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Synergy of interfunctional cooperation and services in companies producing electrical equipment and electronic components in the Czech Republic: pilot study

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Abstract

Research background: Interfunctional coordination (IFC) is a part of market orientation and at the same time an approach which helps to improve cooperation between different departments or functions in a company. Market orientation is an approach aimed at external and internal elements and activities leading to performance increase. Services offered by a manufacturer are activities complementing their products. Manufacturers can benefit from the service differentiation and use it to design alternative marketing strategies. Generally, IFC and services — contributes to higher positive effect on business performance. For this reason, it is interesting to know if synergy of IFC and services have a higher positive effect on business performance.

Purpose of the article: This article aims to determine how IFC and services at manufacturing companies in the Czech Republic influence business performance. The research question is as follows: Does the synergy of IFC and services in companies producing electrical equipment and electronic components have a higher positive effect on business performance?

Methods: Sixty SME's filled in a questionnaire to gather information about IFC and services. For measurement of correlation for two variables, Spearman's rank correlation coefficient was chosen. Regression analysis was used for measuring the synergy.

Findings & Value added: The main finding shows that the synergy of the quantities observed has not been confirmed, although some of the following relations were approved such as a positive relationship between: a) some items of IFC and items of business performance, b) some items of services and items of business performance and c) items of IFC and items of services. The result of the paper shows further consequences of IFC and services in today's manufacturing companies.

Introduction

Interfunctional coordination (IFC) is an approach which helps to improve cooperation between different departments or functions in a company. Tay and Tay (2007) stress that ICF produces a harmonization of all internal functions and processes in an organization. IFC with a connection of services is often shown as a part of market orientation, e.g. Oliva and Kallenberg (2003); Brax (2005), Gebauer *et al.* (2007). They all emphasise the importance of market-oriented service development. Therefore, market orientation and understanding of the customer is a prerequisite and a key strategic factor in forming successful business-to-business services (de Brentani, 2001; Neu & Brown, 2005). According to Ramayah *et al.* (2011), the results show that market orientation has a significant effect on organizational performance and service quality.

Argenti (1994) stresses that synergy is achieved through resource sharing by combining more activities, processes or business to create greater value than they would be able to realize separately. According to Harris (2004), synergy is defined as a dynamic process, which involves adaptation and learning, creates an integrated solution, the total effect that is greater than the sum of the effects when acting independently, does not signify compromise, and facilitates the release of team energies. Synergy can be described as the systemic processes whereby business units of diversified organisations may generate greater value through working as one system rather than working as separate entities. In this sense, synergy activities in a company can positively influence business performance (Benecke *et al.*, 2007). Naudé *et al.* (2002) stress that the reason why many managers reject synergy is the organizational difficulties of achieving clearly beneficial interrelationships between business units.

According to Ensign (1998), Rumelt identifies three types of synergy: operating, managerial, and financial synergy. Rowley (2002) suggests that companies try to be better than their competitors and aim to gain some competitive advantage. This competitive advantage can be achieved through alliances with collaborating companies and the resultant synergy. Ensign (1998) notes that coordination becomes increasingly more important as the environment becomes more competitive.

The importance of industry in the Czech Republic is still very high (e.g. according to European Statistics Eurostat, data for 2016, 33 % of GDP was gained in industry and 29 % of Czech people worked in the industry sector.). According to Milichovsky (2017), it is important for every industrial company to focus on the current situation as well as on future one, because the results of previous periods could be misrepresentative.

Taking the above in to consideration, the article aims to find out if the synergy of the two approaches — IFC and services — contributes to higher positive effect on business performance. In this paper, firstly, we would like to briefly introduce two approaches — IFC and services, and secondly, to determine if the implementation of these two approaches can increase business performance. Methods used for the writing of this paper are description, analysis and synthesis. The relationship between environmental and ethical aspects and business performance is analysed by using Spearman's rank-order correlation. Regression analysis was used for measurement of the synergy.

The article is structured as follows. The first chapter introduces the development of attitudes towards IFC and services in product-oriented companies. The second chapter involves research question development. The third chapter describes research methodology. This chapter is divided into research design and survey information and its statistical processing. The fourth chapter focuses on presentation of the results. The fifth chapter offers a comparison the findings with the other researches and shows limitation of the research. The last chapter offers a summary of the article and stresses the implication of the findings for theory and practice.

Literature review

Interfunctional coordination

IFC is considered a highly significant component of market orientation. Market orientation is an approach aimed at external and internal elements and activities leading to performance increase (Tomaskova, 2005). The

other important components of market orientation include customer orientation and competition orientation. Very often IFC is, in the sense of market orientation, mentioned as the coordination between all departments, e.g. Jaworski and Kohli (1993), coordination of the utilization of company resources in creating an improved value for customers (Narver & Slater, 1990) or cooperation between different functions or departments within a company (Tay & Tay, 2007). Coordination and cooperation is connected with communication, which is highlighted by Woodside (2005). This paper expands on the current conception of IFC. In our conception, IFC includes the following parts: Cooperative Arrangements, Company Culture, Functional and Expertise, Communications, Leadership Style, Ethics and Goodwill, Organizational Structure, Coordination and Control.

Since 1990, hundreds of measurements of market orientation on business performance have been conducted. To sum up, a positive influence of market orientation, and IFC as a part of market orientation, on business performance has been shown, e.g. Narver and Slater (1990); Jaworski and Kohli (1993); Matsuno and Mentzer (1995); Gray *et al.* (1998); Deng and Dart (1999); Akimova (2000); Langerak (2001); Vázquez (2002); Hooley *et al.* (2003); Woodside (2005); Menguc *et al.* (2007); Sousa and Lengler (2011); Smirnova *et al.* (2011); Kanovska and Tomaskova (2012); Julian *et al.* (2014); Wilson *et al.* (2014).

By contrast, only a minority of researchers analysed the influence of individual IFC (not a part of market orientation) on business performance. Mentzer (2001) or Woodside (2005) describe the positive impact of IFC on competitive advantage and overall profitability. Furthermore, Min (2015) noticed that IFC is important especially for logistics activities. A change in logistics activities has an impact on the efficiency and the effectiveness of production.

Services in product-oriented companies

The services offered by a manufacturer are activities complementing their products. Manufacturers can benefit from the service differentiation and use it to design alternative marketing strategies. Oliva and Kallenberg (2003) noted that highlighting service differentiation could lead to a company transitioning from being a pure goods provider to a service provider. The focus on service differentiation suggests a variety of procedures, which can further support the customer-oriented approach leading to a positive impact on the business results. Nevertheless, service differentiation can reduce the perception of the customer complexity and can move the cus-

tomers and innovativeness from the centre of the company's attention at the same time (Gebauer *et al.*, 2011).

During recent years, services have become a significant factor of revenue growth and profitability. There are some examples of companies, such as ABB, Caterpillar, General Electric, or Rolls-Royce, which confirm strong service business growth. Today, service revenues account for nearly 50% of total revenues (Gebauer *et al.*, 2016). Service revenues mostly consist of “advanced services” (Baines & Lightfoot, 2013), which incorporate maintenance, repair and overhaul contracts. Revenue generation is directly linked to the asset availability, reliability and performance in advanced services (Martín-Peña & Bigdeli, 2016). According to Oliva and Kallenberg (2003) revenue and profits are mostly attributable for the services. Products often become an add-on to services. Service differentiation, for a service provider, means the key strategic priority, constructed on the company's customer centricity and innovativeness (Gebauer *et al.*, 2011).

The services offered by a manufacturer are activities complementing their products. Moreover, services revenues frequently offer healthy profit margins that help compensate for the declining revenues and profitability in equipment sales (Reinartz & Ulaga, 2008). Besides, services might stabilize cash flows and provide increased visibility in revenue streams, a key benefit in economic slumps (Oliva & Kallenberg, 2003; Fang *et al.*, 2008). Extending the service business thus promises greater firm revenues and profits (Wise & Bumgartner, 1999).

Research question development

Services are a part of customer orientation and the influence between IFC and customers was confirmed by e.g. Narver and Slater (1990) or Zhao and Cavusgil (2006). Kirca *et al.* (2005) proved that the correlation between market orientation and business performance is stronger for manufacturing firms than for service providers. Ordanini and Maglio (2009) studied the development of new services, which are recognized as vital for service offering and are able to ensure excellent and sustainable competitive advantage. Tests among companies providing hospitality services were performed in order to determine how successful service development could be achieved. It was discovered that a proactive market orientation is imperative to the successful development of new services. Peña, Jamilena and Molina (2011) regarded that market orientation, as a competitive strategy, is suitable for small service firms operating in local markets. The rural tourism sector was analysed, and a positive impact of the employment of in-

formation and communications technology on market orientation and performance was discovered. Chen and Myagmarsuren (2012) analysed the relationship between market orientation from the perspective of value offerings (i.e. service emphasis and price emphasis) and business performance. The results of Thai travel agencies suggest that the more that price is emphasised, the greater impact it has on the market orientation-performance relationship. According to Tomášková and Kaňovská (2016) it was confirmed that a) there is a significant relationship between IFC and the development of new products and services according to customer needs and b) there is a partly significant relationship between IFC and the quality of products and services provided in manufacturing companies.

However, no research is aimed at the synergy of IFC and services on business performance in manufacturing companies. There is only research about IFC (often as a part of market orientation) and the impact of IFC on business performance or services and the influence of IFC on business performance or correlation between IFC and services. It is apparent that there exists:

- a positive relationship between IFC and business performance (e.g. Narver & Slater, 1990; Jaworski & Kohli, 1993; Mentzer, 2001; Woodside, 2005; Menguc *et al.*, 2007; Smirnova *et al.*, 2011; Julian *et al.*, 2014);
- a positive relationship between services and business performance (e.g. Reinartz & Ulaga, 2008; Oliva & Kallenberg, 2003; Fang *et al.*, 2008; Wise & Bumgartner, 1999);
- a positive relationship between IFC and services (e. g. Ordanini & Maglio, 2009; Tomášková & Kaňovská, 2016).

For this reason, we believe that companies can achieve higher business performance through both the implementation of IFC and the focusing on services, and we propose the following research question (RQ):

RQ: Does synergy of IFC and services in companies producing electric equipment and electronic components have a higher positive effect on business performance?

Benecke *et al.* (2007) stressed the advantages of the synergy effect. (1) Synergy is systemic and it is viewed in the context of processes. (2) Working together brings a greater value than working apart. (3) It is the result of a process whereby better use of physical and invisible resources is made by viewing the total diversified organisation as one system. (4) It has a positive influence on business performance invisible assets, like brand name,

customer knowledge, technological expertise and corporate culture can be used elsewhere in the company without the risk of being depleted.

Research methodology

This article includes the results of the research aimed at IFC, services and business performance.

Research design

To determine the answer for our research question, we had to prepare a questionnaire focusing on IFC and services. The questionnaire has a Likert scale form; the range of Likert scale was from 1 (No, I don't agree) to 5 (Yes, I agree).

The subject of IFC with 22 items was divided into the following parts: Cooperative Arrangements, Company Culture, Functional and Expertise, Communications, Leadership Style, Ethics and Goodwill, Organizational Structure, Coordination and Control. Each part involves two items; the part of coordination is divided into Coordination Activities, Fundamental Information Acquisition and Information Coordination and includes six items. This part of questionnaire was partly created from the results of previous pieces of research (Kanovska & Tomaskova, 2012; Bartosek & Tomaskova, 2013), meaning that 15 items were chosen from the “New Method” measured market orientation by Tomaskova (2005). All 15 items were distributed into the above-mentioned parts (such as Cooperative Arrangements, Company Culture, etc.). Some new items were added to the questionnaire: a) two items related to Cooperative Arrangements were inspired by Mentzer (2004), b) one item related to Company Culture was inspired by Homburg and Pflesser (2000), and c) four entirely new items related to Functional and Expertise, Ethics, Fundamental Information Acquisition and Information Coordination.

The second part of the questionnaire, related to services, involves 27 items. The items are divided into three parts: a) Service Offering with twelve items, b) Importance of Services with six items and c) Service Delivery with nine items. Five items (three from Service Offering and two from Importance of Services) were based on previous research. This research was undertaken in 2005 in the sector of SME's of saw and saw bands in the Czech Republic (Kanovska, 2005). Another four items (two from Importance of Services and two from Service Delivery) were inspired by the above-mentioned research. The items in Service Delivery (four

items) were mostly stimulated by Gebauer *et al.* (2010) and Turunen and Toivonen (2011). The rest of the items in the questionnaire are new. They are, firstly, based on the study of the literature, mainly Gebauer *et al.* (2012); Kindström and Kowalkowski (2014) and Baines and Lightfoot (2013); secondly, created according to the interviews with manufacturers; thirdly, based on the recent information about service support in manufacturing companies; and lastly, based on the information from journals focusing on services.

Another two important sections were added to the questionnaire, namely the questions related to Company Performance and also General Questions about the respondents.

Survey information and its statistical processing

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) and CZ-NACE 27 (The production of electric equipment) in South Moravia Region. According to the Czech Statistical Office, the total number of these SMEs reaches 107. Respondents were contacted over the phone or by email and asked to fill out a web-based questionnaire. A total of 60 completed, valid questionnaires were processed.

Directors or managers of companies producing electrical equipment and electronic components in the Czech Republic were respondents taking part in the research.

The complete database of sixty questionnaires was analysed by using the statistical software package Minitab, version 17. The data was analysed by using standard statistical methods. For the measurement of the correlation for two variables Spearman's rank correlation coefficient could be used. Regression analysis was used for measurement of the synergy.

Results

As the topic of this paper is meant as a pilot study, we have stated four synergies for answering the RQ. Therefore, the combinations (synergy 1 — synergy 4) of three items were chosen from the questionnaire. Each synergy is based on three related items: a) the item of IFC, b) the item of services and c) the item of business performance.

Synergy 1

Synergy of competency and responsibility of workers on the one hand, and perfect distribution on the other hand, leads to a higher positive effect on business performance. The first group contained some items connected to the organisational structure and its transfer into distribution and also a decrease of the number of warranty claims “Every worker knows his competency and responsibility” (item IFC13); “Delivered products, incl. services, are delivered completely, in time and in good technical conditions” (item S3); “The number of warranty claims decreases” (item BP3). Table 1 shows Spearman correlation coefficient between these three items.

The Spearman coefficient shows a high positive correlation between the item of IFC and the item of business performance and the item of IFC and the item of services ($p < 0,05$). However, the item related to services and the item related to business performance is independent ($p = 0,131$).

Table 2 shows analysis of variance source at first synergy. No synergy was detected, because of synergy significance test $p = 0.484$.

Synergy 2

Synergy of analysis of remarks of workers on the one hand and analysis of customer needs on the other hand leads to higher positive effect on business performance. The second group involved items oriented on the analysis of workers' remarks and customers' needs which can lead to an increase of new customers: “We analyse remarks of workers” (item IFC6); “New products including services are developed, tested and improved according to customer needs” (item S6); “The number of new customer increase year-on-year” (item BP2). Table 3 shows Spearman correlation coefficient between these three items.

Spearman coefficient shows a high positive correlation between the item of IFC and the item of business performance ($p < 0,05$). However, the item related to services and the item related to business performance and the item related to IFC and the item related to services are independent ($p > 0.05$).

Table 4 shows analysis of variance source at second synergy. No synergy was detected, because of synergy significance test $p = 0.855$.

Synergy 3

Synergy of analysis of all-important information on the one hand, and service improvement on the other hand, leads to higher positive effect on

business performance. The third group included the items connected to the analysis of the information and service improvement and the influence on sales volume: “We gain and analyse all-important information regularly” (item IFC15); “Company pays high attention to service improvement” (item S3a); “Company registers the sales volume increased by current customers” (item BP1). Table 5 shows Spearman correlation coefficient between these three items.

Spearman coefficient shows a high positive correlation between all items ($p < 0,05$).

Table 6 (in Appendix) shows analysis of variance source at third synergy. No synergy was detected, because of synergy significance test $p = 0.141$.

Synergy 4

Synergy of information coordination on the one hand, and good IT systems to record data about services on the other hand, leads to higher positive effect on business performance. The last group involved items about the information coordination and IT systems and their influence on the production effectiveness: “We focus on information coordination among all company departments” (item IFC19); “Company has an IT system to record data about services (repairs, claims, etc.)” (item S8); and “Production effectiveness increase” (item BP5). Table 7 shows Spearman correlation coefficient between these three items.

Spearman coefficient shows a high positive correlation between all items ($p < 0,05$).

Table 8 shows analysis of variance source at last synergy. No synergy was detected, because of synergy significance test $p = 0.686$.

Discussions

The synergy between the selected items of IFC, services, and business performance was not found. The research question RQ was not confirmed. The results are the opposite of outcomes presented by John and Harrison (1999). They found that most high-performing, manufacturing-related firms create high value by using synergy. These manufacturing companies aggressively pursued resource-sharing and employed administrative mechanisms to achieve coordination. They noticed that relatedness in physical capital and human resources is a necessary, but not satisfactory, condition for creating the synergies.

The reason for the disconfirmation could be seen in the type of companies participating in our research, including small and medium enterprises, but excluding large companies. Benecke (2007), Juga (1996), Ensign (1998) and other authors explore synergy in large companies between individual business units.

Secondly, the observed data did not reach a statistically significant synergy in any case. This test did not confirm synergy; however, it is not possible to definitely exclude that some synergy exists. The reason why the synergy was not shown may be caused by difficulties in the realization of synergy within a company. This consideration is presented by Chang (1990). He stressed that stronger competitive advantage of constituent business units is the cause of difficulties in the realization of synergy in a company. According to Shaver (2006), the merging of many different types of businesses could have a negative impact on competitiveness due to the fact that synergy, on the contrary, may increase threats and eliminate the ability to react positively to conditions on the market.

Furthermore, the variables in our research were not monitored either during a short-term period nor a long-term period. The time could be a very important variable. According to Shirokova (2014), the results of their analysis suggest that rapid realignment and rapid transformation is more likely to have a stronger impact on the firm growth in the short/medium-term, but a weaker impact in the long-term for emerging market companies.

Conclusions

This article shows how IFC and services provided by the manufacturers of electrical equipment and electronic components in the Czech Republic influence business performance. The research was aimed at manufacturers of computers, electronic and optical products and at manufacturers of electrical equipment. In brief, the results show that synergy of IFC and services on business performance has not been confirmed.

The article has important theoretical implications. This is the first piece of empirical research in this area carried out among the electronic components manufacturers and the electrical equipment manufacturers in the Czech Republic. Newly, this paper attempts to address whether implementation of IFC and services can produce a higher positive influence on business performance. However, the result of our pilot study does not confirm that.

The article offers useful practical implication as well. The results show that it is possible to see (a) a positive correlation between IFC and business performance; (b) some positive correlation between services and business performance; and (c) some positive correlation between IFC and services. These results can help companies with their approach towards IFC and services.

The limitation of our research is with regards to the impact of time on business performance. It could be useful to differentiate between a short-term impact on business performance and a long-term impact on business performance. This would take into account the time and its impact on business performance.

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Annex

Table 1. Spearman correlation coefficient at 1st synergy

Items	Results*
Item IFC13 and item BP3	0.444 0.000
Item S3 and item PB3	0.206 0.131
Item IFC13 and item S3	0.330 0.013

Note: *The first value is Spearman's correlation the second value is p-value.

Table 2. Regression analysis — assessment of Variance Source at 1st synergy

Variable	Estimate	t-student	p-value
Constant	1.220	-	-
Item IFC13	0.544	1.93	0.059
Item S3	0.275	0.810	0.423
Item IFC13*ItemS3	-0.056	0.701	0.484
Coefficient of determination		0.667	

Table 3. Spearman correlation coefficient at 2nd synergy

Items	Results*
Item IFC6 and item BP2	0.332 0.013
Item S6 and item PB2	0.142 0.291
Item IFC6 and item S6	0.184 0.170

Note: *The first value is Spearman's correlation the second value is p-value.

Table 4. Regression analysis — assessment of Variance Source at 2nd synergy

Variable	Estimate	t-student	p-value
Constant	1.910	-	-
Item IFC13	0.315	1.12	0.268
Item S3	0.010	0.020	0.981
Item IFC13*ItemS3	0.019	0.180	0.855
Coefficient of determination		0.542	

Table 5. Spearman correlation coefficient at 3rd synergy

Items	Results
Item IFC15 and item BP1	0.311 0.022
Item S3a and item PB1	0.353 0.008
Item IFC15 and item S3a	0.499 0.000

Note: *The first value is Spearman's correlation the second value is p-value.

Table 6. Regression analysis — assessment of Variance Source at 3rd synergy

Variable	Estimate	t-student	p-value
Constant	-0.142	-	-
Item IFC13	-0,829	2.07	0.043
Item S3	-0,913	2.22	0.031
Item IFC13*ItemS3	-0.169	1.501	0.141
Coefficient of determination		0.542	

Table 7. Spearman correlation coefficient at 4th synergy

Items	Results
Item IFC19 and item BP5	0.549 0.000
Item S8 and item PB5	0.390 0.004
Item IFC19 and item S8	0.500 0.000

Note: *The first value is Spearman's correlation the second value is p-value.

Table 8. Regression analysis — assessment of Variance Source at 4th synergy

Variable	Estimate	t-student	p-value
Constant	1.346	-	-
Item IFC13	0.573	2.26	0.029
Item S3	0.217	0.280	0.771
Item IFC13*ItemS3	-0.029	0.410	0.686
Coefficient of determination		0.542	