

# Productivity of Services – An Empirical View on the German Market

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**Abstract.** The growingly important role of services in economies leads to an increasing competition. Thus, services have to be provided as efficient as possible. Corresponding to the industrial domain, the management of productivity is an important factor of success. Since productivity management of services is relatively new compared to the industrial domain, only few scientific studies exist. The paper adds to this topic by conducting an extensive survey of the current status of productivity management of service companies in Germany. The findings could support both business and science by giving a reference of service productivity management in practice and identifying gaps regarding the development of tools and methods.

**Keywords:** Service Productivity, Service Performance.

## 1 Introduction

Corresponding to the growing economic relevance of the service sector, methodical approaches concerned with the increasing competition become more and more relevant. Offering customer-individual service configurations is one option to set a company's portfolio apart from a competitor's portfolio. A price-related differentiation is another option. Thus, the management of productivity is an important, competition-relevant factor. In order to achieve both of the somewhat conflicting aims of customer-individuality and high efficiency, powerful tools and methods are required.

In the industrial domain, the management of productivity has a long tradition. A widespread practical use and an extensive scientific discussion have led to a range of established and well-developed tools and methods. Since the economic transformation from the secondary (manufacturing) to the tertiary sector (services) has only recently been realized it can be assumed, that the maturity level of methods and tools used in the service sector is lower compared to the domain of manufacturing. Therefore, it is worthwhile to analyze the state of the art for managing the productivity of services. The results can be used to identify methodical gaps, leading to both practical and scientific challenges as well as future trends.

The paper presents the results of a quantitative empirical study conducted in the service sector in Germany. The aim was to capture and analyze the state of the art of

service productivity. The paper is structured as follows. First, the empirical approach is described in the next chapter to allow for a sensible evaluation of the statistical relevance of the survey. Since the term “service” subsumes various forms of services, the third chapter describes the profiles of the companies for a better characterization of the offered services. Chapter four presents various tools and methods and their frequency of application as well as potential obstacles. The economical relevance of productivity management is deduced in chapter five. Finally the paper is concluded outlining future trends and emphasizing the importance of service productivity management.

## 2 Empirical Approach

In order to develop a basic understanding of productivity management in the domain of services, two qualitative pre-studies were conducted. The first study analyzed service productivity from the viewpoint of the structured description and modularization of service portfolios as the basis for productivity management. Semi-structured interviews with various companies were conducted. Key findings include difficulties of companies regarding the description and modularization of service portfolios, both required for an effective productivity management [1]. The second study was based on the results of a working group consisting of various participants from business and science. The result of the working group comprises the collection of currently used methods and tools as well as the delineation of future scenarios [2].

Both studies showed the relevance of productivity management of services but lacked statistical significance due to the chosen methodical approach. Therefore, a consecutive quantitative study was devised. Capturing the current status and future trends of productivity management in the German service sector was the aim of the study. Furthermore, the identification of current challenges and demands of business practice regarding tools and methods could support the alignment of the scientific focus and practical needs.

The population of the study consisted of almost 55.000 German companies of different service industries. These included ICT, EDP, telecommunications, architecture, advertising, metal working, machine building industry, tax and business consultancy, accounting as well as research and development. The companies' addresses were extracted from the database “Hoppenstedt”. A stratified sample of 1990 companies was selected randomly. The questionnaire was sent to all participants by regular mail, with 88 letters being undeliverable. To offer various, convenient ways of response, the participants could use an included, reply-paid envelope, send the questionnaire by fax or complete it online. After removing incomplete and unusable questionnaires, a number of 120 responses could be used for further statistical analyses. This corresponds to a response rate of 6.44%.

Due to the limited sample size and the chosen population, the results are only meaningful for certain German service companies. Nevertheless, the insights provided

might be valuable for a wider range of corporations as well. Furthermore, the identified gaps between business needs and scientific results indicate general topics for further scientific research.

The questionnaire contained three different chapters focusing on the company's service profile, the use of methods and tools as well as expected trends. Basically, the subsequent chapters are following this structure.

### 3 Characteristics of Services

Due to the growing importance of services in today's economy, services are not solely provided by pure service companies. Instead, more and more product companies tend to provide services to distinguish themselves from their competitors. To get an insight into the prevalence of service providers, companies were asked to define their main industry domain. Due to the wide variance of possible answers, Table 1 gives a consolidated overview of the responses.

**Table 1.** Domain distribution of surveyed companies

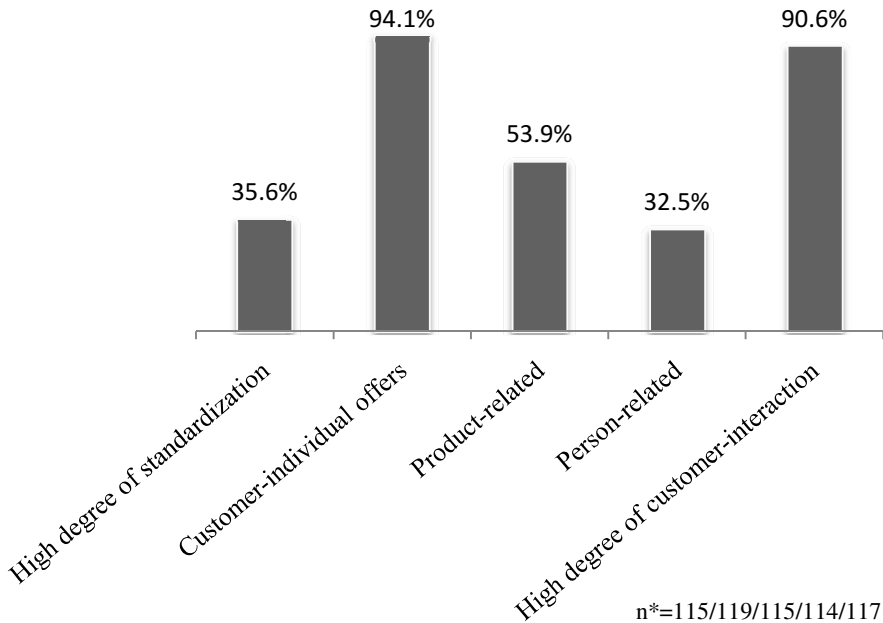
Industry domain	Number of companies
Metal working and machine building	21
EDP, ICT, telecommunications	30
Tax consultancy, accounting, business consulting, research and development	37
Architecture	19
Advertising	13

As a second characterization concerning the surveyed companies, the amount of service revenue compared to the overall revenue is used. Based on the results of the survey, the companies were divided in five classes as shown in Table 2. Almost half of the participating companies are pure service providers, i.e. their service revenue is 100% of the overall revenue. The high ratio of pure service providers needs to be connected to the industry domains in Table 1. More than 60% of all responding companies represent domains that usually do not sell any products.

**Table 2.** Amount of service revenue of surveyed companies

Share of service revenue of total revenue	Relative frequency
0 – 24%	12.5%
25 – 49%	8.3%
50 – 74%	15.8%
75 – 99%	15.0%
100%	48.3%

The surveyed companies were asked to characterize their service portfolio according to the following criteria: degree of standardization, degree of customer-individualization, product relatedness, person relatedness, degree of customer interaction (Fig 1). According to the survey, a high degree of standardization is defined as a highly homogeneous service portfolio. Commonly, standardized services require less information about customers and are provided in higher production volumes [3].



**Fig. 1.** Service characteristics

Services that are customized according to customer requirements are characterized as having a high degree of customer-individualization. Customizing services usually leads to higher quality as perceived by customers because the service is tailored to specific requirements. However, there often exists a trade-off between customization and service profitability, particularly in situations where customization is not structured according to a predefined process. Although customization and standardization seem to be contrary and incompatible approaches, standardization may help to foster customization in a cost efficient way. Using modularization, the definition of standardized service components that can be combined according to customer requirements is possible [4].

Product relatedness and person relatedness are two characteristics focusing on the service object. Product-related services are provided in association with or for a specific product, e.g. maintenance. On the contrary, person-related services directly address humans as the service object, e.g. consulting.

The degree of standardization and customization is of special importance during service definition. The degree of customer interaction is assessed based on the time that the customer is involved during service provision. It can be assumed that person-related services have a higher degree of customer interaction than product-related services. It is necessary to note that this is a solely quantitative measure, i.e. it does not allow for statements about the customer influence on service provision. For example, services rendered to the customers generally have a higher degree of customer interaction than services that can be provided without the customer being present. Furthermore, single decisions of customers possibly have a high impact on the ways a service is provided.

As can be seen in Table 3, an overwhelming majority of 95 percent of the surveyed companies provides customer-individual services. In addition, 90 percent of the companies characterize their service portfolio as having a high degree of customer interaction. This has an immense impact on research regarding human service interfaces. It is not only necessary to provide appropriate interfaces during service provision. In addition, companies need methods and tools for gathering customer requirements and mapping these requirements to customer-individual service offers.

As stated above, standardization is often seen as an enable for providing customer-individual services in an efficient way. Contrary to this popular belief, only a little more than one third of the companies use standardization. Though not part of the survey, several reasons for this fact are conceivable. For example, companies with a highly complex service portfolio that has evolved over time might not be able to structure their portfolio according to standardization requirements. Furthermore, the customers of a service provider might have different requirements that cannot be met using standardized service portfolios. The development of appropriate methods and tools for these companies is necessary.

**Table 3.** Influence factors on service development

During service development...	Acknowledgment	Absolute values
... services of competitors are a valuable source of inspiration.	43.9%	114
... customer integration is a valuable source of approaches regarding effective service provision.	88.4%	112
... customer requirements and complaints provide important suggestions for service improvement.	82.8%	116
... employees with customer contact provide valuable ideas.	75.2%	113

As presented in Table 3, customer feedback is seen by a vast majority of companies as a valuable source for service evaluation. This feedback can be gathered in two different ways. First, customer complaints can be evaluated according to weaknesses in service design. Second, customers can be integrated in the service development process by imposing requirements on the service provider. Both ways of gathering feedback need to be supported by companies.

Several approaches exist for enabling customer feedback. First, the service processes need to be designed with flexibility in mind. Therefore, it is possible to react according to changing customer requirements. If processes are fixedly defined, front-end employees might not be able to take changing requirements into account. However, this approach is limited by possible legal parameters. Various approaches and requirements for service customization during provision have been proposed so far by, e.g. [5,6].

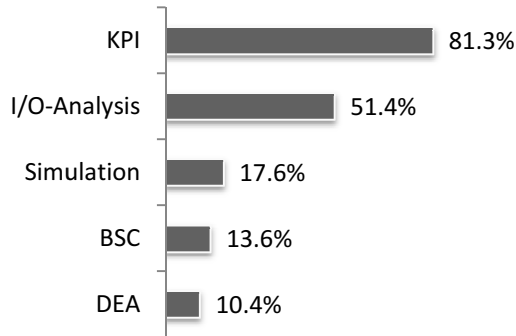
Another enabler for allowing customer feedback during service provision includes the implementation of customer feedback software systems. Using these systems, the gathering of customer complaints and suggestions for improvements is possible. This feedback can be integrated during service redesign and optimization. In doing so, the next generation of a provided service can be tailored more specifically to customer requirements.

## 4 Usage of Tools and Methods

Although the measurement of productivity is a precondition for analyzing and evaluating the efficiency of the provided services, around a third of the questioned companies do not conduct any productivity management. The reasons for this situation vary with lack of suitable methods and tools as well as an unfavorable cost-value ratio as the dominating explanations.

Productivity management is a process mainly consisting of three steps. The first step encompasses the measurement of productivity, including the sometimes challenging quantification. The second step is the analysis of the measurement results and the deduction of corresponding actions. The third and last step covers the introduction of different tools and methods for improving productivity. The structure of the questionnaire reflects this three-fold classification. Since the deduction of adequate actions is an individual process, which can hardly be supported by tools or methods, the study focused on surveying tools and methods related to the steps of measurement and improvement only. The selection of the presented tools and methods was based on the findings gathered in the pre-studies described above.

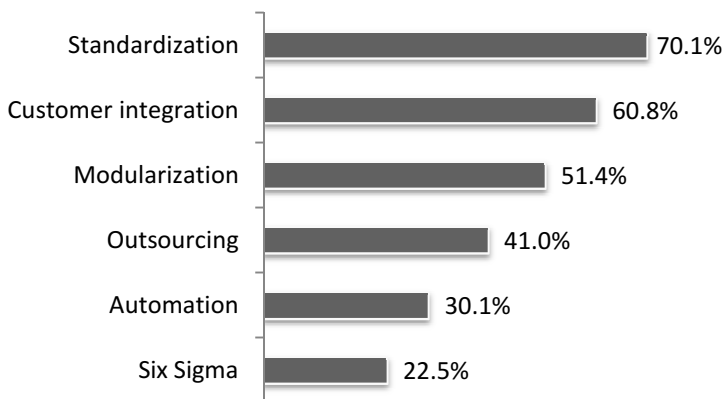
The dominating approaches for the *measurement* of service productivity are the direct quantification of key performance indicators (KPI) and the calculation of such indicators based on the relation of input and output factors (see Fig. 2). These methods are originating from the industrial domain. Service specific approaches such as Balanced Scorecards (BSC) or Data Envelopment Analysis (DEA) are hardly used. Furthermore, the pre-studies showed that the identification of appropriate key performance indicators is another challenge. One possible solution is the provision of a structured library of common KPI [7].



**Fig. 2.** Approaches for measuring service productivity

The reasons why the methods are not applied in business practice vary. Whereas BSC, Simulation and Input/Output-Analysis are mainly assessed as inappropriate for specific services, DEA is mainly unknown.

Looking at the methods supporting the improvement of productivity of services, standardization and modularization are among the most common approaches (see Fig. 3). Together, these two methods form the conceptual core of mass customization, an approach to allow for the use of economies of scale and customer individual configurable offers at the same time. Although originating from the domain of industrial engineering, this concept can also be applied on services [8]. A more service specific approach for improving productivity is the integration of customers in the service provision process, which use almost two thirds of the questioned companies. Due to an increasingly specific scope, further methods such as outsourcing, automation and Six Sigma are used only by a minority of the companies.



**Fig. 3.** Approaches for improving service productivity

## 5 Relevance of Productivity Management

Besides the question *what* is done for productivity management of services, a more important point is whether it is *economically sensible* to conduct productivity management. Based on the results of the survey, the intuitively obvious relationship between productivity and success could be statistically substantiated.

Since the direct surveying of financial key performance indicators is not feasible the survey used the abstract concept of ‘success’ to model and analyze the potential connection between productivity and economic success. First, the companies were asked to describe their relative performance of the three operational figures: profit, total revenue and number of employees over the last three years. The performance indicators were captured using a scale of five possible categories (highly decreased, decreased, unchanged, increased, highly increased). Then a number between 1 and 5 was assigned to each category. Finally, the average of the three scales was calculated, representing the overall success of a company. Thus, a numeric value of “3” represents a constant success, whereas higher values indicate a growing success. Based on this model, two thirds of the questioned companies are successful companies.

Based on this approach of identifying successful companies, advanced analyses can be conducted. Correspondingly, a regression model was created, evaluating the influence of

- conducting productivity management,
- the companies’ location and
- the companies’ industry affiliation

on the companies’ success. The analysis shows an index value of 2.854 for West German advertising companies not managing productivity. This indicates a slightly declining success during the last three years. As Table 4 shows, conducting productivity management leads to an index value increased by 0.451. This coefficient is highly significant, which leads to the conclusion that conducting productivity management is a decisive factor for a company’s success. Another factor is the location of the company.

**Table 4.** OLS-Regression

Variable	Coefficient	Standard error	p-Value
Constant (success index)	2.854	0.237	0.000
Conducting productivity management	0.451	0.156	0.005
East-German company location	-0.473	0.170	0.006
Metal working/machine building industry	0.520	0.257	0.046
R <sup>2</sup> = 0.176			



East German companies are less successful than companies from West Germany by an averaged index value of 0.473. The last statistically significant factor is industry affiliation. Although the effects are statistically not as strong as the factors of productivity management or location, companies active in the metal working or machine building industry have an index value increased by 0.52, thus tend to be more successful than the index. The model also included other industries, which are not listed due to a high p-Value.

Accordingly, the relevance of productivity management is recognized by the companies. 78% of the questioned companies expect a growing relevance of this topic and 21% assume at least a constant relevance. This implies that almost every participant (99%) expects a constant or growing relevance of service productivity. If these numbers are put into connection with the third of the companies not conducting any productivity management at the moment, a high potential and demand for suitable methods emerges.

## 6 Conclusion

The paper presented a quantitative survey among German service companies studying the current status of service productivity in business practice. Besides the depiction of the current usage of various tools and methods, the survey also provided evidence for the relevance of service productivity management as an essential factor of company success.

Although showing a broad consensus of the importance of service productivity management, around a third of the companies did not conduct any productivity management. A closer look at the applied tools and methods can provide potential reasons hindering a further application of service productivity. Predominantly, tools and methods originating from the manufacturing industry are used. Tools and methods specifically developed for service are hardly applied. Since the lack of suitable methods and tools is a major obstacle for productivity management, approaches adapted to the specifics of services might lead to a higher penetration rate of tools and methods for service productivity. Therefore, corresponding research actions support a broader application of service productivity management.

There are some limitations regarding the study. Due to the low response rate and small numbers of cases, it is not possible to make generalizable statements for German service companies or to analyze single industries. Since only German companies participated in the study, the study presents a view on the German service sector only.

The findings of the survey can be the basis for additional research. Subsequent studies may be conducted for answering several specific questions. For example, an in-depth analysis of challenges using existing approaches for measuring and improving productivity for businesses might seem relevant. In addition, the findings show a clear mission for academic research to establish appropriate methods and tools for productivity management of services.

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