

THE IMPORTANCE OF NEW PRODUCT DEVELOPEMENT IN SERBIAN SMALL-SCALE MANUFACTURING ENTERPRISES

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ABSTRACT

"Market pull" strategy is dominating in small scale manufacturing enterprises in the Republic of Serbia. The research whose results are presented in this work has determined the significance of this strategy from the aspect of developing new products. The strategy is reflected in close collaboration of enterprises and their customers, from the idea to the final product, including R & D activities. Beside customers, the main sources of ideas are: competitors and fairs. It has been also determined that marketing activities related to introduction of new products are limited and in comparison to the results from surrounding countries Serbia doesn't lag behind. However, in order to improve the activities related to the development of new products in Serbian small-scale manufacturing enterprises we have suggested two strategies in this work: "open innovation" in making closer collaboration with external knowledge sources and the creation of "innovative networks" with partners in this concept usage. Limitations of this research are: weak feedback from respondents (the questionnaire was sent by e-mail), geographical limitations of the sample and the lack of homogenous sample group in the analysis of certain parameters.

Key words: SMEs, new product development, market pull, open innovation

INTRODUCTION

Small manufacturing enterprises are seen as great driving forces of transitional economies growth. Although high-tech enterprises are dominating on the market, many manufacturing enterprises worldwide fall into low-tech (LT) and low-medium-tech (LMT) manufacturing enterprises. LMT enterprises are important from the aspect of employment, economic growth and knowledge creation (Hirsch-Kreinsen, 2008). LT and LMT enterprises make 53% and 35% out of the total number of all enterprises in EU countries (REPORT ON EUROPEAN SMEs 2012/2013). According to this fact taken from (Petrović, 2014), the enterprises in Serbia are presented, according to technological structure, in the following relation: 65% LT and 25% LMT enterprises. According to EU classification, the enterprises with less than 50 employees are small enterprises (SE), while micro enterprises (ME) have 10 employees (Lindner and Bagherzadeh, 2005). Urošević and Stamatović (2011) say that small and micro enterprises (SME) in Serbia represent 99,8% out of the total number of enterprises, 65,5% of unemployment, 67,6% of the turnover and about 36% of GNP. Generally speaking, SMEs are carrying out closed strategies for developing new products. However, there is a risk for enterprises business because the enterprises are not able to identify themselves and fulfill all business opportunities for product development (Tapio Lindman, 2002).

Market pull strategy is of high significance for successful new product development in small-scale manufacturing enterprises. This strategy requires a strong interaction with customers via sale, marketing and design of a product (Handfield et al., 1999). In the world developed economies SMEs often integrate suppliers for the development of new products through the common education and training, feasibility studies, adjusting common objective performances and estimation of product design (Petersen et al., 2003). SMEs have a weak negotiation power on the market. Therefore, a collaboration with big companies enables SMEs to develop and commercialize new technologies but it also increases the relation of dependence of SMEs to generate and value technologies to the detriment of their contribution to intellectual property (Katila et al., 2008). This work deals with a description of new product development and the application of strategies for improving manufacturing process and launching new products in Serbian SMEs. In the same time, we want to present our research related to new product development from the standpoint of the applied strategies in developed countries in the surroundings. We will also discuss the main disadvantages for new product development in Serbian SMEs and give some suggestions for improving the process.

BARRIERS IN THE DEVELOPMENT OF SERBIAN SMEs

Economy of the Republic of Serbia lags behind EU for 29.5 years. The worst are enterprises in the field of textiles (35 years), then the enterprises from mechanical engineering field (34.5 years) (Djordjević et al., 2011). Pharmaceutical enterprises lag behind for 21 years and they have the best result of all. From regional aspect, facilities, tools and other manufacturing means are worst in the south of Serbia (41 years), and the best situation is in Backa (about 18.5 years).

According to Aidis (2005), the biggest barriers for the development of SMEs are: lack of financial funds, lack of knowledge, lack of markets and resources. Domestic enterprises are not ready to enter international market, in other words, they are not strong enough to compete with foreign enterprises. In most enterprises with dominating domestic capital there is a problem related to late introduction of the world achievements in the field of management and modern management techniques are slowly applied. Moreover, Serbian enterprises are faced with other serious problems such as insolvency, business disability, indebtedness, technological underdevelopment and insufficient competitiveness so they have to accept foreign business experiences, especially those from global leaders (Djordjević et al., 2011). Table 1 gives a review of barriers for the growth of manufacturing SMEs in Serbia compared to Slovenia and Romania.

Table 1: Barriers for Serbian SMEs in comparison with Slovenia and Romania

Country Barriers	EU member		In transition
	Slovenia ¹⁾	Romania ²⁾	Serbia ³⁾
Company registration	•	•	•
Corruption	•	•	•
Credit conditions	•	•	•
Taxes			•
Qualified labor	•	•	•
Training		•	•
Imports and exports		•	•
Attracting investments		•	•
Cooperation with universities		•	•
Resources			•

1) Bartlett and Bukvič (2001); 2) Constantin (2002); 3) Čoćkalo et al. (2011); Kontić et al. (2012)

METHODOLOGY

In this paper we have examined the role and significance of new product development from the view of requirements satisfaction of final customers. A special attention was paid to the following elements: R&D, strategy for new product development. A sample of 300 manufacturing enterprises was planned but the answers were

received from 76 small manufacturing enterprises, including 48 middle and 28 small enterprises. Executives and their substitutes as well as other representatives from the enterprises participated in the poll.

Table 2 presents a sample structure which included manufacturing enterprises. The main problem in this research is related to the data of small-scale manufacturing enterprises presence in Serbia. Since the research was terminated at the end of 2011, (<http://webzrs.stat.gov.rs/WebSite/repository>) formal statistics was taken as reference data according to which the planned sample was less than 8% out of the total number of small manufacturing enterprises in Serbia and the result was a little over 3% of that number. There is a presumption that all SEs were not of small-scale manufacturing type, several manufacturing fields were examined simultaneously, in other words, we did not examine a certain homogenous group.

The questions were focused on the analysis of the existing strategies and new product development. The main objective was to determine the differences between the current practice in Serbian SMEs in relation to new product development and the introduction of new strategies in order to achieve market oriented way of business performance. The results were first analyzed by means of descriptive statistics. Chi-square test was used for examining new product development and the analysis of strategies aimed at final customers. The value $p < 0,05$ points at statistical significance for the rejection of general hypothesis in relation to researching customer requirements (market pull strategy), quality requirements related to managing development processes, launching and manufacturing of new product, requirements related to reducing costs of new product manufacturing as well as the needs of business enterprises in Serbia for better sale of products on the market.

Table 2: Manufacturing enterprises in Serbia

Business area	Number of respondents
The production of machines and devices, The production of electric and fiber devices	16
The production of chemicals, chemical products and artificial and synthetic fibers	16
The production of rubber products and product made from plastic mass	14
The production of basic metals and standard metal products	12
Wood processing and products made from wood	8
The production of food products	2
The production of textiles and textile products	2
The production of leather and objects made from leather	2
Publishing and printing	2
The production of products made from other non-metal minerals	2

FINDINGS AND DISCUSSION

SMEs in Serbia are working closely with their customers on new product development. About 69% of SMEs use a kind of "market pull" strategy while only 18% examinees said that they used a "technology push" strategy. Market pull strategy relies on respecting the needs of customers and the market. The essence of this strategy is, first, to "identify the customers needs", and then to start projects for the development of new technology (Brem and Voigt, 2009). About 83% SMEs directly combine their research activities with customers.

External sources of ideas for new product development are: buyers (29%), competitors (27%) and fairs and exhibitions (20%). In comparison to Serbia the results in Austria (buyers-21,4%/competitors-33,6%) (Kontic et al., 2012) and Slovenia (buyers-41%/competitors-22%/fairs or exhibitions-25%) (Constantin, 2002) are similar in the fact that collaboration with suppliers is better than in Serbia.

Unfortunately, the ideas practically never come from universities or research institutes which indicates a small influence of scientific and technical institutions on industrial development of Serbia. Unlike Serbia, in Austria 20% ideas for new product development come from universities and research institutes (Kaufmann and Tödting, 2002). In Slovenia, SMEs collaborate in a certain extent with state, public research institutes and universities in new product development (Hojnik, 2013).

Internal sources of knowledge are also significant for SMEs. In developed economies such as Great Britain, internal sources of ideas are present with only 28%, while the external factors are more extinguished (Laursen and Salter,

2004). The ideas from universities and research institutes are present in only 5%. In Serbia, internal R&D (84%) plays a significant role in new product development. This percentage is significantly higher in SEs (93%) than in MEs (78%). In this sense, R&D activities are reduced only to testing products or realization of technical services. About 92% examinees were directly involved in new product development in their SMEs. The main barriers for new product development were lack of financial means (58%) and institutional barriers (42%).

It is important to say that SMEs in Serbia fall into the group of modest innovators: 3.5% SMEs do innovative research activities while 19% of them were involved in innovative collaboration networks with other enterprises (Hadzic and Pavlovic, 2012). In comparison to the neighbouring countries about 17% of all Slovenian enterprises with domestic capital can be considered innovative (Damijan et al., 2005). When speaking about Romania, only 19% SMEs were involved in innovative activities directed towards new products (37%), new technologies (29%), managerial and marketing activities (24%), training of HR (13%) (Mioara et al., 2010).

Marketing activities are rather limited in SMEs. Only 33% examinees said that they carried out marketing activities when they advertised new products. Most enterprises represented new products at some exhibitions or fairs (67%). A small number of SMEs (22%) used professional journals or other technical publications for R&D activities related to new product development. Slovenian SMEs represented their products most frequently at fairs and exhibitions (83%) and in journals (75%) (Koschatzky et al., 2001). In Romania, 70% enterprises took part at fairs and exhibitions mainly at the national level while the rest of 30% enterprises presented their manufacturing program at international fairs which speaks about relatively low, efficient marketing activities (Dindire and Gănescu, 2010).

In Table 3 an intersection between Slovenian and Serbian SMEs is given, on the grounds of idea sources for new product development and marketing activities in advertising new products.

Table 3: Comparison of Slovenian and Serbian SMEs on the grounds of idea sources and marketing activities

SMEs		Slovenia	Serbia
External idea sources for new product development	Buyers	41%	29%
	Competitors	22%	27%
	Fairs and exhibitions	25%	20%
Marketing activities in advertising new products	Fairs and exhibitions	83%	67%
	Publishing ideas in professional/technical publications	75%	22%

FURTHER IMPROVEMENT FOR NPD

Low-tech concept is characteristic for relatively mature enterprises with a high percentage of low-qualified workers in which standard products are manufactured, where business risks are low, the enterprises do business at relatively wide market and in which the costs for R&D are low and internal scientific knowledge small. Lack of scientific and technical knowledge within low-tech enterprise can be compensated by high quality skills developed through practice and permanent learning at work (Hirsch-Kreinsen et al., 2003). In the same time, low-tech concept gives flexibility in enterprises re-organization with an accent on specific forms of knowledge.

On the other hand, SMEs cannot rely on internal forces and knowledge so they have to seek for the solutions from their surroundings. An efficient innovation process which is applied on new product development assumes the use of external knowledge sources and better usability of internal knowledge and intellectual property (Chesbrough and Crowther, 2006). In this sense, a collaboration with universities and research institutes would be useful for SMEs. According to Schartinger et al. (2002), universities have a key role in knowledge transfer. Their influence is reflected in common collaboration in research projects which are financially supported by enterprises through funding researches, defining contracts on permanent education of employees and involvement of academic researchers as consultants in private enterprises. For all these reasons the activities of Serbian SMEs should be definitely improved through technology, resources, and

knowledge from external sources. Serbia should make a strategic collaboration with the countries in the region in order to increase innovative activities.

SMEs in developed countries in the field of low-tech industry are able to use and integrate knowledge from external sources for new product development. When considering SMEs in developing countries, it has been said that they do not have contacts with research centres and multinational corporations, the generators of open innovations (Vrgovic et al., 2012). According to the same source, efficiently open innovation strategy requires a significant participation of the Government in building infrastructure and communication network among SMEs with a stress on market needs.

SMEs in developed countries have proved their ability to use and integrate knowledge from external sources for new product development. Open innovations are not necessarily connected to technology. The concept of open innovation has been known for a rather long time not only as a valid strategy for increasing competitiveness of SEs (Forsman, 2011) but for increasing their innovative capacities as well (Lee et al., 2010).

CONCLUSION AND IMPLICATIONS

Small manufacturing enterprises in Serbia mainly use "market pull" strategy as a dominating strategy for new product development. This approach enables a close collaboration with customers in all development process steps including common R&D activities. The research has shown that the most frequent idea sources for new product development in Serbia are: buyers, competitors and fairs and exhibitions. The ideas almost never come from universities or research institutes which shows a low influence of scientific – technical community on industrial development in Serbia. The results are similar in neighbouring countries, in Slovenia and Romania, for instance, which have a slightly better inclusion of external knowledge centres in generating ideas.

Marketing activities related to introduction of new product are reduced to low level of advertising. The main channels of advertising new products are fairs and exhibitions but even in this case a small part of SMEs use professional journals and other publications to report R&D activities related to new product development. The results are similar to the analyzed countries as well.

To conclude, two strategies are recommended for new product development in small-scale manufacturing enterprises on the territory of the Republic of Serbia: 1) Open innovation which points at the significance of external knowledge sources (universities, research institutes and innovation centres), through collaboration at national, regional and international level; and 2) creation of "innovative networks" through establishing a network with collaborators who would use a certain form of open innovations. Our research has shown that SMEs in Serbia are not concentrated enough on providing satisfaction of final customers, therefore we recommend the introduction of monitoring and control system in order to provide timely product delivery and satisfaction of customers in relation to product quality.

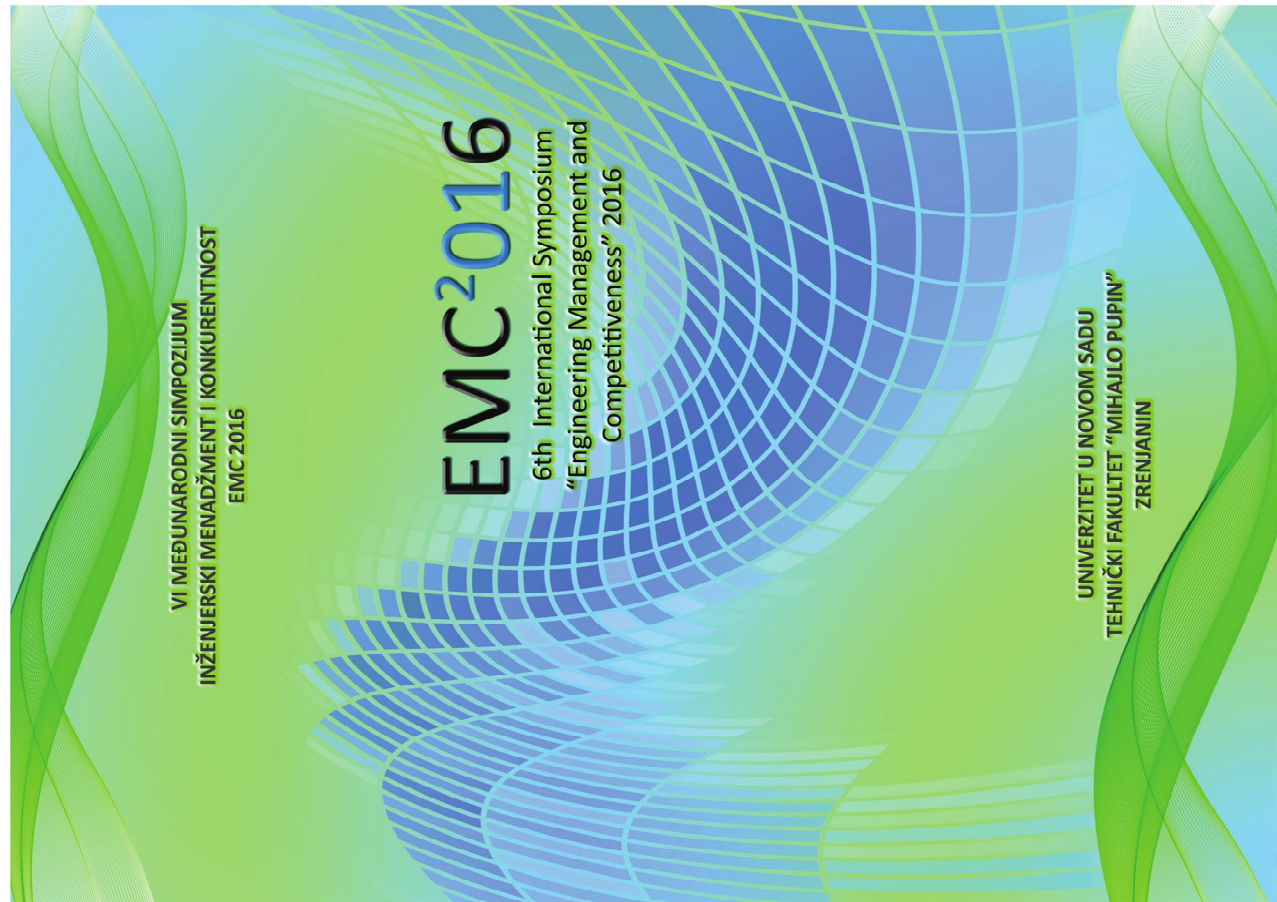
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INTRODUCTION

Department of Management and Technical faculty “Mihajlo Pupin” from Zrenjanin have started the organization of International Symposium Engineering Management and Competitiveness (EMC) in 2011. Since 2013 the organization EMC symposium has been supported by the following foreign partners: Szent István University, Faculty of Economics and Social Sciences, Gödöllő, Hungary, Voronezh State University, Faculty of Economics, Voronezh, Russia and University of Montenegro, Maritime Faculty, Kotor, Montenegro.

The objectives of the Symposium EMC are: presentation of current knowledge and the exchange of experiences from the field of Engineering management, consideration of development tendencies and trends in Serbia and the world as well, gathering researchers from this field with the aim of expanding regional and international cooperation, raising the level of professional and scientific work at Technical faculty “Mihajlo Pupin” from Zrenjanin, expanding cooperation with economic and educational institutions and encouraging young researchers within this field. Taking into account that this Symposium is international, the importance of this event is obvious for the town of Zrenjanin, Banat region, Vojvodina and Serbia. Organization of EMC by Technical faculty “Mihajlo Pupin” from Zrenjanin represents this scientific-educational institution as one of the major representatives of economic and social development in Banat.

Within this Proceedings are presented all accepted papers received for VI International Symposium Engineering Management and Competitiveness (EMC 2016). This year at the symposium we have 59 papers and 3 abstracts. The authors come from 15 countries: Albania, Bosnia and Herzegovina, Canada, Croatia, Hungary, Iran, Italy, Libya, Lithuania, Macedonia, Montenegro, Russia, Slovenia, USA and Serbia. The papers are divided into seven sessions: Plenary session, Session A: Management and operation management, Session B: Human resource management, Session C: Marketing and marketing management, Session D: Economy and financial management, Session E: IT management, Session F: Abstracts.

We wish to thank Technical faculty “Mihajlo Pupin” from Zrenjanin and the dean Prof. Ph.D Dragica Radosav for their active role concerning the organization of the Symposium. We are also expressing our gratitude to all authors who have contributed with their papers to the organization of our sixth Symposium EMC.

Symposium EMC become a traditional meeting of researchers in June, every year. We are open and thankful for all useful suggestions which could contribute that the next, VII International Symposium Engineering Management and Competitiveness (EMC 2017) become better in organizational and program sense.

President of the Programming Committee
Associate professor Dragan Čočkaló, Ph.D.

Zrenjanin, June 2016.

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