Salesforce demonstrate the real commercial success of these models. Building on their widespread use new composite services are created that span across business boundaries in order to implement end-to-end business processes. This phenomenon of a large collection of services has been described as a service ecosystem (Barros and Dumas 2006, Riedl et al. 2009). A key aspect of service ecosystems is that their exposure and access are subject to constraints characteristic of business service delivery. Service ecosystems take the idea of interconnected services even further by putting constraints on the service delivery at a business level. In these service ecosystems, service providers of basic, or core services, could augment their services by distribution and delivery functions made available to them by the ecosystem. For example, such an ecosystem could provide payment and metering facilities that can be used by other providers to extend the functionality of their services.

For developing electronic services, this interdependence from external network actors and service ecosystems renders new service development a major challenge for service providers. New Service Development (NSD) involves the systematic creation of service offerings such as financial services, health care services, telecommunications services, information services, and many more (Johne and Storey 1998). Contrary to new product development which is regarded as a base for much research in this area, NSD stresses core differences between products and services: intangibility, heterogeneity, and simultaneity (Fitzsimmons and Fitzsimmons 2000). In this regard, Hipp and Grupp (2005) identify four patterns of key factors influencing new service development: knowledge intensity, network basis, scale intensity, and supplier dominance. Especially network-based innovations seem to match most electronic services due to their reliance on technological systems for information and communication processing. Menor, Tatikonda and Sampson (2002), moreover, argue

that the nature of electronic services especially benefit radical innovations (major innovations and start-up businesses).

Following the open innovation paradigm service ecosystems can be seen as a catalyst for open innovation and thus offer an opportunity to extend the firm-centric concept of open innovation developed by Chesbrough and others (Chesbrough 2006, Gassmann 2006, Ogawa and Piller 2006) by proposing a platform-centred interpretation. The main aspect of service ecosystems is that of a central platform that brings all actors together. Companies try to extract ideas for service innovation from this central platform and use these ideas to create new or improve existing services (Riedl 2011, Riedl et al. 2009). So, instead of a single organisation following the open innovation paradigm, a larger pool of companies bound together through a central platform follows the open innovation paradigm (cf. Figure 6.2). In such an environment each company would pursue their own innovation projects following the open innovation approach. However, they would share innovative ideas, feedback, and services within the boundaries of the service ecosystem in an open fashion. As actors voluntarily join the ecosystem with the aim of collaboratively developing and offering services, exchange within the boundaries of the ecosystem would be particularly active. This does not mean, however, that no exchange with the world outside the service ecosystem is possible. Actors are also expected to cultivate an open innovation approach towards actors outside the service ecosystem.

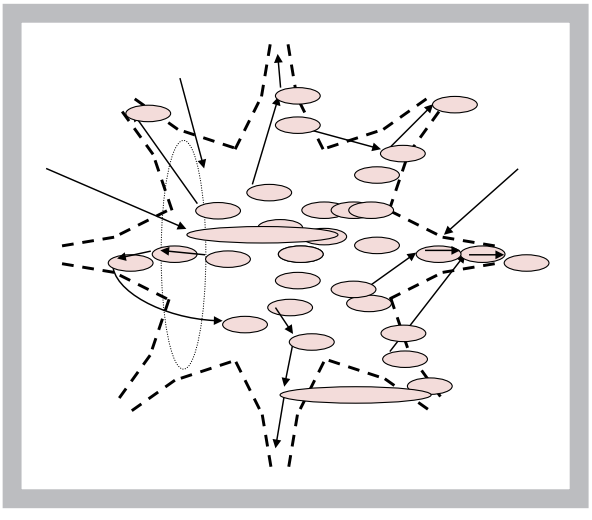


Figure 6.2: Platform-perspective of open innovation (Riedl 2011)

6.2.3 Open Issues for Future Research

As developing innovative electronic services following the open innovation approach is a relatively unexplored research field – so far research provides only a limited understanding on certain relevant issues such as tool support for innovation management (Riedl 2011) – various open issues needs to be addressed by future research.

From a theoretical point of view, there is a need for sound and empirically validated theoretical models facilitating the application of open innovation for developing new electronic services. Thus, the understanding of theories originating from different areas of research has to be consolidated and extended. An integration with various related research fields such as Absorptive Capacity, Creativity and Motivation Research, Human Cognition and Decision Making as well as Organizational Decision Making has to be done in order to advance new service development for electronic services. It is crucial to reveal pivotal factors and conditions determining the failure or success of new service development projects that span company boundaries. So far, fundamental relationships of cause and effect are neither conceptualised nor empirically researched. Furthermore it has to be explored in which service industries open innovation is a useful complementary value creation strategy and where it cannot be applied.

From a socio-economic point of view basic issues of structure and workflow organisation have to be ex-

plored. In the future innovative tasks have to be organised in a manner that they can be simultaneously edited by a multitude of people contributing to creating value. Moreover, these tasks have to be designed in such a manner that the single artefacts can be merged by means of information technology, so that finally an innovative and marketable service can be developed. However, so far it is not yet known, which subtasks of value creation are more appropriate for the open, or the closed innovation approach. On the organizational level, finding the balance between openness and disclosure is still a pivotal challenge. Additionally, incentivation mechanisms and business models have still to be refined. On the level of single employees of service providers, the management and motivation of employees as well as the development of relevant skills of contributing staff has to be researched. In order to utilize the entire potential of an interactive value creation future research has to focus increasingly on external factors that are outside of the company, as much of the potential of open innovation processes derives from the collaboration of various contributors on an individual level (Blohm et al. 2010, Franke and Shah 2003, Gascó-Hernández and Torres-Coronas 2004, Nemiro 2001, Sawhney et al. 2005). Therefore, it is necessary to establish an in-depth understanding of the principles of collaborative innovation development. Moreover the expectations, motives, and actions of all stakeholders involved in the process of value creation have to be better understood, so that appropriate incentive mechanisms can be developed in order to develop, e.g., social capital (Leimeister et al. 2009). In this context, it has to be analysed how individual actors of service companies interact and how they are connected to each other and what social networks they built.

From a technical point of view new ubiquitous, mobile and context sensitive devices offer various possibilities for developing and delivering innovative electronic services are thus a comprehensive avenue for future research. In this context, the investigation of technical developments that support networking and collaboration of service providers and members of service ecosystems in general as well as technical solutions for managing the workflow and labour organisation between different network actors are particular important. As companies face an overwhelming amount of external information in conducting open innovation effective filter mechanisms have to be developed in helping service companies to cope with the external information (Blohm et al. 2011). Moreover, the development of best practice guidelines for the design and implementation of instruments supporting any activities of the innovation process are a further promising approach. Additionally, there is a lack of knowledge on tools supporting an effective stakeholder management.

From a legal point of view, the ownership and copyright of joint innovation development has to be clarified. Although open innovation is gaining in importance in the cooperate practice, yet these legal issues have not been clearly solved. These issues not only comprise facets of value appropriation of jointly developed innovations, but also of value protection, e.g. in terms of preventing idea theft by third parties. Moreover, privacy and data security are of great concern for future research.

Moreover, methodological advances regarding the research of open service innovation may increase the validity and reliability of future research exploring future research questions. In this regard, in particular theory-driven design and piloting of socio-technical innovations that combines existing approaches from the discipline of information systems may be appropriate in order to get an indulgent understanding of the researched phenomenon. However, this can only be seen as first step in the development of appropriate research methods. Research on service ecosystem-based innovation development has to achieve a combination of epistemes and approaches from different scientific disciplines.

6.3 COLLABORATIVE INNOVATION MANAGEMENT – INNOVATION MODEL AND MANAGEMENT APPROACH USING THE EXAMPLE OF A REGIONAL INNOVATION NETWORK IN LEIPZIG

MICHAEL THIEME, KYRILL MEYER, MARTIN BÖTTCHER

6.3.1 Introduction

In times of globalisation, increasing development costs coupled with shorter lead times and increasingly harsh competition between companies and economic regions, the subject of innovation management is more relevant than ever. There is scarcely an article where the importance of research and development strategies for creating and preserving prosperity, jobs and regional and company-specific competitive advantages is not mentioned (Ball 2010). At the same time, innovative solutions and products are increasingly being developed cooperatively within value chains and several companies and institutions are involved (Cases, Bodner and Mutnury 2010).

In the past, closed, internal innovation structures were a practised and very successful strategy. By setting up internal research and development capacities and by protecting the internally-generated knowledge and ideas from others, competitive advantages could be gained and the control over their dissemination secured. However, changes have begun to take place and company boundaries have become more permeable to an external exchange of ideas and cooperation (Chesbrough 2003) and have thus been complemented by an open approach. It therefore seems increasingly essential for sustainable business success, that cooperative relationships be formed with other companies and institutions, with customers or even competitors. The aim of such collaboration is the integration of relevant specialist knowledge into an innovation process, which is otherwise not available within a company. Corresponding initiatives, such as e.g. Open Innovation, have been discussed by experts for some time now and used in practice (Chesbrough, Vanhaverbeke and West 2006, Picot and Münchner Kreis 2009). This is possible, on the one hand, because knowledge and technology that are lacking can be acquired externally instead of being developed in-house, whether by cooperating, purchasing start-ups, licensing or involving customers (outside-in process). And, on the other hand, it enables a stream of internal ideas outside the company (inside-out process) (Gassmann and Enkel 2006).

The scientific and theoretical analysis of innovation management largely focuses on large companies and groups and often takes place independently and without particular consideration of existing company limitations. Formulating special research topics relating to innovation management for small and medium-sized enterprises (SMEs) has been neglected in the past. However, these developments are particularly challenging for SMEs (Ahsen 2010). It is clear that, with traditional approaches and with past practices, there is a deficit in the innovative capability of these companies. It therefore seems to be particularly worthwhile for medium-sized companies to address the implementation of innovations in collaboration. This often requires the creation of new collaborative relationships and changes in organisational structure. This is a dilemma for SMEs in two respects: on the one hand, the implementation of new ideas is restricted by existing knowledge and necessary resources (financial, personnel and technical); on the other hand, this also applies to the implementation of alternative, collaborative innovation processes.

The results of current research at the Universität Leipzig, which addresses these gaps, are shown below. In section 2 "the bottom-up innovation", an initiative for collaboration between SMEs and re-

search institutions is presented, which enables knowledge transfer, helps to use resources mutually and thus advances innovative capability. In close collaboration with SMEs from Central Germany, a new innovation model, based on relevant case studies, was iteratively developed, refined and applied in over fifty case studies (Yin 2003a, Yin 2003b). The approach is presented in section 3 as a collaborative innovation model and is based on the idea of bottom-up innovation (Meyer and Thieme 2010a). On that basis the "service-oriented innovation management" approach is presented in section 4. Section 5 describes a Use Case for how this management approach can be used to implement the innovation model presented in section 3 in the form of a regional innovation network.

6.3.2 The idea of bottom-up innovation

So far participants can be described as very one-sided with regard to the incorporation of the innovation impetus. Typical participants in the "technology push" dimension are, for example, (public) research institutions, and, in the "demand pull" dimension, SMEs. In research institutions, specialisations (e.g. due to a personal research interest) and publicly-funded programmes are significant factors for considering new ideas. As a result, the latest technology, pioneering solutions and specific sectors such as bio-, nano- and microtechnology receive particular attention. The results transfer from such research activity is usually organised top-down, which means that new products or processes emerge thanks to the research, and are then gradually fed into commercialisation (Edquist 1997). Cooperating with SMEs only takes place to a very limited extent in such innovation projects.

Even though the top-down approach is widespread, justified and has without doubt led to the implementation of many sustainable innovations in the past, an alternative bottom-up approach should also attract more interest. The central idea of this second approach is to use the "demand pull" innovation dimension to activate the innovation capacity of participants not integrated in a top-down approach, such as SMEs. In this case, the impetus for research activities arises from examining current problems in businesses. The classic procedure for implementing innovations is thus reversed to the extent that possible solutions are analysed on the basis of current challenges and then the necessary research activity for an implementation is kick-started. The bottom-up approach can be seen as problem-driven in the sense of "what a company needs" in contrast to the research-driven top-down approach according to "what a company should do".

6.3.3 The bottom-up innovation model

As already described, the collaboration between research institutions and SMEs during an innovation procedure can be considered as the basis for a bottom-up procedure. To enable such collaboration in reality, relevant networking structures must first be set up – described as an innovative environment (Camagni and Capello 2000). The activities and interactions, which lead to such an innovative environment, are not necessarily linked to market mechanisms, but comprise among other things the exchange and transfer of ideas, information, knowledge, services and human resources between the participating partners. The manner of collaboration is mostly not formalised, however cooperation agreements, etc. can exist. A core element of such an environment is the ease of communication and trust between the partners. The following are described as elements of an innovative environment by Camagni (Camagni and Groupe de Recherche Européen sur les Milieux Innovateurs 1991):

- various regional socio-economic participants,
- the existence of value chains,
- active regional relationships,

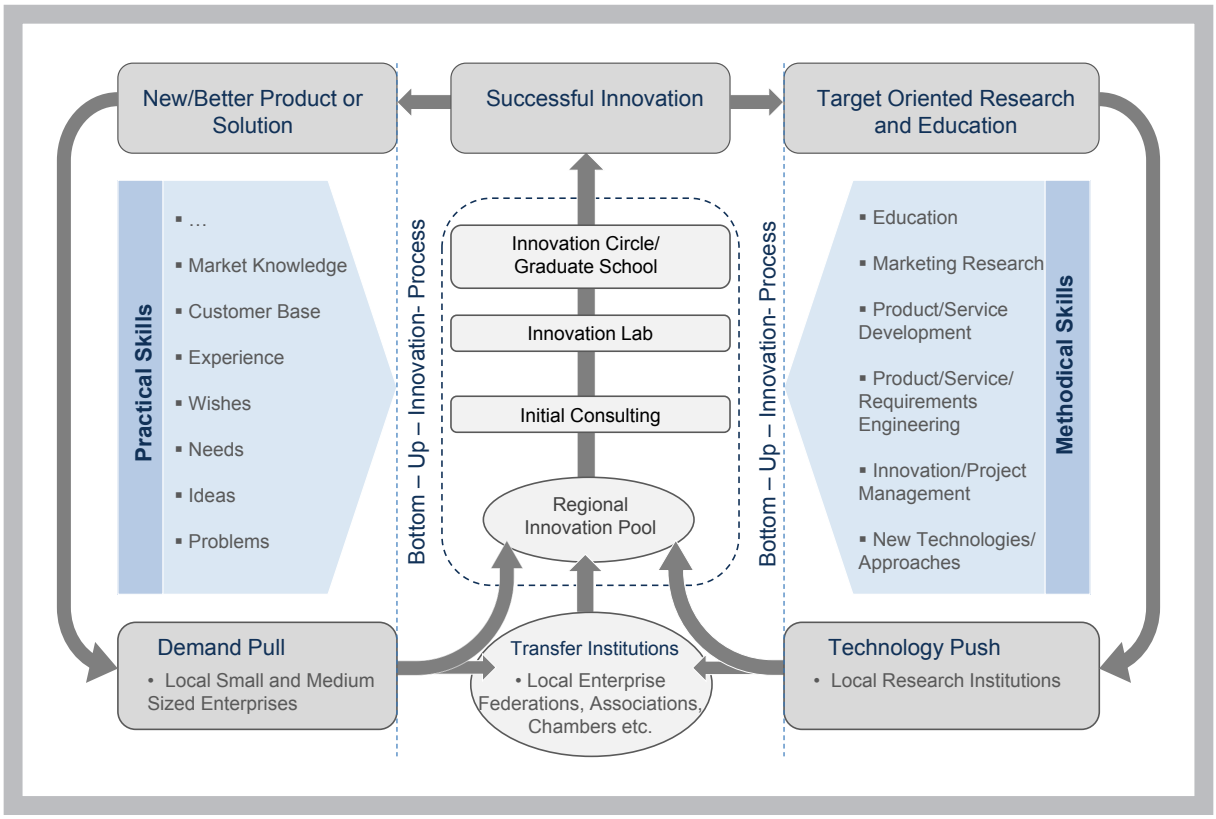


Figure 6.3: – The bottom-up innovation model (Thieme and Meyer 2011)

- a specific culture of exchange and representation,
- dynamic collaborative learning.

When applied to the described understanding of bottom-up innovations in the collaboration between SMEs and research institutions, the approach may be transferred so that an innovative environment can be defined for bottom-up innovations (cf. Figure 6.3). In this case, the socio-economic participants are SMEs, research institutions and transfer institutions. The bottom-up innovation model describes possibilities of collaboration between these participants, who work towards dynamic collaborative learning. In the model, the innovation potential arises from participants' contributions (labelled in the illustration as regional innovation pool). The approach assumes that SMEs in particular have relevant idea potential, only due to limited personnel, technical, financial or time resources this potential cannot often be appropriately tapped. On the other hand, there are research institutions with large methodical and specialist knowledge. It is thus the aim of the illustrated innovation model to bring the participants together and, with regard to their capacities for sharing, to strengthen the innovative capability through the provision of various collaborative arrangements. The following chapter shows how to tap the illustrated innovation pool.

6.3.4 Service-oriented innovation management

The paradigm of service orientation is not an abstract concept; rather it has been used as a matter of course in the everyday world since the discovery

of the division of labour. Erl clarifies this in a simple example (Erl 2005):

"Let's take your average cosmopolitan city. It is already full of service-oriented businesses. Individual companies are service-oriented in that each provides a distinct service that can be used by multiple consumers. Collectively, these businesses comprise a business community. It makes sense for a business community not to be served by a single business outlet providing all services. By decomposing the community into specialized, individual outlets, we achieve an environment in which these outlets can be distributed."

In the field of IT, service orientation can be understood as a design paradigm in software development. The principle enables resources to be clearly divided, consistently reproduced and by this means to be shared in independent logical units. The application of this principle leads to a division of software into several software units, where a unit is designed for carrying out a special purpose. These units are labelled as services (Erl 2005).

Service-oriented architecture (SOA) is a concept for developing a technical infrastructure, which is modelled on the paradigm of service orientation. This approach is comprised of the so-called SOA principles. Erl describes these eight principles as follows (Erl 2005):

- **Standardized contract**
  Services adhere to a communications agreement, as defined collectively by one or more service descriptions and related documents.
- **Loose coupling**
  Services maintain a relationship that minimizes dependencies and only requires that they retain an awareness of each other.
- **Abstraction**
  Beyond what is described in the service contract, services hide logic from the outside world.
- **Reusability**
  Logic is divided into services with the intention of promoting reuse.
- **Autonomy**
  Services have control over the logic they encapsulate.
- **Statelessness**
  Services minimize retaining information specific to an activity.
- **Discoverability**
  Services are designed to be outwardly descriptive so that they can be found and assessed via available discovery mechanisms.
- **Composability**
  Collections of services can be coordinated and assembled to form composite services.

Collaboration in innovation networks requires a management approach for concentrating the existing resources, in order to tap the unused innovation potential of participants. The underlying principle of service-oriented innovation management (SOIM) is to break the innovation process down into individual activities and resources and to define these as independent services. These services are then allocated according to the specialist knowledge of the respective innovation partners.

As a result of this approach a service matrix[6] emerges. This matrix contains all the necessary information on the available resources and thus enables the identification of related participants in the innovation network. The course of action in such a context is analogous to the operation process in SOA-based technical infrastructures. The service provider, e.g. a research institution from the innovation network,

6 A service matrix is defined by the author as a service directory combined with service descriptions for the purpose of this paper.

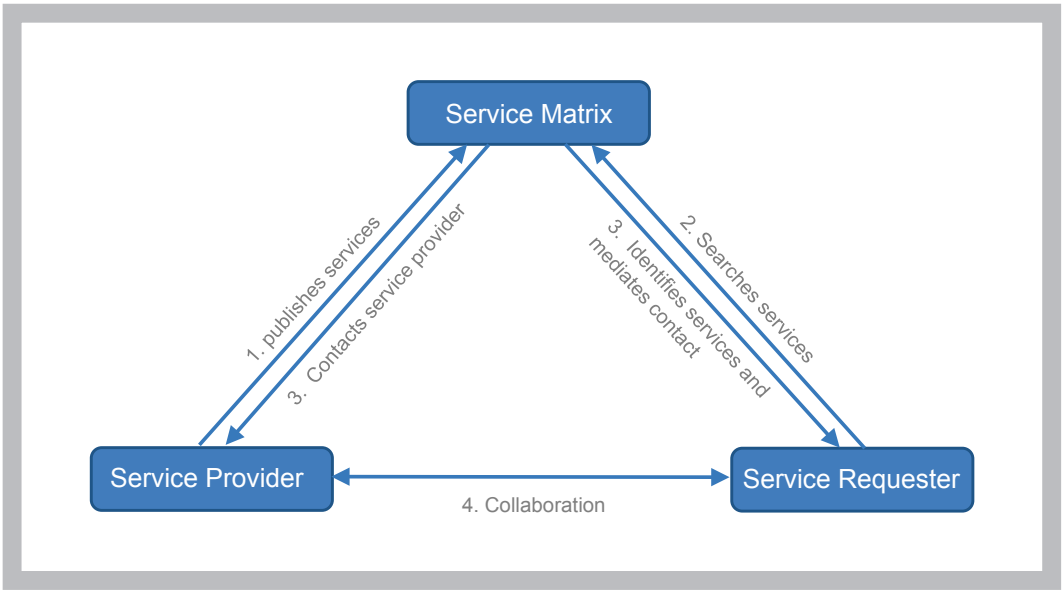


Figure 6.4: SOIM triangle (Thieme 2011)

publishes its services in a service directory, in this case with the administrative institution for managing the innovation network. The service user, i.e. a person or a company with an innovative idea, contacts this institution and in this way gets access to the service directory and the service description contained therein. As a result, the required service provider can be identified according to need and contacted, whereby the service user gains access to the required resources (cf Figure 6.4).

The practical adaptation of SOA principles to process management in innovation networks supports an organisational logic, which can be classified as service-oriented, and definite procedural steps, which can be classified as services. The principles of discoverability, loose coupling and composability ensure that the required resources can be provided according to demand and the whole innovation process can be mapped through the involvement of different service providers. In combination with standardised contracts and reusability, effectiveness can be increased through the realisation of economies of scale and the reduction of initiation costs. Autonomy guarantees that participants are not forced to adapt internal processes to cooperate in the network.

The challenge in adapting SOA principles in the field of innovation management is to limit and describe the services so that they fulfil the principles mentioned. Otherwise, the management approach will not produce the described advantages such as reduced opportunity costs, higher transparency, dynamic resource allocation and increased efficiency.

6.3.5 Use Case: Regional innovation network in the creative industries cluster in Leipzig

Starting situation

The creative industries in greater Leipzig represent an economic factor of 3 to 4 billion and comprise over 4400 companies employing approx. 44,500 people. Altogether this sector accounts for 12 % of the economic value of the city. A study of the situation of the economic participants in this sector was

recently carried out for greater Leipzig (Bentele et al. 2011). The results correspond to those of an earlier study carried out by the German government (Söndermann et al. 2009).

The corporate structure of this sector consists almost exclusively of small and medium-sized businesses (SMEs), with the emphasis particularly on very small firms. Almost 1 in 3 companies are a one-man business. This leads to typical and widespread advantages and disadvantages for medium-sized companies, such as for example a higher degree of flexibility, short reaction times and disadvantages in personnel, financial and technical resources. The sector is also very dynamic. Many companies were newly founded; many of which were dissolved within the critical initial three-year period. In general 4 in 5 of survey participants were satisfied with the location factors, such as cheap rents, a creative working atmosphere and good infrastructure. One point rated negatively by the participants was the promotion of business development. However, the study also showed that only half of the participants were aware of existing promotion possibilities in this field.

Approach to a solution

In order to close the gaps shown, a concept based on the bottom-up innovation model and the SOIM approach for a regional innovation centre must be created, which aims to overcome the SME-specific disadvantages by offering technical resources (e.g. tools for creating a prototype), knowledge (e.g. advice, qualifications) and support in acquiring financial resources[7]. Furthermore, the approach's overall objective is to promote creativity, new ideas and the formation and establishment of new companies. The starting situation requires the development of a new management method and an organisational concept for the innovation centre in Leipzig, as in comparison to comparable procedures in other cities only limited financial resources are available.

The innovative environment in Leipzig comprises various stakeholders who have a large fund of knowledge, competencies, specialist knowledge and technical resources that can be used for the benefit of SMEs. It is important to make this pool of innovative capacity available to SMEs by transferring it into an integrated innovation management approach. With three top universities and various other research institutions, such as two Fraunhofer Institutes, two Max Planck Institutes, a Helmholtz Institute, and countless small research facilities, Leipzig has a broad scientific landscape. Furthermore, many facilities offer different support possibilities, such as e.g. advice and consulting (e.g. the Sparkasse foundation, the SMILE project), and/or the organisation of industry meetings (e.g. Kreatives Leipzig for the creative industries)

The necessary resources are available, but are divided among many stakeholders. This complicates the searchability of available resources and significantly lessens the utilisation of possibilities. For this reason, the primary task of the innovation centre is to make these resources easily accessible to medium-sized companies. The management method require the central registration of all available resources and must allow dynamic and uncomplicated allocation to specific innovative projects. The main aim is the optimum utilisation of existing resources via an active management within an innovation network, led by the innovation centre. A second aim is to identify resources that do not exist in the regional innovation environment and where possible to gradually create and offer them.

7 For further information, see also Thieme and Fähnrich (2011)

Concept for a service-oriented innovation centre in greater Leipzig

The innovation centre shall be established as an independent institution with the help of a streamlined, independent organisation. It will also receive support from so-called service providers and innovation partners. A potential and important service provider is, for example, the Institute for Applied Informatics e.V. (InfAI) with its affiliated chairs. It already has structures, which can be used by the innovation centre, for example, an existing logistics lab or the Sys-Inno-Lab. The function of the service provider is to make his laboratory resources available, which already exist due to research work and group projects.

The innovation partners are to be considered as equal unrelated organisations. These multiple collaborations are organised and coordinated via active cluster management by the innovation centre. The contacts and competencies of all participating innovation partners are catalogued here and transferred to a service matrix. The aim is to hereby identify the required services for all stages of the innovation process and to be able to map them together with

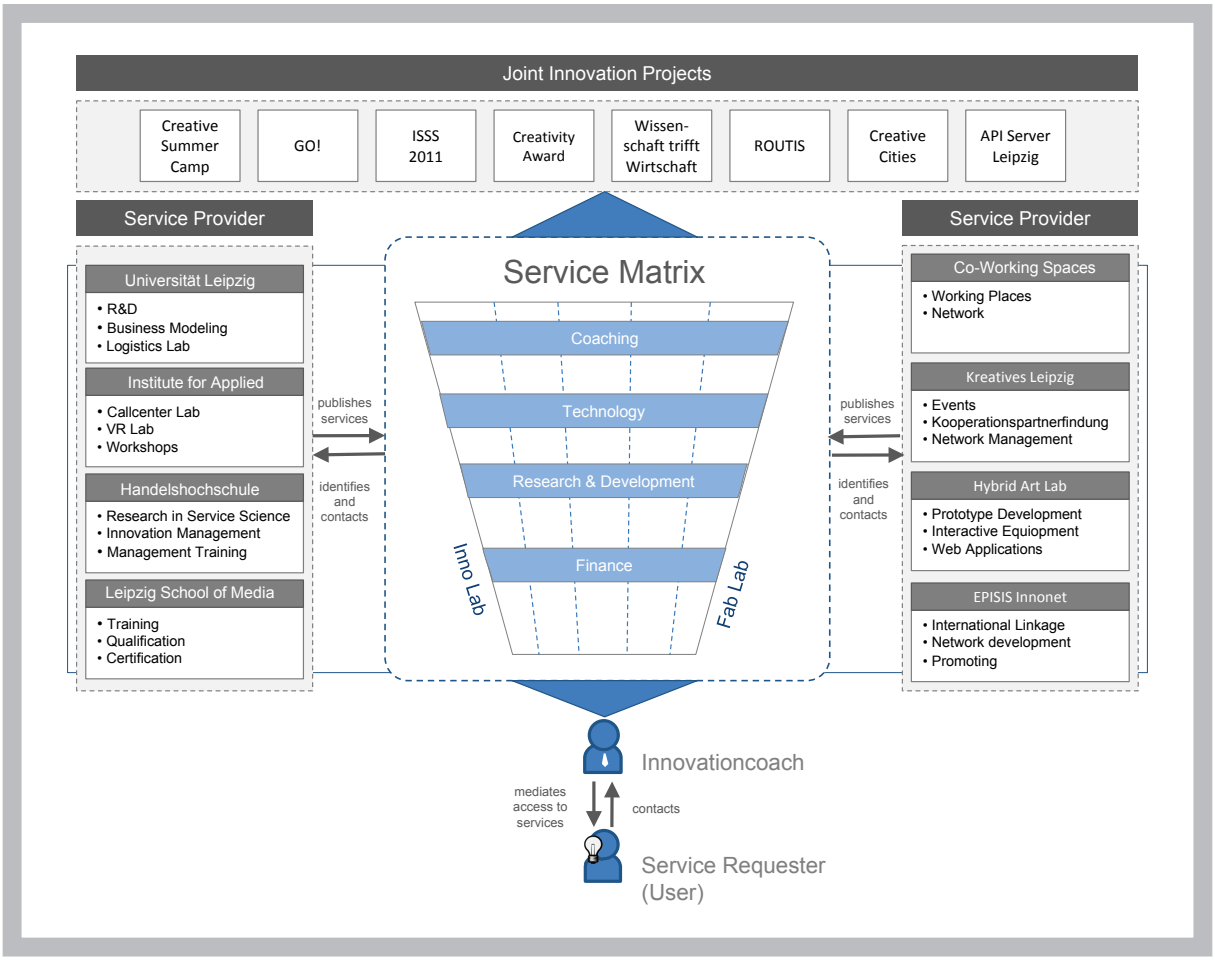


Figure 6.5: Regional innovation network using SOIM, source: Thieme (2011)

the innovation partners. If an important service is not available, this service will be created and offered through the innovation laboratory if financially possible. There would be no new construction of existing resources. The aim is to use available innovation structures and to identify and close existing gaps in the offering.

In the starting stage, suitable collaboration models for the collaborations between innovation partners must be developed, which are mapped by the respective special characteristics of the different services. Win-win situations will be established for all participants with help from appropriate collaboration models. The aim is to simplify communication and reduce communication costs and opportunity costs for initiating innovative projects.

The offer and service portfolios provided by the innovation centre come from the resources, competencies and offers of the collaborating service providers, for example the hybrid art lab or the InfAI. The aim is to map the whole innovation process with the relevant services in one portfolio. For this to work, the innovation laboratory must create and provide its own services in the long-term, which are not covered by the service providers.

Operational support for the "customer" of the laboratory, i.e. innovative persons or companies, is carried out by an innovation coach, who identifies the services required for the implementation of an innovative idea and presents these to the suitable innovation partners with the help of the service matrix. In the next stage, all identified participants are contacted and the innovative project is started. The innovation coach accompanies the innovative project from beginning to end and is the contact person for all participating persons and the mediator in the event of problems.

The Leipzig model consists of two pillars: the "FabLab" component and the "InnoLab" component. The "Innolab" component has a de-centralised structure and mainly helps to allocate human resources (e.g. advice) and link all relevant participants within an innovation network. The "FabLab" component describes mainly the allocation of technical resources to produce prototypes of creative ideas (e.g. 3D printers). The aim is to let the innovation centre continually evolve within both components -"Innovationslabor" and "FabLab" – and to enable new functions through additional services. A further aim is to use resources from funding programmes (e.g. innovation vouchers) to finance joint activities with supported "customers".

6.3.6 Discussion and further projects

The suggested bottom-up innovation model has already been successfully implemented in over fifty innovation projects as part of its development over the last three years and then gradually refined. There is an application-oriented action plan and software support for the model, which can be used as the starting point for individual examination and which are also documented by selected case studies (Meyer and Thieme 2010b).

In conclusion, the successful utilisation of the approach requires high motivation by participants, the desire to implement coupled with the necessary persistence, and clear allocation of tasks and decision-making responsibilities. Further to the motivation of participants, which seems an obvious prerequisite, the ability to rethink is often necessary. It is often a new concept for research institutions to approach SMEs in their environment as described, to make and cultivate corresponding contacts and to act in the long-term as the local innovation centre for the company in the environment of the institution. For SMEs, it is necessary to create a "culture of innovation", which is open to innovations.

Innovations are often associated with insecurities and unforeseen obstacles. Too high expectations and an over-optimistic estimation of one's own possibilities can quickly lead to dissatisfaction with the progress of the innovation project. A difficulty with bottom-up innovation has proved to be that the co-operation with SMEs is often concentrated in one specific person, who must manage the innovative project alongside their day-to-day tasks. This can quickly turn into a bottleneck of decisions to be made and tasks to be completed and it is advisable to set up a suitable project team.

The Use Case described here was presented to possible stakeholders at the forum "Innovation lab in Leipzig: Opportunities, Goals, Limits" during the Creative Summer Camp 2011 and subsequently constructively discussed with all participants. In conclusion, the suggested concept was widely approved by participants. Based on comments made, ten propositions were derived for the implementation and aims of the innovation lab. The next step will be the identification of a subject area for technical support in the "FabLab" component with the help of a competency and needs analysis, which will then be prioritised according to feasibility and potential.

6.4 AXIOS: END-TO-END DECISION SUPPORT TOOL FOR INNOVATION

FREDERIC PONSIGNON, IRENE NG

Introduction

While service innovations are among the critical drivers of competitiveness for service firms, The UK National Endowment for Science, Technology and the Art reports that service firms face a lack of support, expertise, and resources to innovate (2008). It is therefore essential for research to address the following question: how can service organizations improve their innovative capability? Answering this question requires that we first are in a position to conduct good empirical research on service innovation.

Service innovation broadly refers to the development of new services. A new service is often described as an offering not previously available to the firm's customers that results from either a change to the current portfolio of service features or from changes made to the delivery process (Menor and Roth 2007, Ordanini and Parasuraman 2011). This definition reflects both service package and service delivery system innovations. Since the literature has broadly discussed the need to align the service package with the design of the service delivery system (Roth and Menor 2003), service innovation research should focus on studying these interrelated concepts in an integrated way.

Academic exploration of the service package has traditionally been the domain of the marketing discipline, whereas the design and management of the process through which the service package is delivered has been the responsibility of operations management. Fragmented service research has typically focused on either the package or process elements of service (Cook, Goh et al. 1999). With research existing within disciplinary silos, conducting research to drive service innovation is challenging. The dominance of a silo-oriented perspective impedes the development of service innovation research which is constrained by disciplinary boundaries. This calls for the marketing and operations disciplines to interact and integrate to offer meaningful insights into service innovation issues. To bridge the gap, service innovation research should focus on the link between service package design and service system design and should take into account both marketing-oriented and operations-oriented aspects of service.

We illustrate how this can be done in practice by reporting on a joint research project carried out by our team of marketing and operations scholars who worked together on an 18-month long service innovation research project. The case organization is a leading UK equipment-based manufacturer that has been offering a range of services for several years to respond to changing customer requirements. The organization's competitiveness is heavily dependent on its ability to continuously add new service elements into the product-service offering whilst maintaining operational efficiency.

The research project

The objectives of the project were twofold. First, the project aimed to investigate the interactions between the service package, customer value, and the resources and process costs of delivery to provide a visualization of the organization's current capacity to deliver customer value. Second, from the results of this investigation, the project sought to build an end-to-end decision support tool, referred to as Axios, that enables firms to understand the economic value of innovations from the perspective of both the service package and the delivery process. The tool links customer preferences for the features of the service package to delivery processes, resource

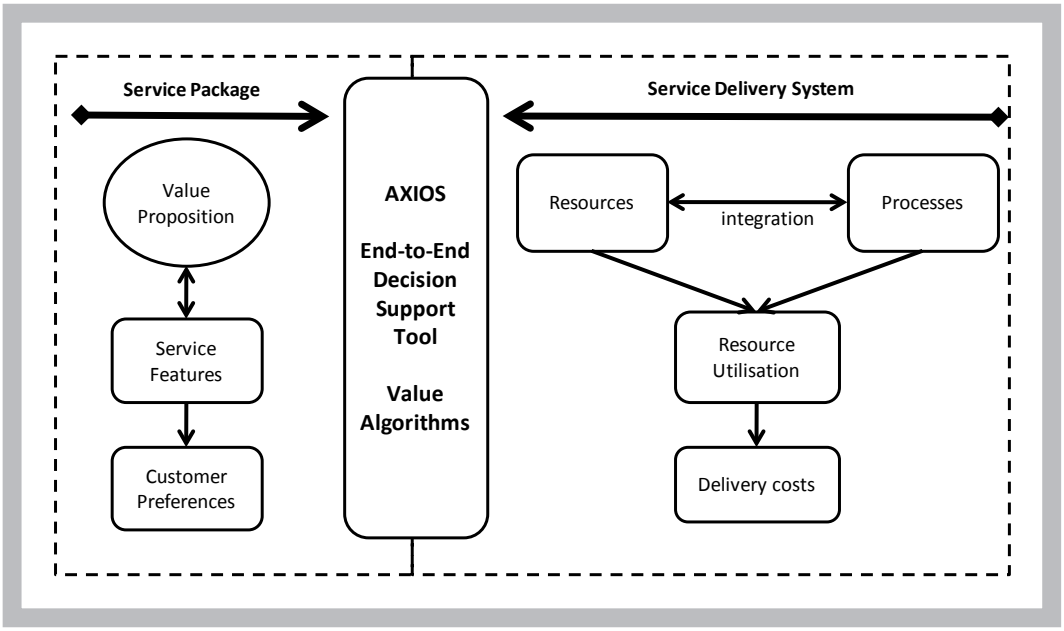


Figure 6.6: Conceptual model

utilization, and costs through value algorithms. Axios helps firms to evaluate what innovations can be effective or efficient in delivering value to customers. Figure 6.6 shows the conceptual model underpinning the research and the development of the tool.

The project was divided into three work streams, namely "customer", "process", and "tool". We report on each individual work stream separately below.

"Customer" work stream

First, the marketing team determined the nature of service value, the features of the service package that deliver value to the customer, and measured customer preferences for each individual feature of the service package. Using interviews with staff and customers and review of company documentation, the features (i.e. attributes) of service value were characterized. The team then measured the perceptions of the customer community on the basis of these value attributes and the trade-offs between them. In a Customer Value Survey, six individual customers were shown a controlled set of potential service attribute packages. Respondents were asked to evaluate and choose between potential service packages rather than to simply select preferred attributes; this is considered a more realistic choice situation. Each package was constituted by multiple conjoined service attributes. The resulting conjoint (trade-off) analysis measured the individual customer's perceived value of these service attributes. The implicit valuation of the individual service attributes was determined by focusing on how each customer makes preferences between the proposed service packages. These implicit valuations were used to build a model of customer preference, including associated sensitivity of individual and bundled service attributes. This enabled us to determine the extent to which changes to the package result in value gains or losses for the customer and to determine what combination of attributes is most influential on customer choice and decision-making.

"Process" work stream

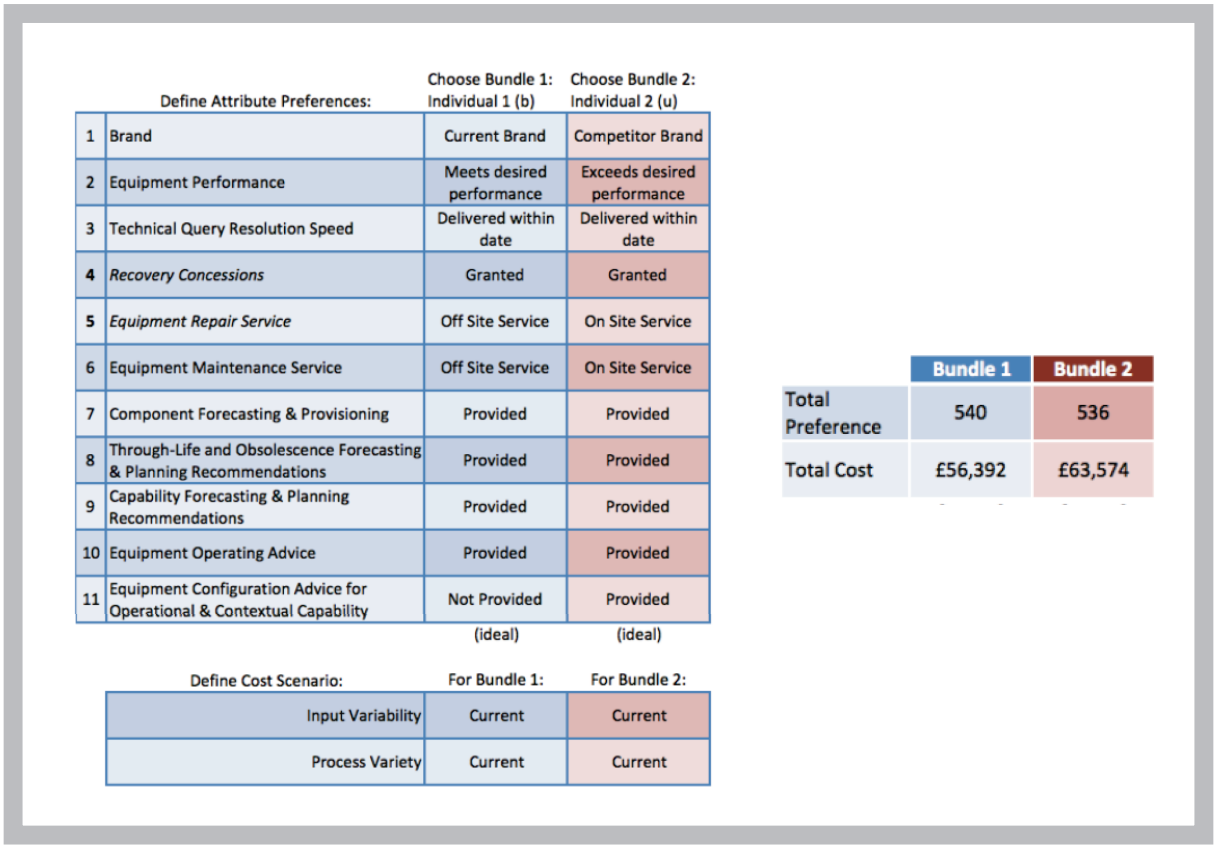
Second, the operations work stream addressed the organization's capacity to deliver the service features to the customer. Using interview data, documentary evidence, and service time and cost data, process models and simulation models were built to estimate resource consumption and delivery costs. Various scenarios were set up to visualize the impact of process changes on total delivery costs.

"Tool" work stream

Third, a demonstrator of the Axios decision support tool was built and populated with the results obtained from the marketing and operations work streams. Value algorithms were applied onto the results to link the value embodied in the service package to the costs of delivering the package. Axios offers an integrated, end-to-end view of the organization's capacity to deliver customer value.

The role of Axios in supporting service innovation decisions

Axios enables firms to better understand the potential economic value of service innovation and to undertake service innovation initiatives from a customer value perspective. Figure 6.7 provides a first illustration of how Axios can help service innovation decisions. By manipulating the features (i.e. attributes) that constitute the service package, it is possi-



	Define Attribute Preferences:	Choose Bundle 1: Individual 1 (b)	Choose Bundle 2: Individual 2 (u)
1	Brand	Current Brand	Competitor Brand
2	Equipment Performance	Meets desired performance	Exceeds desired performance
3	Technical Query Resolution Speed	Delivered within date	Delivered within date
4	*Recovery Concessions*	Granted	Granted
5	*Equipment Repair Service*	Off Site Service	On Site Service
6	Equipment Maintenance Service	Off Site Service	On Site Service
7	Component Forecasting & Provisioning	Provided	Provided
8	Through-Life and Obsolescence Forecasting & Planning Recommendations	Provided	Provided
9	Capability Forecasting & Planning Recommendations	Provided	Provided
10	Equipment Operating Advice	Provided	Provided
11	Equipment Configuration Advice for Operational & Contextual Capability	Not Provided	Provided
		(ideal)	(ideal)

Define Cost Scenario:	For Bundle 1:	For Bundle 2:
Input Variability	Current	Current
Process Variety	Current	Current

	Bundle 1	Bundle 2
Total Preference	540	536
Total Cost	£56,392	£63,574

Figure 6.7: Assessing the value of different packages against delivery costs

ble to visualize the customer value, represented by a total preference score, attached to each service package. The process costs of delivering that value are automatically calculated and displayed as total costs. By allowing the comparison of customer preferences and their impact on costs for one customer or between customers, Axios helps the service organization to offer the right combination of service elements to each customer.

Furthermore, Figure 6.8 shows how the customer value and service package information analysed by the marketing team and the process and costs information provided by the operations team are integrated into an end-to-end analysis. Axios recommends an optimal service package that maximizes both customer value and process efficiency. It informs service innovation decisions by showing the ideal service package from the perspective of both the customer and the organization. The ideal package is situated in the E2E Recommended column. It represents the most effective (i.e. highest customer value) and most efficient (i.e. lowest service delivery costs) service offering. In this example, Axios indicates that the organization would lose £40,209 in revenue if it decided to remove the feature "Technical Query Resolution Speed" from the service package. The snapshot shows that altering the package would generate a preference loss of 47 % for the customer. This measure shows that the customer is very sensitive to this particular feature. The juxtaposed Loss figure is directly connected to the prefer-

Customer Heterogeneity (interacts with bundled preference loss)	
Overall	6%
Buy-leaning	6%
Use-leaning	1%

CLIENT	
CONTRACT	
ANNUAL CONTRACT	£86,000

	Attributes	EFF Ideal	E2E tradeoff - REVENUES & COSTS APL	Loss	Gains	%	Net	E2E RECOMMENDED	Notes
	Bundled Preference Loss	-12%						-15%	
	Annual Costs	£63,574.32						£33,466	
1	Brand	Current Brand	-23%	-£19,759		0%	-£19,759	Current Brand	No Costs Provided
2	Equipment Performance	Equal to desired	-33%	-£28,633		0%	-£28,633	Equal to Desired	No Costs Provided
3	Technical Query Resolution Speed	Delivered within date	-47%	-£40,209	£453	1%	-£39,757	Delivered within date	
4	Recovery Concessions	Provided	-34%	-£29,442	£12,174	19%	-£17,268	Provided	
5	Equipment Repair Service	Offsite	-17%	-£14,456		0%	-£14,456	Offsite	No Costs Provided
6	Equipment Maintenance Service	Offsite	-16%	-£13,587		0%	-£13,587	Offsite	No Costs Provided
7	Component Forecasting & Provisioning	Provided	-7%	-£6,322	£14,545	23%	£8,223	Not Provided	
8	Through-Life and Obsolescence Forecasting & Planning Recommendations	Provided	-13%	-£11,221	£8,452	13%	-£2,769	Provided	
9	Capability Forecasting & Planning Recommendations	Provided	-3%	-£2,945	£6,609	10%	£3,664	Not Provided	
10	Equipment Operating Advice	Provided	-10%	-£8,200	£8,955	14%	£755	Not Provided	
11	Equipment Configuration Advice for Operational and contextual Capability	Provided	-11%	-£9,342	£7,182	11%	-£2,160	Provided	

Figure 6.8: Analysis of customer value and service package information

ence loss (APL). It expresses the loss in revenue that would result from the change, £40k in this example. The Gains column is a measure of the cost savings that would result from this change. In this example, cost savings of £453 would be achieved. The Net column provides the marginal revenue associated with the change. It represents the difference between revenue loss and cost savings. Recommendations of which features to offer to create the most effective and efficient service package, are based on the marginal revenue obtained for each feature. Conversely, in this example, Axios would recommend that three changes be made to the service package. The features "Component Forecasting and Provisioning", "Capability Forecasting and Planning Recommendations", and "Equipment Operating Advice" should not be included in the package because the costs of delivering each feature outweighs the value created for the customer.

Overall, Axios facilitates the visualization of the effects of changes to the service package on customer value and on the service delivery system costs. Concerning service package innovations, Axios informs decision-making on customer segmentation, the features that should be included or excluded, and on pricing. Furthermore, Axios enables organizations to focus attention on the processes that deliver value for improvement initiatives. In other words, service process innovation begins with consideration of customer value and aims to make the service delivery process more effective in meeting customer requirements. Such a value-based perspective on service innovation represents a major shift in mindset for most organizations that have traditionally relied on efficiency-driven business improvement programs.

Conclusion

To conclude, this paper has argued that service innovation research should bridge the gap between operations and marketing. This involves carefully examining the effects of service innovation both in terms of marketing- and operations-oriented dimensions and their necessary interactions and integration. Against this background, we have reflected on a research project on service innovation that was recently completed by our multi-disciplinary team of marketing and operations academics. We hope that this will encourage service scholars to increasingly engage in cross-functional collaboration to advance service innovation knowledge.

6.5 INNOVATION BARRIERS TO GERMAN INTEGRATED HEALTHCARE

LILIA WAEHLERT, HANS CZAP

Models of integrated healthcare address provision of medical care along clinical treatment procedures. Usually, these procedures combine treatments of different healthcare sectors, i.e. ambulant and clinical care as well as medical rehabilitation. In general, there are high levels of agreements emphasizing the advantage of integrated care against the traditional sector-bounded treatments. Nevertheless, besides the obvious advantages, different studies show a very low usage of integrated care. This study addresses the discrepancies between expectations and reality providing empirically based arguments showing barriers to cooperation in healthcare.

6.5.1 Background and Specifics of Cooperation in German Healthcare

Any patient having medical problems usually consults a general physician. After first examinations and in the case of a disease requiring clinical treatment he will be admitted to a hospital. The hospital, in general, will redo some of the examinations since accompanying documentation is not complete, does not suffice the usual quality standards of the hospital or elapsed time requires it. Similar problems arise if the patient is placed to rehabilitation.

Models of integrated healthcare address these problems by concentrating on the general accepted medical procedures related to a specific diagnose. They intend to optimize quality of treatment and, simultaneously, to avoid duplicated or unnecessary medical treatment steps. In so far integrated healthcare is seen as mean to optimize coordination of medical care across the different sectors, to reduce overall costs of treatment and improving medical quality (Von Schulenburg 2007, Güssow 2007, Eckardt 2006).[8]

Indeed, cost management of medical treatment turned out to be a serious challenge. Age of population in Germany in the mean is increasing, thus requiring more and more medical care. For example, costs per treatment case in Germany rose from 2.567 € (1991) to 3.519 € (2007, Statistisches Bundesamt 2008). Government tries to counter by regulations for the refunding of regular hospitals, rehabilitation and practicing physicians. As a consequence, there is substantial pressure reducing costs for treatment within each medical care provider. For example, 56,4 % of all hospitals expect losses for the year 2010 (Blum and Offermanns 2010) and 24 % of all rehabilitation hospitals are – according to the Reha-Rating-Report – acutely at risk (Augurzky, Krolop, Lemm, Schmidt et al. 2009).

Hospitals in Germany are paid by a diagnosis related flat-rate-system, called DRG.[9] Thus, regardless of the actual effort to fulfil the necessary treatments, the hospital gets a fixed rate which mainly depends on the diagnosis alone. As a consequence, any hospital having only low case numbers for a specific diagnosis are at risk that refunding does not cover costs. As a consequence, management is eager to increase case numbers. In doing so, hospitals establish medical care centres thus penetrating into the

8 Since 2004 the German legislature allows cooperation between healthcare providers across sectoral boundaries (Henke and Göpffarth 2010, p. 11 f.).

9 The German DRG-System is described in Thiex-Kreye and von Collas (2005). The tendency to pay flat-rates can be observed in other sectors too. For example, in the ambulant sector was introduced the EBM plus which is based on a flat-rate for medical services (without author 2009). For rehabilitation a DRG-like System is under discussion. See for example Fuchs 2004.

ambulatory sector (vertical cooperation).[10] Horizontal forms of cooperation also increase, i.e. mergers & acquisitions became very often.[11]

Nevertheless, concentration on case numbers alone does not provide a convincing strategy for survival in the long run. Since patients use their possibilities to get information about quality of medical service providers, management should concentrate on areas with superior quality and sufficient returns and outsource the less interesting ones. Clearly, in the short run hospitals are committed to treat every disease, but in the longer run, for example by cooperation, they have the possibility to reduce not interesting treatments and increase the other ones. Integrated healthcare models offer the possibility for this strategic positioning. As explained above, integrated healthcare models establish cooperation between different medical care providers. Usually they are bounded to specific diseases, where each partner concentrates on those treatment steps where he provides superior quality. This requires organizational, technical and informational innovation processes. Specifically, one needs an integrated patient health record system to provide medical data online, a cost accounting system to monitor costs of treatment steps and a management system for planning and controlling the clinical path across different sectors.

Although cooperation offers promising effects on healthcare problems, reality shows a different picture. The survey of the German Hospital Institute documents that just a third of all German hospitals join integrated care structures and that the participation rate is declining (Blum and Offermanns 2009). Based on an empirical study this paper, therefore, examines the reasons of this discrepancy and discusses them in the light of German healthcare specifics.

6.5.2 Empirical results: cooperation and innovation barriers

The study involved seven service providers from all sectors. Most participants were drawn from rehabilitation.[12] Accordingly, four of the participating houses have 201 to 500 beds (hospital: over 500 beds; 1 rehabilitation clinic: under 201 beds; 1 participant from ambulant care: without beds). Interview partners were experts from business management or controlling. Research question was the evaluation of the current and future significance and role of integrated care cooperation of participants from all three sectors. The experts were asked to evaluate given items of the following areas:

1. Status quo of Integrated Care Cooperation (IC-Cooperation)
2. How do you evaluate IC-Cooperation in principle?
3. How far fulfil IC-Cooperation the aims and expectations and what were the reasons to participate IC-Cooperation?
4. What problems and barriers do you see which impede IC-Cooperation?

Figure 6.9 presents information about evaluation of IC-Cooperation in principle as well as future and current status quo.

Looking at the economical contribution of IC-Cooperation the financial impact is valuated especially in

10 By a study of "Krankenhaus Barometer" nearly 25 % of hospitals established medical care centres during 2010. These centres combine statutory health insurance physicians of different disciplines (Blum and Offermanns 2010).

11 Blum and Offermanns 2010, p. 97 f.; Statistisches Bundesamt 2010, table 1.1 demonstrates a reduction from 2411 hospitals in 1991 to 2081 hospitals in 2008.

12 Rehabilitation: 5 participants, hospital: 1 participant, ambulant care: 1 participant.

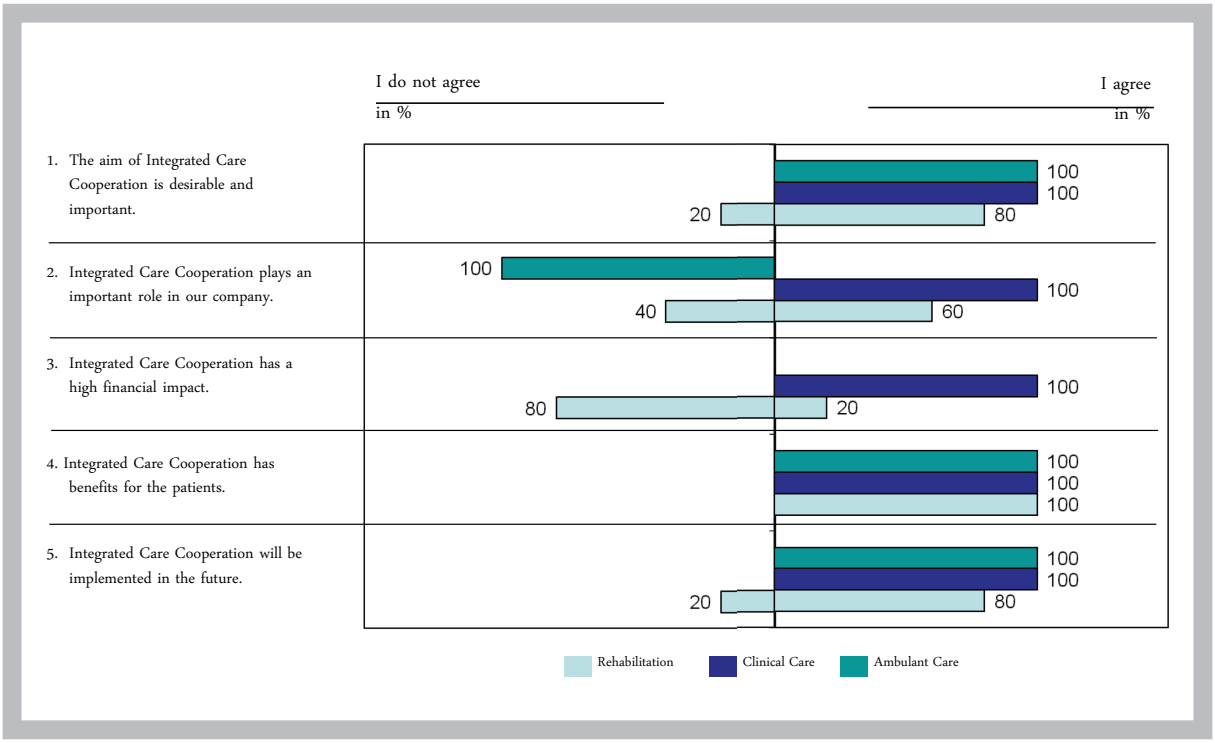


Figure 6.9: Status Quo and evaluation of Integrated Care Cooperation

the rehabilitation area rather low. This negative evaluation can be explained by the fact that rehabilitation houses are paid on a daily rate. This reimbursement scheme does not offer any stimulus to participate in IC-Cooperation. In the case of hospitals integrated care models offers a chance to generate extra profit outside the budget and thus can explain the positive evaluation of the financial impact. But looking at the current share of total revenue volume the financial impact of IC-Cooperation shows minor effects across all sectors (cf. Table 6.2):

The results of figure 6.9 also show importance of IC-Cooperation is judged very differently (question 2). Combining question 1 and 5 this ambivalence results from the fact that participants in principle expect great potential from cooperation but under the given circumstances IC-Cooperation evaluates as being problematic. This confirms the noted gap between theoretical advantages of IC-Cooperation and practical use.

Sector	Number of service providers		
	low	average	high
rehabilitation	4	1	0
clinical care	1	0	0
ambulant care	1	0	0

Table 6.2:
Share of total revenue volume

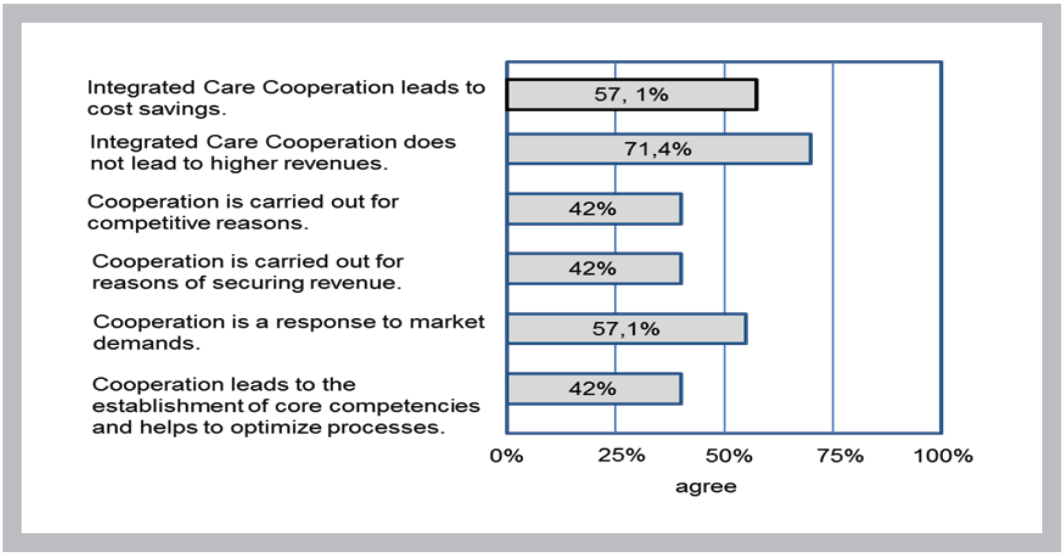


Figure 6.10: Aims and expectations of Integrated Care Cooperation

All participants agree that cooperation leads to benefits for the patient. The desired aim of better patient care, therefore, is verified.

In summary, cooperation and partnerships in principle are seen positively, especially with respect to the patient. But due to missing financial incentives current IC-Cooperation is evaluated negatively.

These results are consistent with the answers to question 3 (How far fulfil IC-Cooperation the aims and expectations and what were the reasons to participate IC-Cooperation?, see figure 6.10),

More than 71 % quote IC-Cooperation not leading to more profit. Therefore, the main reason to join an IC-model can be seen as a reaction to external, market-based requirements. Cost savings, assurance of revenues and optimization of processes are valued equally.

The rather positive evaluation of the importance of cooperation in healthcare is confronted with the expression of reservations which prevent cooperation (question 4). In particular, the respondents cited the fear of financial losses, a lack of trust between possible partners, structural barriers (for example technological or organizational barriers) and the necessary effort for the implementation of cooperation agreements as the most important barriers. These are the most important arguments contributed by the providers of healthcare services judging IC-Cooperation problematically.

6.5.3 Conclusions for the design of cooperation processes

Although the study is limited with regard to the representativeness, it provides some interesting results that might help to understand why IC-Cooperation is of minor interest in German Healthcare. The study shows that there are a lot of different barriers to cooperation processes. Although all participants see positive effects of partnerships and Integrated Care Structures, IC-Cooperation is evaluated critically as soon as current situation and personal interests are

involved. Especially, lack of financial impacts seems to be the most important issue preventing IC-Cooperation. Along with the expressed reservations missing financial attractiveness leads to a consolidation of objections rather than encouraging cooperation. Therefore, it's of vital importance to put up the right incentives. Appropriate cost- and activity accounting concepts are a prerequisite. Mainly, because of service providers need to know which treatments generate profits and which don't. As soon, as one can show that cooperation leads to economical advantages, more service providers will take this chance. Simultaneously to the financial aspects of cooperation efforts have to be undertaken to overcome the cited structural, organizational and personal, trust-related barriers. Implementation of cross-sectoral information systems for planning and controlling clinical pathways (Hellmann 2002, Eckardt and Sens 2006), an issue currently discussed in science and practice, will offer a substantial step to overcome sectoral bounds and to support the necessary holistic perspective.

7 OUTLOOK AND RECOMMENDATIONS

THOMAS BURGER, PETER HOTTUM,
ROBERT LORENZ, THOMAS MEIREN, ANDREAS NEUS,
KATHRIN SCHNALZER, CARSTEN SCHULTZ

7.1 DEVELOPMENT AND MODIFICATION REQUIREMENTS IN THE FIELDS OF APPLICATION

The third area on which the study focused (in addition to innovation patterns, barriers and the use made of methods in service innovation) was determining recommendations for action.

Industrial services

Development and modification requirements in the field of industrial services arise from the need to use innovative and high-quality services to generate revenue in addition to product business, to use these services to create a clear competitive profile and to meet the demands inherent in increasing internationalization. Against this background the workshop participants identified the following requirements:

- Processing and transfer of existing knowledge:
  Practicable methods and tool kits, including guides and tools, should be provided. The creation and realignment of web-based platforms (such as DL2100.de) are also considered an appropriate way of making current research findings and practical application examples available to a large number of companies. The workshop participants would also like to see much greater consolidation of existing research knowledge and its presentation in a "language" which can be used and understood in practice.

- Study of the impact mechanisms of new services:
  The practitioners taking part in the workshops articulated the need for suitable methods of measuring the impact of service innovations in order to make the successes of service innovations more transparent internally. There is a lack of concepts and methods of evaluating the benefits offered by new and innovative service concepts, particularly in the field of product-related services.

- Intercultural service management:
  As industrial service providers have a strong presence on international markets, methods for designing interculturally modifiable and divergent service offerings are required. Participants also expressed the wish for pragmatic resources such as guides, methods and tool kits as well as application examples in this field.

- Business models:
  The company experts taking part in the workshop believe that there is a special need – under the heading of "business models" – for methods of measuring, valuing and controlling services as well as for methods of designing price and revenue models for services.

Information-based services

Development and modification requirements in the area of information-based services arise from four different perspectives: firstly, from rapid technological developments which pose challenges to the adaptability and responsiveness of the affected organizational structures, processes and technologies; secondly, from the changing role of the customer, from a passive "consumer" to an active and well informed "prosumer" (Toffler, 1980); thirdly, from the changes in business models produced by new providers and the trend towards disintermediation; and fourthly, from the challenges which the speed of change poses to the flexibility of corporate cultures and the behaviour of employees and customers.

The business models and value chains of many companies operating in the field of information-based services – some of which are several hundred years old – are currently being called into question. The need for development and modification is apparent along the four perspectives described here as follows:

- Adaptability of established structures:
  Methods which support flexibility and innovation in companies while helping to outcome typical challenges. In the workshops the experts emphasized the cannibalization of core business, overcoming established silo structures and the improvement of communication within the company and with partners in particular.

- The metamorphosis of the customer into a "prosumer":
  Methods which improve understanding of changes in customer behaviour, which improve the involvement of the customer in the company's value chain, and which support dialogue with the customer as part of an "open innovation" approach.

- Changes in business models:
  Better understanding of the interplay of innovation and business models by employing a common terminology and, where appropriate, formal modelling opportunities for business models, as well as methods for the development, testing and scaling of new business models.

- Changes in corporate culture:
  Pragmatic methods for the analysis of corporate culture in relation to a spirit of innovation and practice-oriented interventions. A better understanding is required of the conflict between risk-averse structures and the willingness to take risk on which innovation depends. Additionally, new approaches to the coordination of innovation projects on the basis of open project structures of the kind which have been used so successfully in the context of open-source software, for example.

Health services

In addition to medical services in the strictest sense, it is services and service-oriented structures which have the most profound impact on the efficiency and quality of health services. Problems coordinating cross-sector care, for example, are addressed by service research on user integration, process design and the development of new business models. What is more, aging societies with growing numbers of chronically multimorbid patients are particularly dependent on the development of holistic, long-term service models which cover the entire value chain from prevention through to palliative care. The systematic development and introduction of new services and processes (such as by involving patients and external players, or by means of professional innovation management), the introduction of benchmarks and service standards in hospitals, the systematic design of health networks and the changes

in service quality brought about by new technologies and care concepts are all important fields of development and modification for service research. These are especially apparent in the following areas:

- Enhancing the innovation capability of the service provider and, as a result, of the probability of the new services being successful on the primary and secondary health markets by developing, evaluating and providing training in suitable change and innovation management approaches, methods for the interactive integration of patients and other players in the innovation process, methods for an improved transfer of results from concepts developed in pilot projects to other fields of health and service providers as well as methods for the integrated analysis of value adding processes in the health market and within individual service-providing organizations.

- Transforming personal service work in the health system by means of new cross-sector and cross-functional integrated care structures, by developing target group-specific health services, taking account of divergent requirements and the interplay between the primary and secondary health market, as well as through the supported development of new interdisciplinary career paths.

- Extending the potential of hybrid products in the health sector by developing service-specific ways of using and benefiting from new technologies, particularly in the framework of an increasing convergence between the health sector and other markets – from "ambient assisted living" solutions[13] in the home living field through to innovative forms of pharmaceutical services and the individual packaging of medication for individual patients.

7.2 RECOMMENDATIONS RELEVANT TO THE NEED TO DEVELOP AND MODIFY METHODS

In addition to requirements which are specific to particular fields of application, general recommendations also apply to service research. These have been collated and categorized in the following three fields:

- The methodological foundations of service research,
- the need to develop methods specific to services,
- the transfer of methods into practice.

The recommended action in response to the need to develop and modify methods is presented in detail in the following.

The methodological foundations of service research

The empirical foundations of service research
The characteristics, challenges and impact on success of service innovations have not yet been described in a standardized form, nor have they been subject to in-depth empirical studies – this state of affairs is reported by both scientists and practitioners. As a result there are substantial deficits in the transfer of knowledge from academia to the real world, in which services are provided, as well as between different companies. This is due to the absence of either a consistent nomenclature or a generally recognized catalogue of requirements for the application of methods. The inability to demonstrate the successful benefits of methods and methodological systems would seem to be a particularly serious deficit. Although measuring benefits is ex-

13 "Ambient assisted living" (AAL) is a generic term for concepts, products and services which combine and improve new technologies and social settings with the aim of improving the quality of life enjoyed by people of all ages.

tremely complex, it is an essential prerequisite for achieving acceptance in the practice field. The success or failure of innovation methods often only becomes apparent a considerable time after measures have been taken (this might be several years after a service has been launched on the market) when their impact may be manifested at different levels of the company. The learning effects of improvements in a specific innovation project may, for example, have a positive impact on the success of service portfolios even if the actual project itself is not particularly successful. Services in the framework of hybrid products in particular can only be ultimately assessed in the overall context of the value system. The impact of the method also depends crucially on context. The dominant innovation pattern in each case (type of service, type of process and degree of innovation) determines the relevance of methods and how successful they are. Finally, there is a complex interplay between the action taken by individual employees, the project work and activities at the company level: each of these factors are addressed by specific methods and, taken as a whole, have an impact in their turn on the success of a method. The methods used successfully in innovation-oriented service companies are likely different from those which are successful in more conservative organizations. Future research and development should therefore help to ensure that methods are relevant and effective for evidence-based management. In line with current trends in international innovation research (Gupta et al., 2007) empirical studies should focus on longitudinal and multi-level analyses. Long-term effects are identified with the aid of longitudinal analyses. In contrast, multi-level analyses show the interactions which take place between different company levels and – as a result – methods. The heterogeneity of the service sector must also be taken into account in the sample to be able to analyse the influence of different innovation patterns on the method used.

Development of service-specific methods

The study clearly showed that, to date, very few methods have been developed and used in the framework of service innovation in particular. Practitioners tend to make do with methods established in other innovation-relevant disciplines such as product and software development. This may be successful, depending on the type of service. However, success does depend on adapting methods in advance and also entails the danger that areas which are especially important for many services, such as the interaction between customers and employees, are not dealt with in sufficient depth. This is regarded as a shortcoming by the participating experts from science and business, who consequently believe that much more work should go into developing methods which are specific to services. This is above all the task of scientists, given that only very few large enterprises have the resources which are needed to develop their own methods and the broad mass of companies simply does not have the requisite specialist know-how. Joint projects offer an appropriate launch pad for the development of service-specific methods, particularly joint projects in which methods could be developed by the scientific partners with the participating companies taking on the job of testing the methods out in practice.

The development of methods as a specific task of service research and science

A comparison of the methods considered with the cited barrier clusters clearly shows it is not possible to overcome barriers only using methods derived from existing disciplines. Specific core competences and independently developed methods must be developed for services – drawing at the same time on related disciplines – in order to advance beyond previous product-oriented approaches (paradigms). An independent service science discipline would not only enable service companies to rectify these methodological deficits, it would also create new professional career structures.

The need for new service-specific methods

Methods for improving innovation culture
Cultural barriers were considered particularly relevant in all the workshops. This suggests that there is an acute need for methods which help companies to surmount these barriers successfully. In particular, corporate culture – in the context of willingness to accept the risks inherent in innovations – and cultural obstacles to change were both identified as important barriers. In these instances methods and procedures must be developed which increase readiness to accept risk and to experiment as well as to support the willingness to change. Incentive systems – such as empowering employees by supporting entrepreneurial or intrepreneurial activities right through to market launch – should be basic pillars of a company's internal innovation culture. Although these objectives are regarded – both in the applicable literature and by the experts – as the key to an organization's innovative ability, practice-relevant methods for improving innovation culture are not available to date.

Methods for shaping interactions and emotions
There is a need for instruments which can be used to analyse requirements in relation to emotional and interaction work. Existing services must be analysed in terms of content and scale of requirements. In the concept development phase there is a lack of methods which facilitate modelling of the service process with the associated interaction sequences and requirements for work on emotions. The development of a formal modelling language may permit using existing process design instruments. The identified need for work on emotion should be linked methodologically to a competence strategy which ensures that the required competences are always available as required. In the case of "servicescape" design, i.e. spatial settings, there is a lack of methodological support with regard to the influence fittings and ambiance can have on interactions. It should be possible to simulate key interaction stimuli and to systematically test their behavioural effects. When implementing service innovations the spotlight is on the support which methods offer customer development for new forms of interaction. The evaluation of the linking up of virtual and real services is a second field of action in this phase. A third is the development of standardized test procedures for new services in virtual worlds or with virtual interaction partners. The methodological development work required for the market launch phase concerns the development of performance criteria for good interaction work. Solutions to meet these requirements can be developed through approaches involving service design and service laboratories.

Modelling and simulation of services
While the creation of models, and consequently modelling and simulation, are important elements in the development of goods and software, this aspect – with a handful of exceptions – has been largely neglected in the service field. The expert workshops carried out as part of the study, and the accompanying work, both show that there is great potential available in these areas, however. This applies to the development of fundamental models and description languages for services or, at least, to selected service domains (such as specific branches of business or industry). On this basis a modelling and simulation process could be developed for services which would provide systematic support for the conception, implementation and testing of new services analogous to the support provided in other fields by CAD or CASE tools. The setting up of service laboratories and the integration of new methodological approaches such as virtual reality for services, service games or service theatre, would also allow consideration of features which are highly specific to services.

Methods for the "co-creation of value"
Models which focus solely on customers' role as consumers fail to do justice to the reality of service delivery, which increasingly take place in service systems with several involved parties (Spohrer et al. 2008). Added value is generated in collaboration with the customer and partners and this, in turn, depends on methods which motivate and help participants to co-create value. The barriers identified in this context included the lack of support for collaboration – in the form of established methods, processes and technology for the co-creation of value from innovation (open innovation) through to the exploitation of deliverables. The current lack of experience with joint rights to service deliverables generates uncertainty, which limits the use and capture of value by all those involved. Developing appropriate methods and concepts for the co-creation of value might enable customers to be involved more intensively in the innovation cycle and in service delivery.

Governance, organization and processes
The maturity level of innovation management and the use of methods by service companies are on the whole both very low and noticeably lower than in classic industrial firms. Services' R & D lacks a specifically service-oriented stance. The spectrum of topics extends from the influence of various fundamental strategic orientations and leadership styles through to the impact of incentive systems and the effects of portfolio and project management on the success of service innovations. Starting from the lack of institutionalized R & D units, attention must be concentrated on the development of both formal and informal organizational approaches which ensure that responsibilities and roles are assigned by service providers as required. As well as establishing a temporary project organization it is also important to find, encourage and commit proponents in service companies. Service-specific methods must be developed along the innovation process. Such methods must, for example, help companies to elaborate and execute strategies and enable them to establish cross-functional coordination between players who occupy different professional roles and who operate at different locations. The objective must be to develop a method system which maps the interaction between corporate strategy, innovation portfolio and the contribution to innovation made by individual employees but which can, at the same time, be dynamically modified to meet the evolving requirements of the company and its environment. The focus is less on the development of specific methods than it is on their integration in an all-round innovation system. The development of suitable organizational mechanisms becomes more and more relevant as services become increasingly complex. The issues touched upon in the context of cross-provider service networks in particular are not clear as it is almost impossible to draw on an established operational, formal organization and as partners' generally diverging interests and backgrounds also tend to impede innovation processes.

The transfer of methods into practice

Research on the adoption and implementation of methods
Innovation methods are tools which only develop their true impact in the hands of companies. The failure to implement methods in practice has met with a great deal of criticism in recent years, not least considering the consistency with which innovations prove to be unsuccessful in practice. In this respect transfer between researchers and practitioners plays just as much a role as transfers between companies or even within a single company. Methods are management and process innovations which – according to Rogers (2003) – are adopted in "knowledge", "persuasion", "decision", "implementation" and "confirmation" phases. Suitable instruments must be used in relevant companies accordingly to make such transfers transparent and to

underline their benefits. Professional development, coaching and mentoring programs must also be developed in order to communicate the skills needed to use methods and in order to adapt standardized methods to company-specific conditions. Management training is particularly important as managers must create the structural, cultural and strategic conditions which are needed before methods can be put to effective use in the company. Fundamentally this entails imparting management knowledge which is geared to innovation and transformation. Finally, methods will only be adopted in the long term if their costs and benefits are plain for all to see. For this reason methods must be evaluated internally and/or externally over a period of time. The organizational learning processes which accompany the adoption of management innovations require systematic methodological support which in its turn creates the need for research and development (Zahra and George, 2002).

Collaboration between researchers and practitioners
The business representatives taking part in the workshops clearly expressed the view that the framework within which they collaborate with the academic world needs to be improved. One of the main wishes expressed in the workshops was that scientists should express the findings of their research work in a consistent language which can be understood by non-academics. The inconsistent use of terms which carry different meanings in different disciplines makes it very difficult for practitioners and researchers to engage in meaningful discussions, particularly across the boundaries of different disciplines. The creation of a scientific theoretical framework for the description of service innovations and the development of a common vocabulary are therefore appropriate objectives for successful collaboration between science and practice.

The issues described by the participants highlighted the deficits in collaboration between service companies and research institutions. Such joint enterprise, to the extent that it occurs at all, is primarily of a bilateral nature, in contrast to product-oriented companies which often work very closely with university departments. In conclusion, therefore, cooperation networks need to be established between service providers and research institutions which will enable synergies to be exploited.

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9 PROFILES OF THE PARTICIPATING INSTITUTES

Fraunhofer Institute for Industrial Engineering IAO

The Stuttgart-based Fraunhofer Institute for Industrial Engineering IAO has been a distinguished provider of R & D services in the field of corporate and work organisation, technology management as well as information and communication technology for more than 25 years. The institute has a long tradition of exploring issues relating to service innovation and was involved in the establishment of the specialist discipline of service engineering in the 1990s. Today, an interdisciplinary centre with competent and experienced staff guarantees a holistic approach to research and consulting projects.

More information is available on the Internet at: www.iao.fraunhofer.de

Karlsruhe Service Research Institute (KSRI) at the Karlsruhe Institute of Technology

The Karlsruhe Service Research Institute (KSRI), which was founded in 2008, is an innovative and open "public-private partnership" between the founding partners KIT (Karlsruhe Institute of Technology) and IBM. An interdisciplinary team of researchers from the spheres of science and industry develops concepts, methods and technologies for a world which is increasingly shaped by information and communication technologies and the services which are based on them.

More information is available on the Internet at: www.ksri.kit.edu

Chair of Technology and Innovation Management (TIM) at the TU Berlin

The 23 research assistants currently working for the Chair of Technology and Innovation Management under Prof. Dr. Hans Georg Gemünden are active in the five fields of innovation management, service innovation, project management, technology management and entrepreneurship. Close interaction with practitioners facilitates the performance of state-of-the-art research projects which are both highly relevant to practice and which have been shown in many international publications to achieve the very highest scientific standards of quality. The management of service innovations working group is led by Prof. Dr. Carsten Schultz and concentrates on innovative services in the health sector, technology based services, and servitization. Since January 2012 he is professor of technology management at Kiel University.

More information is available on the Internet at: www.tim.tu-berlin.de