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The importance of the service sector for the industry

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The services sector is also called "tertiary sector" and has become increasingly important in the last few decades. The process of this occurring structural change is characterized by a significant increase in employment in the services sector. On the other hand, the former economic importance in traditional areas, such as agriculture and forestry, as well as manufacturing, is declining.

The relevance of the service economy in the Federal Republic is shown by the employment figures of 2007. Currently, 28,80 million persons are employed in the service economy, 10.12 million in the manufacturing economy and 0,84 million in agriculture (including forestry and fishing). The service economy employs 72,42 percent of the total workforce of 39,77 million [SVR 2008, p. 55]. In 1991, this proportion was only 59,48 percent. It accounts for 68,71 percent of the total value-added [SVR 2008, p. 54].

The service sector includes the following business sections:

- Trade and the hotel and restaurant industry,
- Transport and communication,
- Credit and insurance industry,
- Real estate and housing, renting, other economic services,
- Local authorities and social security,
- Education and training,
- Health, veterinary and social work, as well as,
- Other public and personal services.

The service can be divided into three different groups:

1. The term “service” is clarified by a list of examples (so-called *enumerative* definition).
2. The term “service” term is determined as a negative definition distinguishing it from stuff goods.
3. The term “service” is explicitly defined on the basis of constitutive characteristics, whereby it distinguishes between potential-oriented, process-oriented and outcome-oriented definitions. [Corsten 2001, p. 21]

In economic science, goods were mainly regarded as means of satisfying the needs of people [Blum 1992, p. 2]. This satisfying of needs is therefore considered a value-added feature. In the classification of the goods, services are included in intangibles.

The **enumerative approach** is defined by a list of performances that are considered services [Langeard 1981]. This approach can be found, where industries are listed which have a character of services in the economy.

In the case of a **negative definition**, services are delineated from other types of performance [Altenburger 1981]. They are shown as a residual of unmappable activity types. This approach eventually leads to the sector theory. All services are assigned to the tertiary sector, when they cannot be assigned to forestry and agriculture (primary sector) or industrial output (secondary sector).

In the **constitutive characteristic viewing** those features are identified that characterize service [Scheuch 2002]. In the area of services marketing, the third group is often favoured. In this case, the task-oriented definition is also considered in addition to the three previously mentioned definition approaches.

In the **potential-oriented** service definition, it is considered that potential created by people or machines can be regarded as service [Meyer/Mattmüller 1987, p. 187]. The **process-oriented** service assumes that: "Services in the broadest sense are addressing the needs of research serving processes with material and/or immaterial effect, whose implementation and use require a synchronous contact between performance provider and performance recipient or rather their respective objects to meet the demand [Berekoven 1983, p. 23]." From the **results-oriented** point of view services are intangible assets produced for sale. The service is seen as the outcome of the process [Maleri 1997, p. 4].

A further consideration is seen in the definition as an **activity-oriented service**. "Any human activity is in its actual and original sense a 'service,' i.e. a performance serving own or re-

search interests." One can also say: "What one does when working physically or mentally with or without connection to the material world in order to satisfy human needs is a service [Schüller 1967, p. 19]."

In conclusion, the following definition can be presented:

"Services are separate, marketable benefits associated with the deployment (such as insurance) and/or the use of capabilities (e.g. hairdressing services) (potential orientation)." Internal (such as premises, personnel, facilities) and external factors (i.e. those who are not in the sphere of influence of the service provider) are combined in line with the creation process (process orientation). The factor combination of the service provider is used with the aim to achieve (results orientation) value-added effects (e.g. an inspection of a car) on external factors or people (e.g. customers) [Meffert/Bruhn 2009, p. 19]."

Service research studies

Until the late 1970s, the subject of service played second fiddle to material production [Häußermann/Siebel 1995, pp. 134]. In the classical economists service was regarded as unproductive, not adding value and very often as consumptive. Since the 1980s, the relevant economic literature has dealt more intensively with the topic of services. However, in the beginning, the focus was placed on the concept of service and quality of service [Nüttgens et al. 1998, p. 15]. In service sector research, services are increasingly examined in relation to technology, companies, economic growth, jobs, employment, innovation and prosperity [Gouthier et al. 2007; Streich/Wahl 2006; Baethge/Wilkens 2001].

In the face of this radical change in consideration of services research, the Federal Ministry for Education, Science, Research and Technology (BMBF) launched the initiative "Services for the 21st century" in 1994. Together with the developer DLR "Arbeit und Technik" (current name: "Work and Services") the BMBF has set up the funding area "service research." At the instigation of the BMBF, the first service meeting was launched in 1995 to advance and promote the service economy. Before there have been workshops on service marketing since 1991.

Another Milestones in service research was the future report "Service 2000plus" with the development of six fields of research from which derived research projects funded for one or

two years, "priority initial measures". Among other things, the project entitled "Market leadership through service bundling and customer-oriented service engineering" led to the publication of the "DIN report 75", as well as the special edition of the journal "Information management & consulting" under the title "Service Engineering" and thus formed the basis of the conception of service engineering as a discipline of its own [Bransch 2005, pp. 67; Fähnrich/Opitz 2003, pp. 89; Ernst 1998, pp. 7]. Since 1999, the promotion was tendered by means of notices published as "guidelines". Are an integral part of the BMBF and The service meetings are an integral part of BMBF and were held for the eighth time in the year 2010.

Other research approaches that deal with the matter of service research and service engineering are described in the the following:

At the DFKI-German Research Centre for Artificial Intelligence (www.dfki.de) there was the project **"CASET-Computer Aided Service Engineering Tool"** between 2000 and 2003. It was a computer-aided tool to document service engineering processes from brainstorming up to the provision of services. The subject of **"Learning in and with SMEs"** was the subject of a program of comprehensive exchange of experiences in so-called thematic networks from 2002-2007. In the newly formed German Federal States, there has been the project **"Economy meets science"** from the BMVBS (www.bmvbs.de) since 2007, which is looking for new approaches for improved transfer of scientific and technical innovations into economic applications. 25 projects were approved of in the first round and seven more in the second round. Sys-Inno, "Systematic development of bottom-up innovation" is a project for SMEs in the newly formed states, which analyses comprehensive innovation requirements (www.sys-inno.de). A research project of the BMBF on "export capability and internationalisation of services" was in place from 2005-2008, which involved among other things knowledge transfer between experienced companies and export newcomers, SMEs, in order to close the gap in service research (www.dienstleistungsexport.de). The BMBF launched the programme **"Innovation with services"** (www.hightech-strategie.de/de/250.php) in 2006. It is about the ability to enable SMEs to use appropriate management tools and design suitable processes. The ZIM, **"Central innovation programme SMEs"** was launched in July 2008 and offers small and medium-sized enterprises (www.zim-bmwi.de) a reliable perspective to support their innovation efforts by the end of 2013. It also encourages collaborative projects between SMEs and research institutions. A transfer project is the project of the DHI-Deutsche Handwerksinstitut e.V. of 2007 on the subject of **"Service engineering-driving innovation in SMEs"**,

with the goal for SMEs to develop and test suitable business and process models. (www.service-engineering-kmu.de).

In July 2008 the Landesstiftung Baden-Württemberg has announced a two-year project titled **"Knowledge transfer services research-use services to remain competitive"**. This scientific knowledge concerning Service Engineering is intended to be put into practice by SMEs, in particular by the manufacturing trade.

It is therefore not a response to a legislative proposal from the Commission.

Based on the establishment of service research by the BMBF, one reacts to the increasing importance in service research and service development.

In summary, the following characteristics have emerged as a result of an intensive study of services:

- Services can be a differentiating competitive factor for manufacturing companies,
- Business-related services are on the increase,
- In the secondary and tertiary sectors services grow together to form hybrid solution offers,
- Customers are increasingly involved in the creation of services,
- Trends in the demographic development promote the service sector,
- Technically based services are produced and offered globally and must also face up to international competition.

On the basis of the increased examination of the production of goods, similar attention is now being paid to service research. This enables us to work out the concepts of a "hybrid value creation" and examine the "value-in use". An added value is thus created from the combination of products and services, in which the product has a lower value without the service. Therefore, service research should be seen as an exploration of both fields up to a service science. What is required are networks of multidisciplinary experts who combine these fields. "Customers do not look for goods or services per se, they look for solutions that serve their own value-generating processes [Grönroos 2000, p. 4]."

To date service engineering has made a significant contribution to the systematization and professionalization of service development. Services and tangible goods should no longer be considered separately from each other when it comes to their development. The customer is the focal point and expects a performance bundle of products and services. In the early 1990s, ENGELHARDT et al. [1993, pp. 395] has performed studies on this subject. For these hybrid products global approaches must be created, including the adaptation of the methods, tools and process models. The first approaches of this development methodology "Hybrid product development" have appeared in the integrated development of inseparable product and service bundles [Spath/Demuß 2003, pp. 497]. These developments cover only partial areas. Therefore, the topics that deal with hybrid products are a challenge for future work taking into consideration the subject of service engineering.

By way of introduction, it should be noted that the planned case study should not deal with the transfer of findings from all areas of service research, but that there should be a focus on the area of **service engineering** and service development. This should, however, take into account not only approaches to the systematics and professional development of "pure" services but also the integrated development of services and benefits to form hybrid service bundles, as one has to assume a broad identity of the procedure models, methods and tools to be deployed. Other topics referred to in the call for projects (in particular cooperation management, standardization and quality management) are therefore in the here proposed projects only of less importance, they can, however, not be completely disregarded in view of the diverse content links – a consideration of quality aspects for example is indispensable in the development of services. This content focus is justified by the intended in-depth specialization in the field of service engineering. In this respect, the present treatment of level of research focuses on this area.

The research field of service engineering has been developed more intensively since the mid-1990s. In this context, the term of service engineering [Scheer et al. 2003, p. 20] means the systematic development of services using appropriate approaches, methods and tools. In this respect, the terms service engineering and service development are used in the following text synonymously. The BMBF initiative "Services for the 21st century" founded in 1994 in conjunction with the 1. BMBF conference "Service of the future" held in June 1995 is often considered to be the "starting signal" for German service engineering research [Fährnich/Opitz 2006, pp. 88]. This is true insofar as it was actually the first time that this topic had attracted a lot of attention, resulting in a variety of research projects and insights, and it has also led i.a.

to the transfer of engineering methods to the services development. When looking at the state of research, it should not be overlooked that the development of new and the improvement of existing services have already been the subject of business research. Service blueprinting SHOSTACK (1982) and the Gap model PARASUMARAN et al. (1985) are two instruments that have already been developed in the first half of the 1980s and also discussed in the German-speaking business literature and which are today an integral part of the spectrum of methods used in service engineering. Also the process model for the development of new services according to SCHEUING/JOHNSON (1989) that is often cited in literature on service engineering has its origins in business studies.

What can be stated with some certainty is that the true "service engineering-boom" got underway with the beginning of the BMBF initiatives and the provision of appropriate funding for engineering and business research (see the overview provided in the Appendix under literature). FÄHNRICH/OPITZ (2006) gives a very clear overview of the development of service engineering since the "starting signal" in 1995. Central contributions to the services research have emerged e.g. within the framework of the BMBF funding programme "Service engineering and service design" in the years 1999 to 2004. Important foundation work has been done already in the years 1998 to 2000 in Baden-Württemberg as part of the project "Service engineering-innovation and growth through systematic development of services" (funded by the regional Ministry of Science, Research and the Arts). Numerous projects with service engineering content on the priority topics "Export capability and internationalisation of services" and "Integration of production and services" are currently running under the BMBF programme "Innovation in services". In this respect, the range of existing process models, methods and tools for service engineering is continuously expanding-and in the meantime at a very high level. Therefore it will be necessary in the framework of the planned project, to take into account not only the current state of research, but to access new knowledge of services research and to integrate it into the project. The status elaborated at this point may only have a provisional character. A clear overview is given in "Service engineering" BULLINGER/SCHEER (2006). Below, in particular the findings relevant for the present project are highlighted.

Research on service engineering tends to be based on services having three dimensions, which is a well-known concept from service marketing [Engelhardt et al. 1983, p. 398]: service provision, service creation process and service results. In this respect, it must be first determined that a systematic method-based service engineering must take into account all three dimen-

sions, which means that product models, process models, and resource models are used, which, taken together, represent the **development methodology** [Fährnrich/Opitz 2006, p. 95].

An especially important role in the development of new services is played by **process models** that divide the process of developing a service into various phases, from the initial idea to the final realization, that have to be gone through systematically. The literature provides here a variety of concepts which can be broken down into process models, iterative process models and prototyping models [Schneider/Daun 2006, p. 117].

In the various stages that are described by process models, different **methods and instruments** of service engineering may be used. In the course of time, a considerable range of those has developed in service research. The methods discussed are in part phase-specific, but also cross phase methods are considered. With regard to the performance dimensions similar can be said: The methods refer in part only to the three service dimensions but they also help in the design of two or even all three dimensions and thus contribute to the product, process and/or resource modelling. A comprehensive, but somewhat older empirical study method used in practice can be found at FÄHNRICH et al. (1999). Exemplary methods and instruments of service development, which cannot be discussed in detail at this point, include: Cost-effectiveness analysis, cost-benefit analyses, requirement analysis, strengths- weaknesses-and opportunities-risks analysis, prototyping methods, target costing, analysis and effect analysis (FMEA), quality function deployment (QFD), service blueprinting, lead user concept, roadmapping, modularization/modular design principle and morphological box. This list is not exhaustive, and there can be overlaps in the content of these methods. The compilation shows what wealth of knowledge services research can now provide to service engineering in methodological terms.

Without a doubt, the **participation and integration of customers** plays a central role within the framework of service engineering. It runs through all phases of service development, and different phase-specific forms of customer integration can be used, RECKENFELDER-BÄUMER/BUSSE (2006). In most cases this customer involvement also becomes apparent in the application of the above methods and instruments.

The outlined procedure models, methods and instruments which brought forth service research are therefore extremely varied. However, it is identified in the "Knowledge transfer service research" rightly that the implementation of these instruments in the field of small and medium-sized enterprises (SMEs) is still very inadequate. There are only few specific research results in this respect, because most research projects have not been adapted to the

characteristics of SMEs. The exception was e.g. the BMBF-funded project "Service engineering-drivers of innovation in SMEs" of itb-Institute for technology of management in the German Crafts Institute e.V., which is however primarily focused on craft businesses. BMW's "Central Innovation programme" launched 1 July 2008 is expected to provide other findings, which are, however, not presently available. However, further research is needed in this regard irrespective of the specific requirements for the application of practices and methods in SMEs or the modifications of existing concepts.

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