THE ACCEPTABLE STRATEGIES FOR NEW PRODUCT DEVELOPEMENT IN SERBIAN SMALL-SCALE MANUFACTURING ENTERPRISES

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The research results relating to the new product development are represented in this paper. The importance of market pull strategy is described too. Market pull strategy is reflected in the enterprise cooperation with customers from idea concept to final product, which includes R&D activities. Customers appear as external sources of ideas, but instead of them the main sources of ideas are competitors and fairs. Also, marketing activities in SMEs are very limited. In comparison to the neighboring countries Serbia does not have inferior position. For the new product development in Serbian enterprises with small-scale production, the paper proposes two strategies: "open Innovation" and "innovative network". Open innovations are important because of the close cooperation between companies and external knowledge sources, while innovative networks strategy has its advantages in creating business cooperation with subcontractors in the use of ideas and knowledge sources. Limitations of this study are: very poor response rate, geographical limitation and lack of a specific homogeneous group of samples in the analysis of certain parameters.
Keywords: combined hauling wood; the evaluation criteria of technological processes.

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. Based on the OECD classification, LMT industrial sectors are characterized by R&D intensity below 3% and incorporate mature industries, such as the food industry, paper, publishing and print industry, wood and furniture industry, the production of household appliances, and the production of metal products. LMT enterprises are important from the aspect of employment, economic growth and knowledge creation, [16]. LT and LMT enterprises make 53% and 35% out of the total number of all enterprises in EU countries, [38]. According to this fact taken from Petrović [34], 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, [29]. Urošević and Stamatović [48] 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. Spasojevic Brkic et al. [43] point out that innovation performance is very important aspect of business performance, but 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, [47].

New product development in SMEs includes the following phases: opportunity identification (market segmentation, target group definition, strategic alliances for new technology and production), design (customer interviews to identify customer needs, coordination with engineers and production, concept test), testing (informal

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communications tests, product tests, customer placement tests, prelaunch forecasts, monitor roll-out and improve), introduction (national penetration, monitor customers), and life - cycle management (adjust marketing, observing competitors, improving product and service, quality management).

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, [15]. 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, [33]. 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, [20].

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 line with those presented in our previous publications [e.g. 51]. 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 29.5years. The worst are enterprises in the field of textiles (35 years), then the enterprises from mechanical engineering field (34.5 years), [11]. 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 (41years), and the best situation is in Backa (about 18.5 years).

According to some authors [1, 13, 30, 41] the biggest barriers for the development of SMEs are: slow procedures for business registration, high

level of corruption, unfavorable credit conditions, high taxes, lack of qualified labor, lack of training in management and new technologies, the decline in imports and exports, weak purchasing power of the population, poor efficiency in attracting investment from EU funds, poor cooperation between universities and enterprises, as well as the lack of 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, [11].

Stanisavljev et al. [45] pointed out the barriers in the competitiveness of Serbian enterprises through: lack of knowledge 24.8%, the usage of out of date equipment and technology 24.1%, inadequate use of modern methods and management techniques 16.54%, and the lack of a stimulating business environment 8.27 %.

Table 1 gives a review of barriers for the growth of manufacturing SMEs in Serbia compared to Slovenia and Romania.

In the case of Iran [19], were found the main barriers: lack of innovation, lack of competitive spirit between small and medium-sized enterprises and very poor cooperation with universities and research centers. In this connection, the authors state that these barriers can be eliminated by introducing various strategies.

Today, SMEs are active in the global market. These companies can overcome the existing barriers because they incorporate a variety of strategies: entrepreneurship, marketing, innovation, networking and cooperation with external sources of knowledge, [22].

We can conclude that lack of the mentioned strategies that affects the barriers still exist. The paper deals with the analysis of the existing situation in Serbia and proposes new strategies to eliminate these barriers and increase the efficiency of SMEs. The strategy and policies for the development of industry in Serbia in the period of 2011-2020 [46] indicate that SMEs are the

most important source of industrial growth and new employment in the Republic of Serbia. This strategy should be focused on technology development, the knowledge of scientific personnel, cooperation with science-research centers and faculties, and the adoption of ever more present, rigorous, environmental standards. The "industrial politics" strategy [37] points out that the basic goal of the industrial development of the Republic of Serbia is a creation of a modern, developed and competitive industrial structure.

Research settings

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 and 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 (the structure is given in table 2). Executives and their substitutes as well as other representatives from the enterprises participated in the poll.

This research was a part of a broader study that deals with investigating various business aspects of manufacturing SMEs in Serbia, as very important entities [42]. Questionnaires were sent electronically to 300 SMEs and the response rate was 25%. According to the official statistics for 2011 (data of Statistical Office,the Republic of Serbia, relevant for the research) the sample size corresponds to 0.5% of micro and small enterprises operating in the processing industry in Serbia. However, we believe that the total number of relevant micro and small enterprises is significantly lower than the number from the official statistics, since these data include a large but unknown number of enterprises engaged in individual and not in a small-series production, as well as a considerable number of companies that are no longer active due to the ongoing economic crisis in Serbia since 2008. Therefore, the sample size covers a larger percentage of relevant SMEs, which somewhat increases its limited validity. According to data for 2011, SMEs were distributed in two regions: Central Serbia and Vojvodina. About 71% of SMEs operating in the processing industry were located in Central Serbia, while the remaining 29% SMEs were from Vojvodina. Our research sample included 74% of SMEs from Central Serbia and 26% from Vojvodina, which is close to the official regional distribution.

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.

After collecting the data, a statistical analysis and primary data presentation were performed.

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

Country	EU member		In transition
Barriers	Slovenia[1]	Romania[2]	Serbia[3]
Company registration	●	●	●
Corruption	●	●	●
Credit conditions	●	●	●
Taxes			●
Qualified labor	●	●	●
Training		●	●
Imports and exports		●	●
Attracting investments		●	●
Cooperation with universities		●	
Recources			●
Source [2,7,8,23]			

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.

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, [4, 40]. About 83% SMEs directly combine their research activities with customers. In Table 3, the importance of market pull strategy in Serbian SMEs is shown. In the "market pull" strategy SMEs mostly create products according to specifications and documentation sent by a buyer (p<0.005).

A large number of employees believe they work in an innovative enterprise (70%), and the introduction of new technology represents an advantage for an enterprise (82.5%).The respondents, through "technology push" strategy, view buying new technology (42.5%) and buying technological solutions 32 (40%) as the best ways to improve business activities. The risks involved in introducing new technologies are: high investment in new technology (22.5%), an increase in product manufacturing expenses (12.5%), intellectual theft of information (12.5%) and inaccurate assessment of the market (12.5%). In Table 4, the importance of technology push strategy for SMEs in Serbia is shown. The implementation of this strategy is reflected in: warehouse usage, distribution of workers according to their qualifications and maintenance service.

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

Table 3: The importance of market pull strategy for SMEs in Serbia

Market pull strategy	x^2	
	Respondents	p
Realization of a new product according to specifications and documentation from the buyers	22 (40.7%)	

According to the theory, the new product development in enterprises is considered as: innovation, modification or elimination of the existing old product. Development of a new product in small-scale production is realized mostly: through modification (62,5%), and through innovation (37.5%). The main reasons for product modification are: using existing capacities (47,5%), avoiding large investment in the R&D of the products (45%) and small modifications that give the product new applications (42.5%). The reasons for investing in a new product include: improving enterprise competitiveness (75%) and pointing out product quality (45%).

External sources of ideas for new product development are: buyers (29%), competitors (27%) and fairs and exhibitions (20%). We see that fairs still have a role in representing SMEs in Serbia.

Table 4: The importance of technology push strategy for SMEs in Serbia

Technology push strategy	x^2	
	Respondents	p
Warehouse use	24 (60%)	0.05
Distribution of workers according to their qualifications	28 (70%)	0.022
Maintenance service	16 (42.1%)	0.018

Respondents mostly exhibited their production program thaqnks to their own engagement (27.5%). Fairs and exhibitions help enterprises in promoting their products. They represent trusted medium for information sharing. Participation in fairs and exhibitions enables creation of new commercial agreements, meeting competition, potentially increasing the number of customers, and entering new markets, [3]. In comparison to Serbia the results in Austria (buyers-21,4%/competitors-33,6%) [23] and Slovenia (buyers-41%/competitors-22%/fairs or exhibitions-25%) [7] 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, [21]. In Slovenia, SMEs collaborate in a certain extent with state, public research institutes and universities in new product development, [18].

Most SMEs in developing countries participate in financing projects for their needs. It is also a big undertaking, but also an incentive for SMEs to occupy their strategic position for further development and strengthening in the domestic and international markets. In this matter, the situation in Serbia is unfavorable because 60% of domestic enterprises have never participated in financing of any projects, whereas only 27.5% participated in the projects funded by domestic capital.

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, [26]. In the case of USA, the share of SMEs in industrial R & D has increased from 4.4% in 1981 to 24.1% in 2005, [44]. 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%).

The enterprise is seen as innovative because it adopts new ideas and responds quickly to external changes. The largest number of respondents believe that they should accept challenges. They think they work in innovative enterprise (70%), while the rest claim they work in traditional enterprise (30%). 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, [14]. In comparison to the neighbouring countries about 17% of all Slovenian enterprises with domestic capital can be considered innovative, [9]. When speaking about Romania [31], only 19% SMEs were involved in innovative activi-

ties directed towards new products (37%), new technologies (29%), menagerial and marketing activities (24%), training of HR (13%).

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%), [24]. 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, [10].

In Table 5 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.

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, [50]. In EU countries, low-tech companies represent 32% of the total number of enterprises in the manufacturing sector, while high-tech companies are present in only 6%, [37]. 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, [17]. In the same time, low-tech concept gives flexibility in enterprises re-organization with an accent on specific forms of knowledge,

such as practical knowledge, from which potential competitors can easily take advantage, [28].

On the other hand, SMEs cannot rely on internal forces and knowledge so they have to seek for the solutions from their surroundings, [36]. 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, [5]. In this sense, a collaboration with universities and research institutes would be useful for SMEs. According to Schartinger et al. [39] and Wynarczyk et al. [54], 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, [32]. 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, [52].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.

Table 5: Comparison of Slovenian and Serbian SMEs on the grounds of idea sources and marketin gactivities

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%

Van de Varande et al. [49] introduced the term "open innovation" to describe the situation related to fulfilling user demands or permanently following the competitors. 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 [12] but for increasing their innovative capacities as well [27].

According to West and Gallagher [53] three main challenges were identified for enterprises that apply the concept of open innovation: finding creative ways to take advantage of internal innovation, inclusion of the external innovation in internal development and dormant motivation to provide a continuous flow of innovations. Developing strong relationships with partners who have different capabilities can significantly improve new product development in LMT enterprises. It is important for the partners to recognize their specific capabilities and integrate them into innovation networks based on partner coordination in the area of product development and manufacture, [25]. This type of networks leads to an open innovation concept which is defined as "…the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively." [6].

CONCLUSION

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 showh 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 cetres 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 analized 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.

Further implementation of open innovation in Serbia will provide: active cooperation with external knowledge centers, universities and institutes, the increase of internal innovation potential in the enterprise and effective involvement of SMEs in an open network of innovators.

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