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INNOVATION DIFFERENCES BETWEEN SERVICE AND NON-SERVICE FIRMS IN CROATIA

Services have different characteristics than products, and naturally we would expect this to be reflected in innovation development practices of service companies. Although there exist empirical studies that address this issue in developed economies, no study to date investigated this question in a transition country. In particular, this paper explores whether service firms in Croatia are inclined to adopt modern business tools like new product development process, and whether they differ in the use of business functions in product development. The paper is based on an empirical study of Croatian companies performed in spring 2002.

Introduction

Innovation plays a crucial role in transformation of economic structures and industrial sectors in transition countries through development of new products, services and processes. Improving innovative capabilities will require transfer and adoption of new technologies and their integration in firm's existing activities, but it will also require the adoption of advanced business practices. Firms in transition economies find this challenging because business skills required for successful innovation were not considered important in centrally planned economies. Accordingly these skills, which include marketing, management,

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management of human resources etc., were often neglected in past. This lack of experience in modern business practices may act as an impediment in reaching desired innovation capability, and consequently in reaching desired competitiveness level. The companies in Central and Eastern European countries (in further text CEECs) have become aware of the importance of adoption of advanced business practices including those for innovation development. As a result in the last decade the companies in CEECs have started adopting new product management tools and practices and integrating them into the business routine (Mickiewicz and Radosevic 2001). One of these advanced business practices is new product development process (in further text NPD process), which is usually described as a conceptual and operational model for moving new product or service projects from idea to launch and beyond.

A particular topic of this paper is the difference between service and non-service companies in innovation practice, as seen in a transition country. Services have different characteristics than products, and naturally we would expect this to be reflected in their innovation development practices. Although there are several studies that address this issue in developed economies, no study to date investigated this question in a transition country. In particular, this paper explores whether service firms in Croatia are more inclined to adopt modern business tools like new product development process, and whether they differ in innovation practices and innovation output. The paper is based on an empirical study of Croatian companies performed in spring 2002.

Literature review

Although both literatures on new product development and on new service development are large, literature on differences between service and non-service firms in new product development is rather small.

One point of difference between service and non-service firms is in use of new product development process (NPD process for short). Urban and Hauser (1993) described NPD process as consisting of five groups of activities: opportunity identification and screening, product design, testing, commercialization and post-launch control. Copper and Kleinschmidt (1991) found that firms use formal development processes for three main reasons. First, to improve cooperation, coordination, and communication among people involved in new product project. Second, to improve quality and timing of the activities that make up the project. The third main reason is the desire for more control and information. Several studies found that structured NPD process is one of the key factors for new product

success (Cooper 1990, Cooper 2001, Cooper and Kleinschmidt 1986, Cooper and Kleinschmidt 1991).

NPD process, that has been used in manufacturing firms for at least two decades, has been adopted by service firms relatively recently. Empirical studies of service industry often found that service firms do not use development processes in the same way as manufacturing firms. Bowers (1989) did an empirical study of US banks, insurance companies and hospitals and found that in general these firms are doing an incomplete job of managing the development process, often skipping some stages. The same result was reported in Edgett (1996) for financial companies. This can be caused by the relative inexperience in using such processes in service industry, but another explanation may be that these are in fact modifications of new product development process that reflect different characteristics of service industry.

It is natural to expect that the difference between goods and services would reflect itself in the innovation development process. Mitchell Madison Group (1995) found that some service characteristics such as intangibility and close temporal connection between service delivery and service manufacturing (service is produced and delivered at the same time unlike manufactured goods), lead to differences between service firms and goods-producing firms. However the same study also reports that regardless of the differences, many of the key success factors for new service development are identical to those identified in manufacturing firms. Cooper and de Brentani (1991) also found that the factors associated with success and failure are mostly similar for service and manufacturing firms.

A study by Griffin (1997) finds that on average service firms use similar but different product development processes. According to that study, the main difference is in the number of development steps (service development processes on average consist of a statistically fewer number of steps than manufactured goods processes). A very interesting finding is that although on average Griffin reports differences between service and manufacturing firms, almost none existed when best firms from both sectors were considered.

There is a lack of empirical studies comparing service and non-service companies regarding importance of business functions in product/service development. There are some empirical studies that documented importance of marketing in new service development (Johne 1993, Johnne and Pavlidis 1996). However, these studies point out the importance of truly cross-functional product development, where no function should dominate others.

The purpose of this paper is to add to the literature by comparing the service and non-service firms regarding new product or service development, in particular the presence of NPD process and importance of business functions in product development.

Survey

The study was performed on leading Croatian companies from all sectors of industry. The companies were chosen so that the share of firms from a certain industry in the sample equals that industry's share of employment.

This survey was targeted at leading firms in Croatia. These firms were defined as fulfilling following criteria: either the company has more than 100 employees, or its income exceeds 40,000,000 HRK (equivalent to about \$ 6,000,000). In addition, company was required to have some international experience. Companies were drawn from two sources. Primary source was ZAPI, which is the register of all firms in Croatia. Since the study was about largest firms, an additional source of information was "400 najvećih" ("400 Largest"), a list of firms ordered according to their yearly income. The newspaper Privredni Vjesnik publishes this list annually.

The sample did not discriminate regarding company ownership; it included both predominantly Croatian owned companies, as well as those in predominantly foreign ownership. Firms of various sizes were included in the sample.

The field study took place in the spring of 2002 through a survey that was administered by face-to-face interviews with CEOs of chosen companies. Out of 150 contacted companies, 100 companies responded. Data collection took a little over a month. Survey questions were based on literature review and the results of previous in-depth interviews with several companies. Questions were mainly seeking multiple choice or scale position answers. Questionnaire was pre-tested on six firms before the onset of the survey.

Hypotheses development

From this point on, according to conventional terminology of new product development literature, the word "product" is used both for products and services.

NPD processes in service and non-service firms

Firms that practice NPD development process were divided into three groups according to the level of sophistication. The least advanced group consists of firms where no formally documented process exists. The more advanced group contains

firms which use a formally documented process but without the involvement of cross-functional teams. Finally the most advanced group consists of firms that practice a formally documented process performed by cross-functional teams.

Service firms are less limited by outdated machinery and production processes, which means they might be more able to adopt modern business tools like new product development process. However, because of their flexibility in production, service firms on average exhibit less need for ordered structured NPD process than manufacturing firms. Implementation and running of an advanced NPD process is expensive, as it requires substantial financial and human resources. Consequently firms adopt NPD process only if they can clearly see the benefits. Although the best service firms introduce NPD process as well as the best manufacturing firms, we would expect that on average larger percentage of non-service firms adopt NPD process. We can explain this by the fact that manufacturing firms have less flexibility in production, being more tied to machinery, technology, and production processes, which makes it more crucial for them to carefully plan and execute all phases of new product development. We would expect this to hold in a transition country as well.

Hypothesis 1

In Croatia NPD process is less prevalent in service firms than in non-service firms.

Importance of business functions for new product development in service and non-service firms

Firms in transition economies often lack business skills necessary for successful new product development. To ascertain which skills firms recognize as deficient, preliminary interviews with managers were performed. Those interviews indicated that R&D, Management, Marketing, Manufacturing, and Sales are the functional areas that need to be addressed in the survey.

Information on business functions can help us to gain insight into new product development. Perceived importance of various business functions gives us information about nature of product development (for example radical versus incremental), and together with other information can help us to identify possible weaknesses in innovation development. Although these perceptions are expected to differ between service and non-service firms, this issue has not been investigated yet. In particular, service firms may have different perceptions due to the different

nature of their output. For example, when rating importance of business functions in innovation development, one can expect that service firms on average do not consider manufacturing as important as non-service firms, because production of services does not involve traditional manufacturing. The same can be expected for traditional R&D function. We formulate this as hypothesis 2.

Hypothesis 2

Service firms rate Manufacturing and R&D as significantly less important for new product development than Marketing, Sales and Management.

NPD process and business functions importance in service and non-service firms

According to Griffin (1997), the best service and manufacturing firms have many similarities when it comes to NPD process, but there are differences as well. Griffin's results show that similarity between service and non-service firms increases as we progress from less advanced to more advanced firms. It is not clear whether these similarities extend to the perception of business function importance. Treatment of business functions may be intrinsic to the nature of output, and not dependent on firm's level of new product sophistication. On the other hand, service firms that practice sophisticated innovation can be expected to use a blend of business functions in order to introduce innovative products, instead of relying on traditionally strong functions like marketing and sales. This is why advanced service firms may share the perceptions of advanced non-service firms. We formulate this as hypothesis 3a.

Hypothesis 3a

Among firms that practice advanced NPD process, service firms rate importance of business functions in new product development similarly like non-service firms.

We can expect that perception of business function importance changes with sophistication of new product development. This would indicate that business functions play different role in firms that practice advanced new product development, contrasted with those less advanced companies. We can formulate this as hypothesis 3b.

Hypothesis 3b

Service firms that practice advanced NPD process rate importance of business functions differently than those service firms that do not practice advanced NPD process. The same is true for non-service firms.

Need for business function improvement in service and non-service companies

This study examined not just perceptions of business function importance, but also perceptions about the need for improvement of business functions. Here the question was asked about improvement in general, not just in association with innovation development. This perception of the need for improvement informs us about companies' self-assessment in functional areas. In addition, comparing perceptions of business function importance with need for business function improvement gives us insight into new product development as it relates to company's strengths and weaknesses.

We can expect that companies which practice advanced product development do have different views of what needs to be improved than firms that have no structured NPD process in place. Advanced new product methods pose different requirements on company, and thus it is possible that business functions, which were considered adequate before NPD process introduction, are suddenly perceived as deficient and in need for improvement. We would expect this to be true both in service and non-service industries. Therefore we formulate following hypotheses:

Hypothesis 4a

Service firms that practice advanced NPD process have different perceptions of which business functions should be improved than those service firms that do not practice advanced NPD process.

Hypothesis 4b

Non-service firms that practice advanced NPD process have different perceptions of which business functions should be improved than those non-service firms that do not practice advanced NPD process.

Results: Difference between service and manufacturing industry

NPD processes in service and manufacturing firms

When asked about whether they agree that there is a well-structured process of new product development in their company, on average Croatian respondents in the service and manufacturing sector did not give significantly different answers. In other words, respondents in manufacturing and service sectors view the level of product development structure in a similar way.¹

However, when Croatian respondents were faced with the descriptions of the NPD process², significant difference was found between non-service companies and service companies. Data shows that larger number of manufacturing firms than service firms use formally documented process and multifunctional teams (please see table 5.1.1.). This proves hypothesis 1.

This finding is not surprising, since using formal processes for new service development is of more recent date than for manufacturing goods (Mitchell Madison Group (1995)). Griffin (1997) reports that although best US service firms have very similar innovation development processes to those of the best US manufacturing firms; in the total sample even 60% of all service firms in her survey did not use a formal NPD process. In Croatian sample, there is 42% of such firms among the service firms in the sample (please see table 5.1.1.). However, these numbers should be compared with caution since Griffin's sample is very large, while sample used for this study consists of hundred leading companies in Croatia.

¹ The question was phrased as "Would you agree that there is a well structured new product development process in your company?" . Answers were offered on the scale from 1 to 7 (1- completely disagree, ..., 7- completely agree). The average on manufacturing companies is somewhat higher, but not significantly (t-test is performed, $t = 0.65$, $p = 0.52$, 98 degrees of freedom)

² Descriptions are listed in table 5.1.1.

Table 5.1.1.

DIFFERENCE BETWEEN SERVICE AND MANUFACTURING FIRMS
 RELATED TO NPD PROCESSES

	Service firms	Manufacturing firms
No formally documented new product/service process and no multifunctional teams	24	7
There is a formally documented new product/service process but no multifunctional teams	12	9
There is a formally documented new product/service process with the use of multifunctional teams	21	23

Importance of business functions for new product development in service and non-service firms

According to the importance scores that companies in full sample ascribed to them, the business functions fall into two groups: in the first group are Management, Sales, and Marketing (there are no statistically significant differences among averages for those three functions). In the second group are R&D and Manufacturing (again the averages between those two functions are not significantly different). Although there are no significant differences within each group, there is a significant difference between the two groups of business functions. Namely, all scores for the second group are significantly lower than the scores for the first group³.

When instead of full sample, service and non-service firms were examined separately; it is found that the above pattern is driven by a large group of service firms in the sample. On closer observation, service firm data shows a very sharp division between the first and the second group of business functions, which is not surprising since service firms on average have less need for R&D and even less for Manufacturing⁴. Non-service firm data does not show the same division. The

³ Each function from the first group was compared with each function from the second group. All the differences are statistically significant to 1% (the largest p statistics is equal to 0.0016).

⁴ Notice that although smaller, the scores for R&D and Manufacturing are not small by absolute value. This is because some of the firms that were classified as service by their primary activity do perform certain manufacturing activities

average importance scores follow the same ranking as reported in the table 5.2.1., but the only significant differences are between Management and R&D, Management and Manufacturing, and Manufacturing and Sales. For details see the table 5.2.1. This proves hypothesis 2.

Table 5.2.1.

IMPORTANCE OF BUSINESS FUNCTIONS IN DEVELOPMENT
OF NEW PRODUCTS⁵

	Average (full sample)	Manufacturing firms	Service firms
Management	6,150000	6,146341	6,152542
Sales	6,080000	5,975610	6,152542
Marketing	5,930000	5,902439	5,949153
R&D	5,330000	5,463415	5,237288
Manufacturing	5,020833	5,341463	4,781818

*NPD process and business functions importance in service
and non-service firms*

Interestingly no statistically significant differences were found in importance of business functions across different product development practices in the full sample⁶. In other words, firms that practice advanced product development rate importance of business functions similarly as firms that practice less advanced product development. This is a rather robust finding because it did not change when the analysis was performed for service and non-service firms separately. Therefore we reject hypothesis 3b.

To check hypothesis 3a, ANOVA was used to compare service and non-service firms that are all in the most advanced group regarding NPD processes. Intriguingly, no difference was found in ratings of business function performance. Therefore we reject hypothesis 3a.

⁵ Answers were offered on the scale from 1 (not at all important) to 7 (extremely important)

⁶ ANOVA was used

***Need for business function improvement in service
and non-service companies***

Firms in full sample rate Marketing, Management and Sales as most in need of improvement (the question was asked about the need for improvement in general, not necessarily connected with innovation activities). These three business functions again fall in one group, while R&D and Manufacturing fall in the second group, which has significantly lower scores than the first⁷ (please see table 5.2.2.). Interestingly Marketing, Management and Sales are the same business functions that feature so prominently in new product development. Taking in account that these functions were not considered important in the period of centrally planned economy, one explanation for this result is that many companies acutely feel the lack of skills in those areas.

Although no statistically significant effects were found in importance ratings of business functions depending on the type of NPD process, significant differences appeared when respondents were asked which business functions were in need of improvement. Data shows that firms, which have no formal development process, report significantly bigger need for improvement in Marketing, Management, and Sales. Those firms with least advanced NPD process report greatest need for improvement, which suggests that firms are aware of their weaknesses.

The same analysis is repeated on service and non-service firms separately. On closer examination, it becomes clear that the above result is driven by non-service firms. Service firms data shows no significant difference in reported need for improvement across different product development practices. The only somewhat significant difference ($p=0.076$) is found for Management. In other words, service firms that practice advanced NPD process do not differ significantly from less advanced service firms in their perception of which business functions need improvement. Therefore we reject hypothesis 4a.

Compared across different product development practices, non-service firms do differ significantly in reported need for improvement in Manufacturing and Sales, and they differ somewhat significantly in the need for improvement in Management and Marketing. Non-service firms without formal development process report the largest need for improvement for all considered business functions, which suggests that such companies are well aware of their shortcomings. Therefore we accept hypothesis 4b.

⁷ Each function from the first group was compared with each function from the second group. All the differences are statistically significant to 2% (the largest p statistics is equal to 0.017)

Table 5.2.2.

THE NEED FOR IMPROVEMENT IN BUSINESS FUNCTIONS⁸

Firm type	Business function	No formally documented process	Formally documented process without involvement of cross-functional teams	Formally documented process with involvement of cross-functional teams
Service firms	R&D	4.77	3.54	4.39
	Management ^{*9}	5.36	4.09	4.72
	Marketing	5.45	4.18	4.89
	Manufacturing	4.32	4.18	3.72
	Sales	5.27	5.09	4.55
	Finance	4.68	4.27	4.72
Non-service firms	R&D	5.43	4.22	4.43
	Management ^{**}	5.86	4.56	4.52
	Marketing ^{**}	6.14	5.00	4.78
	Manufacturing ^{***}	5.86	3.89	4.26
	Sales ^{***}	6.14	4.44	4.78
	Finance	5.57	4.67	4.43

Conclusion

The results of Croatian study show that there are some significant differences between service and manufacturing firms regarding new product development. The study investigated the prevalence of NPD processes, importance of business functions in product development, and need for improvement of business functions.

The study shows that fewer service firms than non-service firms in Croatia use NPD processes. This finding supports results documented in other empirical studies, and can be explained by particular characteristics of service industry that are reflected in new product development.

⁸ Answers were offered on the scale from 1 (does not need improvement at all) to 7 (needs radical improvement)

⁹ * significant to 8%, ** significant to 7%, *** significant to 2%

Regarding business function importance, the study shows that service firms in Croatia rate Marketing and Sales as much more important than R&D, Manufacturing and Management. Non-service firms do not report such sharp differences, indicating that the business function deployment in new product development in such firms is much more balanced. An interesting finding is that the gap between service and non-service firms regarding business function importance does not get smaller for firms that practice advanced NPD, which is contrary to some existing empirical studies (Griffin 1997). This study did not find any significant differences in business function importance rating between service firms that practice advanced NPD and those that practice less advanced NPD. This suggests that regardless of NPD sophistication, product development in service firms in Croatia is driven predominantly by marketing and sales. This might indicate potential weakness in product development capability, considering that successful product development requires business function balance.

Regarding need for business function improvement, service firms that practice advanced NPD process do not differ significantly from less advanced service firms. While service firms show certain “uniformity”, in non-service firms we observe some significant differences. Namely, non-service firms that do not practice advanced NPD report that their need for improvement of most business functions is greater than for companies that do practice advanced NPD. This suggests that Croatian non-service firms which practice less advanced development are well aware of their need for improvement.

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RAZLIKE U INOVIRANJU IZMEĐU USLUŽNIH I PROIZVODNIH PODUZEĆA U HRVATSKOJ

Sažetak

Karakteristike usluga razlikuju se od karakteristika proizvoda, pa bismo zato prirodno očekivali da razvitak inovacija u uslužnim tvrtkama pokazuje različitosti u usporedbi s razvitkom inovacija u proizvodnim poduzećima. Iako u svijetu postoje empirijske studije o karakteristikama inoviranja u uslužnim djelatnostima, nijedna od njih ne odnosi se na tranzicijske zemlje. Ovaj članak ima za cilj ispitati koliko su uslužna poduzeća u Hrvatskoj sklona prihvatiti moderne metode - kao što je, npr., proces razvijanja novog proizvoda, i razlikuju li se u upotrebi poslovnih funkcija u razvijanju inovacija od proizvodnih poduzeća. Članak se osniva na empirijskom istraživanju hrvatskih poduzeća koje je provedeno u proljeće godine 2002.