

# OPEN INNOVATION POTENTIAL FOR AP VOJVODINA MANUFACTURING SECTOR IMPROVEMENT

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**Abstract:** *The culture of innovation was mostly linked with developed countries in the past. Recently, this concept has been introduced in developing countries, but not much research in this area has been conducted. Even though innovation potential in developing countries has been recognized, utilization is rather internal than external. Open innovation potential is yet to be explored in developing countries. This paper presents potential for improvement of manufacturing sector in Autonomous Province of Vojvodina (APV) through open innovation utilisation. Data collected from the survey that is conducted under international project European Manufacturing Survey shows that companies from APV cooperate with other organizations in the innovation field and that should be used as a base line for further research in the field.*

**Key Words:** *Open Innovation, Developing Countries, Manufacturing Survey, Potential, AP Vojvodina*

## 1. INTRODUCTION

Innovation has been recognized and widely acknowledged as one of the main drivers of the knowledge society. Recently, an increased number of companies started to involve customers, suppliers and other external parties in the process of innovation [1]. The use of external relationships is increasingly interpreted as a key factor in enhancing the innovation performance of modern enterprises [2]. The concept of open innovation was first introduced by Chesbrough in 2003 as he defined it as the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively [3]. The main four drivers for companies to start open partnerships are [4]:

- Cost reduction
- Knowledge gain
- Risk sharing
- Resources accessibility

Open innovation practice has received an extensive attention in the scientific research, management and government [5]. However, the most of the research was based on companies from developed countries [3], [6] and [7]. There is a deficiency in research on open innovation practice in companies from developing

countries [5]. One of the reasons for that can be found in the fact that companies from developing countries were operating in relatively protected environment in the past [8]. Market globalization is forcing companies from developing countries to adapt to new business strategies in order to survive [9]. Globalisation has exposed developing countries' companies to foreign competition and majority of them cannot withstand this competitive pressure because they are not yet sufficiently competitive [10]. Trends such as outsourcing, agility, and flexibility are forcing companies to reconsider their strategies and processes, and to become network organizations. On the other hand, shift to open innovation paradigm is constrained with barriers related to [4]:

- Technology
- Market place
- Collaboration among partners
- Financial sources availability
- Clients needs
- Workforce
- Knowledge and intellectual property rights

One of the first steps towards implementation of open innovation concept should be about investigation of organizational culture in the region of interest. Open innovation potential of Autonomous Province of Vojvodina (APV) manufacturing sector is going to be presented in this paper. For this purpose a survey related to the innovation culture of the APV manufacturing sector has been conducted. APV is a part of the Republic of Serbia which is a developing country striving to join European Union.

The remainder of the paper is structured as follows. Section 2 describes the research methodology that has been used in this paper, Section 3 presents the research results and Section 4 presents the discussion and conclusion of this paper, with a summary of results and propositions for further research efforts.

## 2. METHODOLOGY

The methodology used in this paper is survey research, conducted under the international project European Manufacturing Survey (EMS). EMS is coordinated by the Fraunhofer Institute for Systems and Innovation Research – ISI and it is the largest European

survey of manufacturing activities[1].EMS has been organised by a consortium of research institutes and universities from and across Europe since 2001, and Serbia, University of Novi Sad, Faculty of Technical Sciences is a part of this consortium from 2015.

EMS investigates technological and non-technological innovation in European industry and it is generally focused on technology diffusion and organisational innovation. The survey is conducted in Republic of Serbia in 2015, but data from the survey that is going to be used in this paper is limited to Autonomous Province of Vojvodina (APV).The data was collected from manufacturing companies having at least 20 employees. Total population of 600 companies in APV meets above mentioned criteria. In order to obtain representative sample, 334 companies evenly distributed across all sectors and in all districts of APV were contacted. Total number of companies that participated in this research is 123, representing a response rate of 36,8%.

Several questions from this survey that are related to innovation processes are going to be used for analysis of APV manufacturing sector innovation potential. The results are presented with the use of descriptive statistics. Innovation field is divided into four categories:

- New products
- New technical production processes
- New product related services
- New organizational concepts

First, the importance of these innovation fields for APV manufacturing companies is going to be presented. After that, the major sources of innovation ideas are going to be presented. The major sources are divided into internal and external.

Internal sources of innovation ideas are:

- R&D/engineering
- Production
- Customer services
- CEO/management

External sources of innovation ideas are:

- Customer or user
- Supplier
- Research institutions, universities
- Business or organisation consultancy

In addition, open innovation potential of APV manufacturing sector is going to be analysed through representation of cooperation of companies with other organizations in the innovation field. The frequency of cooperation with other organisations is going to be presented as well.

### 3. RESEARCH RESULTS

The first question that is going to be analysed is about importance of different innovation fields for manufacturing companies in APV. Companies were asked to rate four different innovation fields from 1 to 4, where 1 indicates the highest level of importance. The results are presented in Figure 1.

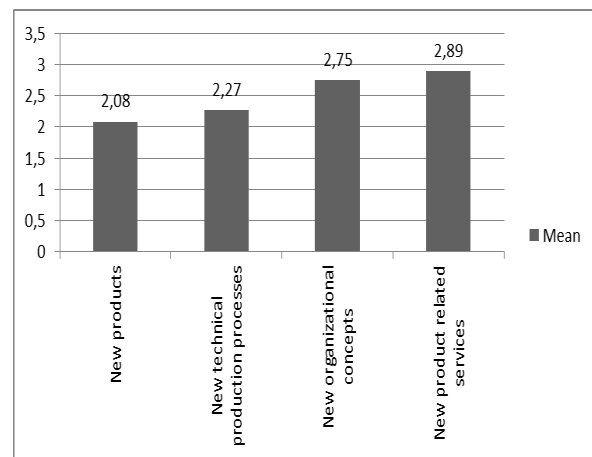


Fig.1.Importance of innovation fields for companies

From 123 companies that participated in the research, 85 companies properly responded to this question. The most important field of innovation for manufacturing companies in APV is the field of new products with the lowest mean value (2,08), followed by the field of new technical production processes(2,27), the field of new organizational concepts(2,75) and the field of new product related services (2,89).

The next question that is going to be analysed is about major sources of innovation ideas. Companies were asked to select no more than three major sources of innovation ideas for any of the four innovation field. The results are presented in Table 1.

Table 1: Major sources of innovation ideas

		New products		New technical production processes		New product related services		New organizational concepts		Total	
		N	%	N	%	N	%	N	%	N	%
Internal	R&D / Engineering	36	38,7%	27	29,0%	9	9,7%	21	22,6%	93	100%
	Production	27	23,5%	49	42,6%	14	12,2%	25	21,7%	115	100%
	Customer service	13	22,0%	6	10,2%	36	61,0%	4	6,8%	59	100%
	CEO / Management	32	21,9%	38	26,0%	24	16,4%	52	35,6%	146	100%
External	Customer or user	60	40,5%	21	14,2%	51	34,5%	16	10,8%	148	100%
	Supplier	11	24,4%	18	40,0%	12	26,7%	4	8,9%	45	100%
	Research institutions, universities	5	16,1%	10	32,3%	3	9,7%	13	41,9%	31	100%
	Business or organization consultancy	8	21,6%	10	27,0%	7	18,9%	12	32,5%	37	100%

As we can see from Table 1, internal sources of innovation ideas are much more present than external. Share of total number of innovation idea sources, when they are divided only into internal and external, is presented in Figure 2.

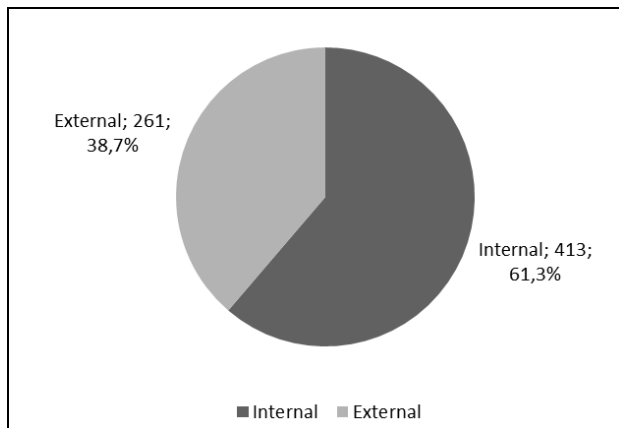


Fig. 2. Internal and external sources of innovation ideas

Even though internal sources of innovation ideas are more present, the most of ideas are generated from costumers or users which are external sources of innovation ideas. This could be an encouraging indicator of open innovation potential in APV manufacturing sector. Costumers or users are already recognized as a solid source of innovation ideas, but other external sources should get more attention. Cooperation of APV manufacturing sector companies with other organisations in the innovation field is also present, as it can be seen from Table 2.

Total number of cooperation of manufacturing companies with other organizations is the highest in the field of new products (150), followed by the field of new technical production processes (98), the field of new product related services (94) and the field of new organizational concepts (61).

Table 2: Cooperation of APV manufacturing sector companies with other organisations in the innovation field

	Customers		Suppliers		Competitors		Service organizations		Research institutions, universities		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
New products	68	45,3%	38	25,3%	8	5,3%	14	9,3%	22	14,7%	150	100,0%
New technical production processes	14	14,3%	42	42,9%	6	6,1%	20	20,4%	16	16,3%	98	100,0%
New product related services	38	40,4%	24	25,5%	5	5,3%	19	20,2%	8	8,5%	94	100,0%
New organizational concepts	11	18,0%	10	16,4%	6	9,8%	23	37,7%	11	18,0%	61	100,0%

It is clear that cooperation of APV manufacturing sector companies with other organisations in the innovation field exists, but only cooperation with customers is exploited enough. There is a great space for improvement of cooperation with other organizations, which could lead to much higher number of innovation ideas generated from external sources. One of the problems related to insufficient exploitation of external sources for innovation ideas could be found in the

frequency of cooperation with other organisations which is presented in Table 3. Medium level of cooperation with other organisations is the most present in all innovation fields.

This is another indicator of APV manufacturing sector companies open innovation potential. Improvement could be achieved through intensification of cooperation with other companies.

Table 3: Frequency of cooperation of APV manufacturing sector companies with other organisations in the innovation field

	Low		Medium		High		Total	
	N	%	N	%	N	%	N	%
New products	5	6,1%	39	47,6%	38	46,3%	82	100,0%
New technical production processes	11	15,9%	39	56,6%	19	27,5%	69	100,0%
New product related services	8	13,3%	37	61,7%	15	25,0%	60	100,0%
New organizational concepts	10	23,8%	24	57,1%	8	19,1%	42	100,0%

#### 4. DISCUSSION AND CONCLUSION

As it has been mentioned before, innovation practice is well-known part of sustainability and development of companies in developed countries. Culture of innovation

has been recently introduced and recognized as a great potential for improvement of companies in developing countries. The first part of innovation culture introduction in developing countries should be about investigation of companies' organizational culture in specific region. Survey conducted in APV clearly shows

that companies are familiar with the innovation concept. However, companies are focused on internal sources of innovation. From external sources, only costumers or users are well recognized. Other external sources should be exploited more. Survey also shows that companies are aware of other organizations with which they can cooperate, but the problem can be found in low frequency of that cooperation. Also, the number of partners for cooperation in the field of innovation could be higher.

There is no doubt that open innovation potential in APV manufacturing sector exists, but the question is how to exploit the most of it. Intensification of cooperation with other organizations and expanding the number of external partners could lead to better exploitation of open innovation potential. Development of open innovation culture and establishing synergetic relationship through cooperation could lead to improvement of manufacturing companies. Improvement of manufacturing companies is necessary in order to compete with other companies on the free market, since Republic of Serbia is striving to join European Union.

It is of great importance to develop models for cooperation of manufacturing companies with other organizations in the field of innovations. This paper presents open innovation potential of APV manufacturing sector and further research should be in the direction of developing models for cooperation.

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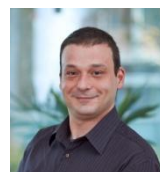
## CORRESPONDENCE



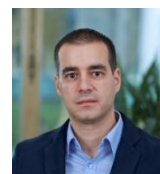
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