
The Impact of Service Offering on Business Performance in Electrical Engineering Companies

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Abstract:

The article presents the results of a research investigating potential impact of service offering on business performance carried out among sixty electrical engineering companies in the Czech Republic.

The main findings reveal the highest number of positive correlations between the items related to business performance, the item related to service offers to VIP customers, and the item focusing on monitoring the service offering of competitors.

The paper discusses a new perspective of discovering whether and how service offering by electrical engineering companies in the Czech Republic influence business performance.

Keywords: *Services in product-oriented companies, service offering, business performance, manufacturers of electrical equipment and components.*

JEL code: M31, L94, L25.

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1. Introduction

The markets have become extremely competitive, unstable and are constantly changing. However, it is still possible to see differences between the Western European companies and the Eastern European companies. According to Demeter and Szasz (2016), the Western European companies have in general a higher level of competency than the Eastern European ones. The Western European companies have accumulated more knowledge than the Eastern European companies. Such knowledge and competency could inspire other companies and could change market conditions. New and Brown (2005) noted that market conditions move from being simple to complex, from stable to dynamic, and from tame to hostile.

According to Vargo and Lusch (2004), we live in the era of services, which means that the traditional product-based companies add services to their offers. In addition, manufacturing companies have also started adding more services to their total offerings as part of their differentiation strategy (Oliva and Kallenberg, 2003; New and Brown, 2005; Gebauer *et al.*, 2010). The companies with greater reliance on the service part of their business reportedly achieve better return on sales and improve their values (Fang *et al.*, 2008). The companies use more developed best practices or training practices, which contribute to better business performance by using service quality, productivity, profitability and rate of innovation (Morley *et al.*, 2016). However, an effective distribution of resources requires paying attention to the firm's innovation strategy (Revilla *et al.*, 2016; Kormishkin *et al.*, 2016).

Depending on the above mentioned, the article aims to describe the findings of the research dedicated to investigating the influence of services provided by electrical engineering companies in the Czech Republic on their business performance. The aim of the research is to verify the research question RQ: Does service offering have a positive influence on business performance? The research question targets electrical engineering companies in the Czech Republic. This field of industry is crucial for the Czech industry nowadays as a great number of companies serve as subcontractors for the automotive and mechanical engineering industries.

The history of the modern Czech electrical engineering companies is very rich due to the basic restructuring of the majority of manufacturing foundations that has been in process for the last twenty-five years. The improvement can be noticed not only in work productivity but also in the quality of products. Czech products are still able to enter new challenging markets due to their high level of innovation. Products are competitive and trade exchange is growing in parallel to the ever-increasing production size in the globalized environment of world trade.

2. Literature Review

The manufacturing companies now seek more service-led growth to secure their position and to expand to competitive markets (Reinartz and Ulaga, 2008; Ostrom *et*

al., 2010). Instead of only innovating the products, the companies are investing in service differentiation (Bogdanova *et al.*, 2016; Mysova *et al.*, 2016; Breckova, 2016). Consequently, instead of services being add-ons to the product, services become the center of the total offering, with products as add-ons to the services (Gebauer *et al.*, 2011; Grima *et al.*, 2017). The use of service differentiation in manufacturing takes advantage of the strategic, financial and marketing opportunities. The fact that services are less visible and more labor-dependent makes them a strategic opportunity and a sustainable source of competitive advantage (Heskett *et al.*, 1997). Services lead to the creation of value based on the competency of the company and the customer (Mathyssens *et al.*, 2006; Vargo and Lusch, 2008), which leads to resources that are unique and hard to imitate (Wernerfelt, 1984). Financial opportunities include additional service revenues throughout the product lifecycle (Wise and Baumgartner, 1999). Marketing opportunities involve using services to augment the product offering and increasing the quality of the customer interaction (Mathieu, 2001). Similarly, Davies *et al.* (2007) indicates that services provide a more constant income, higher profit margins and require less asset allocation than manufacturing.

Despite the general agreement about the benefits of the service growth strategies for goods-dominant firms, managers often report problems in service transition. For example, Stanley and Wojcik (2005) note that only a half of all solution providers realize modest profitability and 25 % lose money through value-added services and solution offerings. Similarly, Neely (2008) confirms that although industrial manufacturing companies offering services enjoy higher revenue than traditional manufacturing firms, they also generate lower profit. Clearly, manufacturers are interested in services, but when they enter that arena, they face considerable risk and challenges associated with the transition to a service-centric business model (Ulaga and Loveland, 2014). It was also discovered that the main competencies in manufacturing engineering include “promotion” and “customer service.” However, promotion and customer service would increase the value only in case of an existing portfolio of core products (Hafeez *et al.*, 2002).

Nevertheless, adding services to products to extend the total offering through services is a possible way of reacting to eroding product margins and the loss of strategic differentiation through product innovation and technological superiority (Fischer *et al.*, 2012). The extension of the total offering via services (so called service differentiation) has been conceptualized in the literature through several definitions, such as: 1) “servitization” (Vandermerwe and Rada, 1988), 2) “transition from products to services” (Oliva and Kallenberg, 2003), 3) “going downstream in the value chain” (Wise and Baumgartner, 1999), 4) “product-service systems” (Tukker, 2004), 5) “moving towards high-value solutions, integrated solutions and system integration” (Davies, 2004), and 6) “manufacturing / service integration” (Schmenner, 2009). These above-mentioned views describing extension of total offering via services led to the concept called “service business development”, which can be defined as an increasing value contribution of services in the capital

goods industry (Fischer *et al.*, 2012). According to Fischer *et al.* (2012), the extension of service offerings includes the following three service categories: 1) customer services with the aim to improve the quality of customer relationship, 2) product-related services that can ensure the functionality of the product, and 3) services supporting business needs, which reach beyond the operational needs of the customer. Two different types of services (basic services and advanced services) are involved in the second category named product-related services.

Services provided on the industrial market have won more recognition within both B2B and service marketing domains over the past decade (Ostrom *et al.*, 2010). Some researches focused on the imperative of why goods-centric firms should move into services, noting competitive, economic and customer-based reasons (Wise and Baumgartner, 1999; Mathieu, 2001; Oliva and Kallenberg, 2003). More recent empirical research also investigates the actual performance outcomes of service transitioning strategies (Fang *et al.*, 2008) documenting positive relationship between services and revenues (Antioco *et al.*, 2008), profitability (Gebauer and Fleisch, 2007; Grima, 2012) and an overall firm value (Fang *et al.*, 2008).

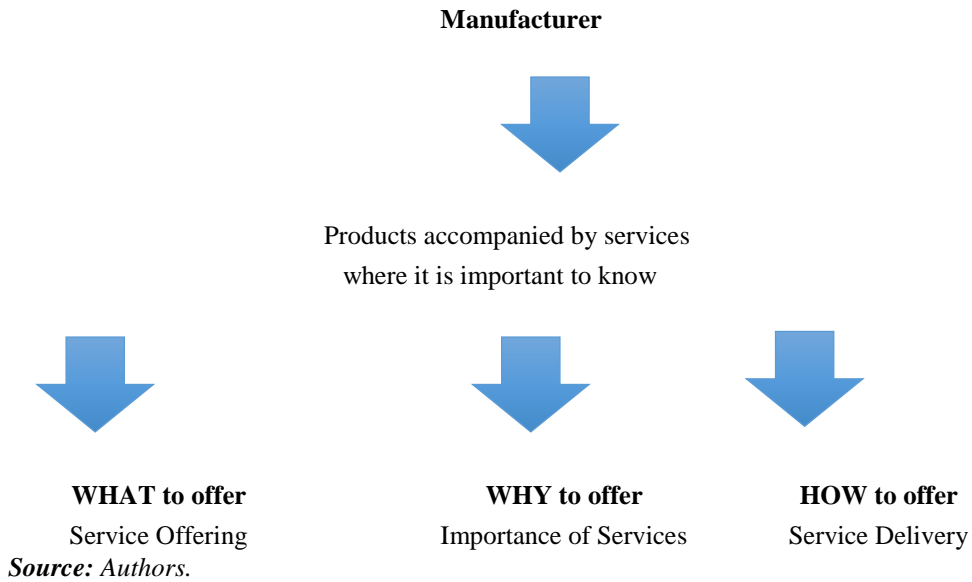
3. Research

3.1 Research Framework

Present day manufacturers are interested in services, but when they enter that area, they face considerable risk and challenges associated with the transition to a service-centric business model. They are uncertain which services to offer and how to provide them to their customers. Moreover, the provision of services fails to bring immediate profit.

In order to assist SMEs in manufacturing in the process of configuring a service offering strategy as an addition to their products a scheme (Figure 1) was designed presenting the areas companies need to focus on when evaluating the addition of services to their existing products approaching the issue of services from the manufacturer's perspective. Manufacturers can use this scheme as a starting point when considering service addition to their total offering and designing strategies how to approach and provide their customers with additional services. This scheme focuses on three key areas: a) the service offering -what kind of services should manufacturers provide to their customers and how they manage total service offering, b) the importance of services - why to provide services to their customers, and c) service delivery - how services are delivered. Each area includes 5 – 7 items, which should recognize the situation of services provided by the manufacturing companies. The first area, service offering, also includes a list of services to know which services are provided by manufacturers to know exactly what kind of services are offered to customers. The Figure 1 presented above may be useful for the company management, service managers or even for customers or any other person involved to better understand the service policy of manufacturers.

Figure 1: Three areas of importance for a service addition strategy design



The article focuses on the first area of the scheme - service offering. This first area includes a) the list of potential services to inspect, what kind of services the company already provides to their customers, and b) six items related to offering. The authors of this paper believe that a well-chosen service offering can be the first step to servitization. Moreover, the first area is comprehensible to the majority of manufacturers as they already provide their customers with some types of services. The findings of the paper can help persuade manufacturers to concentrate more on service offering due to its potential impact on their business performance.

The aim of the paper is to discover whether service offering by electrical engineering companies in the Czech Republic influences business performance. The research was carried out among electrical engineering companies in the Czech Republic, South Moravian Region.

3.2 Research questions development

Based on the study of literature, a research question RQ was designed:

RQ: Does service offering in electrical engineering companies have a positive influence on business performance?

Service differentiation symbolizes alternative business logic for manufacturing companies and can provide ways to strengthen the impact of customer centricity on business performance. Simultaneously, however, service differentiation weakens the

impact of complexity of customer on customer centricity and innovativeness (Gebauer *et al.*, 2011).

Manufacturing companies can benefit from service differentiation as manufacturers may use it to design alternative marketing strategies. Emphasizing service differentiation can lead to a company transitioning from a pure goods provider to a service provider (Oliva and Kallenberg, 2003). Overall, the focus on service differentiation offers a variety of procedures further supporting the customer-oriented approach leading to a positive impact on business results. However, service differentiation can diminish the perception of the customer complexity and shift the customers and innovativeness from the center of the company's attention at the same time (Gebauer *et al.*, 2011).

Services have become an important factor affecting the revenue growth and profitability. Companies such as ABB, Caterpillar, General Electric, or Rolls-Royce show strong service business growth. Today, service revenues account for nearly 50 % of the total revenues (Gebauer *et al.*, 2016). These are all examples of "advanced services" (Baines and Lightfoot, 2013) incorporating maintenance, repair and overhaul contracts where revenue generation is directly linked to the asset availability, reliability and performance (Martín-Peña and Bigdeli, 2016). Revenue and profits are mostly attributable to services. Products only become an add-on to services (Oliva and Kallenberg, 2003).

3.3 Research design

A questionnaire was used to gather information to investigate the relationship between service offering and business performance. The questionnaire focusing on service offering is a part of a larger questionnaire focusing on both the interfunctional coordination and the services provided by electrical engineering companies. The questionnaire consisted of parts used in previous researches (Kanovska and Tomaskova, 2012; Bartosek and Tomaskova, 2013) and was extended by some new questions. The format of the questionnaire is the Likert scale ranging from 1 (No, I don't agree) to 5 (Yes, I agree).

The data related to services and particularly to service offering were used for the purposes of this paper. The part related to service offering was based on the previous research held in 2005 among the sector of saw and band saw SMEs in the Czech Republic (Kanovska, 2005). The rest of the items belonging to service offering are new and were developed based on a) the study of the literature, mainly Gebauer *et al.* (2012), Kindström and Kowalkowski (2014) and Baines and Lightfoot (2013); b) interviews with manufacturers; c) current information about sale and service support in manufacturing companies; d) the study of information contained in the periodicals targeting this sphere. The questionnaire targeting interfunctional coordination and services in manufacturing also includes sections related to interfunctional coordination, company performance and contains general questions about the

respondents. These parts are important for the total overview of the company's situation. The respondents participating in the research were directors or managers of companies producing electrical engineering companies in the Czech Republic. The number of the respondents participating in this research is based on Sekaran (2000) who accepted the formulation of Roscoe (1975) that sufficient number of sample size is from 30 to 500 for most studies.

The data were collected from February to November 2014. The research focused on the following industry classifications belonging to CZ-NACE 26 (Manufacturing of computer, electronic and optical products): CZ-NACE 26.1, CZ-NACE 26.3, CZ-NACE 2651, CZ-NACE 266, and CZ-NACE 27 (The production of electric equipment): CZ-NACE 27, CZ-NACE 271, and CZ-NACE 273. According to the Czech Statistical Office, the total number of these SMEs reaches 107. A total of 60 filled out valid questionnaires was processed, therefore the research study covers a representative sample (561 %) of existing companies.

The companies were selected both from the Czech Statistical Office and the Kompas database and the selection process was restricted to the Czech Republic. Next, the firms were contacted by phone or email and asked to fill in a web-based questionnaire. The complete database was analysed using standard and sophisticated statistical methods. Incomplete questionnaires were discarded. Table 1 represents all industries that participated in the research (CZ-NACE 26 and CZ-NACE 27). The total number of companies participating in the research is 60, i.e. 38 manufactures of computer, electronic and optical products (electronic components) and 22 manufacturers of electric equipment.

Table 1: *Classification of Research Industries*

<i>Classification of Industries</i>	<i>Absolute Number</i>	<i>Relative Number</i>
<i>CZ-NACE 26</i>	38	
CZ-NACE 26.1	21	35.00%
CZ-NACE 26.3	5	8.33%
CZ-NACE 2651	7	11.67%
CZ-NACE 266	5	8.33%
<i>CZ-NACE 27</i>	22	
CZ-NACE 27	4	6.67%
CZ-NACE 271	7	11.67%
CZ-NACE 273	11	18.33%
Total	60	100.00%

Source: *Authors.*

Data were analysed using the statistical software package Minitab, version 17. Descriptive statistics (minimum, maximum, mean and standard deviation) were

applied to describe the characteristics of the organizational performance of the sample. Both the Spearman's rank correlation coefficient and the Pearson's Chi square test can be used to measure the correlation of two variables. However, due to the number of respondents, classes would have to be merged, e.g. classes 1 – 3 and 4 – 5 for both of the two variables analysed possibly leading to simplified results. The Pearson's chi square test was therefore not accepted. Due to the discontinuous scale, other models based on Pearson's correlation and linear regression are also not suitable.

4. Findings

Prior to describing the findings directly linked to the research questions, the aim was to ascertain which services are part of the service offering of the electrical engineering companies. Secondly, the companies were asked to state whether services are important to their total company revenues. Finally, correlations between the items related to service offering and the items related to business performance were calculated.

Firstly, it is apparent which services are mostly involved in service offering of present day manufacturers participating in the research. The most common services, classified according to Fischer *et al.* (2012), provided by the electrical engineering companies in the Czech Republic, South Moravian Region, are customer services and further product-related services (basic services). The services include: 1) product information (customer services) (90% of respondents), 2) product documentation (customer services) (80,00% of respondents), 3) warranty repairs and post warranty repairs (product-related services – basic services) (78,33% of respondents), 4) product delivery (customer services) (70% of respondents) and 5) inspections and basic training (Product-related services – basic services) (66,67% of respondents). These above-mentioned services are widely offered to customers and can be perceived as the main five service types among the electrical engineering companies in the Czech Republic. The findings show a high importance of technical background of the products. Product information, product documentation, product delivery, inspections and trainings, along with the possibility of repairs or spare parts, play a key role in this market and for the customers.

Secondly, based on the findings of the research, it can be established that 30 % of the electrical engineering companies in the Czech Republic generate some profit from the service offering. Table 2 presents the answers to the question whether services provided by companies producing electric equipment and electronic components are important to the total company revenues (Kanovska, 2015).

As shown in Table 2, the results indicate that 30% respondents have a neutral attitude towards the importance of services for the total company revenue, and therefore are not certain whether services lead to an increase in a company profit or not.

Table 2: *The importance of services to total company revenues (Source: Authors)*

<i>Provided services</i>	<i>Absolute Number</i>	<i>Relative Number</i>
...have a positive impact on the total company revenue	9	15.00%
...partly have positive impact on the total company revenue	9	15.00%
...neutral attitude	18	30.00%
...partly do not have positive impact on the total company revenue	16	26.67%
...do not have a positive impact on the total company revenue	6	10.00%
...not available	2	3.33%

Further, 36% of respondents do not perceive financial benefits arising from the services provided. On the other hand, 30% of the manufacturers claim their services generate some profit. Therefore, it is very important to attempt to find the influence of services on business performance to better promote service offering among industrial companies. The topic of better promotion can be explored in further detail in future publications.

Thirdly, the findings showing the relationship between six items evaluating the company perception of service offering and business performance related to the Research Question (Table 3) are described.

The service offering involves following items: (1) new products including services are developed, tested and improved based on customer needs, (2) services influence customers during product selection, (3) company provides a wide range of services, (4) services encompass a complex customer care from product selection to its liquidation, (5) company provides service offers to VIP customers (such as better timing, lower prices), (6) company monitors service offering of competitors.

The figures presented in Table 3 show a correlation between six items related to service offering by electrical engineering companies and five items related to business performance. There are two items (1) new products according to customer needs and (4) complex customer care with no existing correlation between them and all five items of business performance. It can be said that these two items do not have a prompt influence on business performance in a short-term period.

Table 3: Correlation analysis: Service offering and business performance by using the Spearman's rank correlation

Business Performance	Service Offering					
	new products based on customer needs	services influence customers	wide range of service	complex customer care	service offers for VIP customers.	service offering of competitors
Company registers the sales volume increased by current customers.	0.164 0.227	0.233 0.087	0.191 0.159	0.198 0.144	0.3671 0.005	0.106 0.438
The number of new customers increases year-on-year.	0.142 0.291	0.282 0.037	0.284 0.034	0.210 0.121	0.264 0.049	0.211 0.119
The number of warranty claims decreases.	0.177 0.185	0.177 0.185	0.193 0.151	0.232 0.082	0.234 0.079	0.313 0.018
ROA increases year-on-year.	0.208 0.124	0.010 0.942	0.284 0.035	0.228 0.094	0.082 0.552	0.270 0.046
Production effectiveness increases.	0.132 0.336	0.164 0.235	0.129 0.349	0.216 0.113	0.345 0.010	0.337 0.012

Source: Authors. The first value is Spearman's rank correlation: Spearman's rho, the second value is p-value. If $p < 0,05$ then we reject the null hypothesis (H_0 : items are independent), i.e. accept that the sample gives reasonable evidence to support the alternative hypothesis (H_A : items are dependent).

On the other hand, there are three positive correlations between the item (5) service offers to VIP customers and business performance. It shows that special services provided for VIP customers help to increase business performance. Secondly, there are three positive correlations between the item (6) service offering of competitors and business performance. It can be concluded that it is very important to know what competitors provide to their customers and also monitor their service offering.

Further, there is a positive correlation between three items of service offering and the item "The number of new customers increases year-on-year." The findings show that if manufacturers focus on service offering, this decision can lead to an increase

in the number of new customers. Altogether, there are thirty possible combinations between the six items related to service offering by electrical engineering companies and the five items related to business performance as shown in Table 2. Nine combinations with positive correlations between items were found reaching 30 %. The items related to new products based on customer needs and complex customer care are not dependent; it means there are no correlations. On the other hand, the two items service offers to VIP customers and service offering of competitors have the most correlations between them and business performance (3 out of potential 5).

5. Discussion

The research conducted among electrical engineering companies mainly presents which services manufacturers provide to their customers. The findings of the research confirm Buschak's conclusions (2014) that 85% of the manufacturing companies offer at least one service. Over one-third of large manufacturing companies offer services with the proportion increasing to almost 60 per cent in Western economies (Neely, 2008). As Vargo and Lusch (2004) mentioned, we live in the era of services, which means that the traditional product-based companies add services to their offers. Moreover, extending the service business thus promises greater firm revenues and profits (Wise and Bumgartner, 1999). On the other hand, Neely (2008) emphasizes that companies should not only increase the number of services in their total offering, but should also focus on shifting the mindset, transforming relationships from transactional to relational, and developing service offerings that genuinely meet customer needs. This strategy could be very useful and even profitable for all contemporary companies, not only for manufacturing companies.

Further, the research shows that although manufacturers offer services to their customers, they are not certain about the importance and the impact of services on the total company revenue. Almost one third of the respondents has a neutral attitude to the importance of services for total company revenue. Moreover, 36% respondents do not perceive financial benefits from the provision of services (Table 2). Subsequently, findings related to services provided by electrical engineering companies and business performance show 30% of positive correlations.

Such result was surprising as more positive correlations among service offering and business performance were expected. According to Gebauer (2016), the total revenues consist of up to 50% of the service revenues. Moreover, more recent empirical research also investigates the actual performance outcomes of service transitioning strategies (Fang *et al.*, 2008) documenting the positive relationships of services with revenue (Antioco *et al.*, 2008), profitability (Gebauer and Fleisch, 2007) and overall firm value (Fang *et al.*, 2008). For an average manufacturing firm, the share of service sales has reached 31% (Fang *et al.*, 2008), testifying to the financial weight that service activities now command in a manufacturing firm.

This disproportion in the can be caused by the particularity of the Czech industrial and business environment. Czech dependency on industry is one of the highest in the European Union. Moreover, the Czech republic places first in the share of employment in industry and second in the share of GDP in industry behind Ireland. Data were presented in the new statistics of the European Statistics Office Eurostat.

There are four main explanations for the previously mentioned high dependency on industry including: a) long history of industry (industry plays an important role since the second half of the 19th century and industry, was strongly supported during the communist era, especially heavy manufacturing; b) geographical location, especially since 1989 the position of the Czech republic is very suitable for business; c) high amount of foreign investments in the manufacturing industry, and d) cheap and qualified labor force (Hovorka, 2016). Furthermore, industrial SMEs tried to provide services to companies as was also confirmed in the research, but they do not perceive services as a strategic tool and a potential competitive advantage. They provide services based on the customer demand, but fail to show deep interest in services.

Further, the results related to the RQ (Service offering in product-oriented companies, namely in electrical engineering companies, has a positive influence on business performance) show that there are nine correlations among six items of service delivery and five items of business performance, leading to a rather low number of thirty potential combinations. However, Visnjic and Van Looy (2013) discuss that a successful service implementation is a function of three operational capabilities; 1) the capability of manufactures to extend the relationship with their (product) clients through services and to earn presence in the service market; 2) the capability of developing service offering portfolio to better satisfy customer needs and to assure its growth; 3) the capability to improve efficient delivery of more sophisticated services to ensure growing profitability.

It seems that service success is a function of three operational capabilities. First, a manufacturer has to possess a skill set that is necessary to extend the relationship with its (product) clients into services and achieve a presence in the service market. Second, the capability to develop service offerings that provide better coverage of customers' needs is assured to further grow the service business. Third, the capability to improve the delivery efficiency of more sophisticated service provision is important if growth is to remain profitable. Perhaps the above mentioned operational capabilities, mainly the second one, could also present problems to the respondents. They offer services, but are not persuaded deeply about their importance and benefits, not only for customers, but also for them.

Additionally, the item "service offers for VIP customers" shows the highest number of positive correlations with the items related to business performance. This was also proven by Anderson and Narus (1995) and Ovans (1997) who argue that

customizing the service offering to eliminate some of the processes and materials and changing the price accordingly, would help to win over customers.

Implications for theory: The novelty of the paper is in discovering a) which items related to service offering show possible impact on business performance and b) whether service offering in general shows a positive correlation with business performance. Next, the aim of the research was an attempt to discover what kind of services are provided by electrical engineering companies in the South Moravian Region of the Czech Republic. Further, the researched aimed at finding out how respondents perceive services in relation to their total company revenues. Finally, a basic scheme for services provided by SMEs in manufacturing was designed illustrating the manufacturers' complex service perception at the very basic level.

Implications for practice: The findings discussed in the paper can help companies with their attitude towards services, namely service offering. Firstly, the findings confirm a high importance of technological background of the products. Product information, product documentation, product delivery, inspections and trainings, and also the possibility of repairs or spare parts, play a key role for customers on this market. Secondly, the findings show that services are still not viewed as an important source of the total company revenue. Thirdly, the items of service offering, which correlate with business performance, are related to special offerings to VIP customers and to the evaluation of service offering by competitors.

On the other hand, new products offered based on customer demand and complex customer care do not correlate with business performance at all. To sum up, some correlations were found, but less than expected. The majority of electrical engineering companies do not fully understand the complex issue of service offering. Therefore, it is very important to seek influence between services and business performance in order to better promote service offering among industrial companies. The issue of a better promotion from the manufacturers' point of view can be a subject to further research. Lastly, the basic scheme of three important areas to consider when adding services to the portfolio presented in this paper served as a basis for the research. This scheme is a simple illustration of the main service areas to focus on in the daily life of manufacturers (service offering, importance of services and service delivery) and can help the managers to view the complexity of service offering.

6. Conclusion

Nowadays, the competition in the global markets has become increasingly intense and only the creation of long-lasting competitive advantages seems to be a way of survival. Many scholars advocate that one of the main routes to reach competitive advantage is by much stronger focus on the customer (Douglas and Craig, 2000; Kotler and Keller, 2006). Therefore, the aim of the research was to discover some

possible ways that can help companies to focus more on their customers and to get ahead of their competitors.

The paper presents the impact of service offering provided by the electrical engineering companies in the Czech Republic on their business performance. In brief, the results show a partially positive impact of services on business performance. On the other hand, there is still room for a further focus on the service strategy. The limitation of the research can be noted in the area of the time impact on business performance. Further differentiation between a short-term and a long-term impact on business performance would be useful as such differentiation would take into account time and its impact on business performance.

Current research is focused on further evaluation of the service offering, and namely that is offering of smart services provided by manufacturers. Smart services have become very crucial for companies and their customers during last years. Companies participating in the research focused on smart services were chosen from the research held in sixty companies mentioned in this paper. Smart services could be also evaluated for their impact on business performance in the next step of the research.

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