THE ROLE OF PRODUCT-RELATED SERVICES IN SERBIAN MANUFACTURING INDUSTRY

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ABSTRACT:

Service innovations represent one of the most important sources of competitive advantages for the manufacturing sector in the era of Industry 4.0. Servitization, a new fundamental paradigm in Industry 4.0 is important issue for manufacturing firms when they want to upgrade their productivity, improve the quality of supply and retain competitiveness. Analysis of product-related services (PRS) in Serbia became particularly important in the situation where the Serbian transitional economy opted to alter its growth model. This paper analyses the results of the European Manufacturing Survey (EMS) conducted in manufacturing industries in the Republic of Serbia. The current Serbian dataset of 2018 includes 230 observations of Serbian firms of all manufacturing industries. The empirical results indicate the role of PRS in the period of the transformation of product-oriented firms towards service-oriented firms.

1. INTRODUCTION

The servitization trend depicts the relationship between product and service in order to offers fuller market packages and create added value for customers [1]. Recently, service maintenance contracts are increasingly used when industry manufacturers change their business models from product makers to product-as-a-service providers [2]. Hence, prior research highlights the move of some manufacturing industries to offer product-service systems (PSS) [3]. PSS represents a range of services that enable customers to obtain maximum value from their products and increase their loyalty to the manufacturing firm [4]. PSS provides more specific PSS types, one of which is product-related service (PRS), this type of provider not only sells a product, but also offers services that are needed during the use phase of the product [5]. Furthermore, the role of PRS in transformation of manufacturing is not sufficiently investigated in transitional economies [6]. This paper investigates and offers an understanding of the role of PRS in manufacturing firms in transitional economies of the example of manufacturing sector of the Republic of Serbia.

The remainder of the paper is structured as follows: Section 2 presents the literature review. In Section 3, we present data and research methodology. Section 4 provides research results and discussion. Finally, Section 5 shows the conclusion of this paper with identified limitations of the study and suggestions for further research.

2. LITERATURE REVIEW

The importance of services to the overall success of manufacturing firms is growing significantly due to increasing global competition [7]. 60% of all manufacturing firms from western countries

Slavko Rakic – The role of product-related services in Serbian manufacturing industry offer integrated products–services in their packets [8]. PRS can be related to different manufacturing industries and present different characteristics and added value for the customers [7]. Some examples of such services are installation, training, operation, repair, maintenance, upgrades, etc [7]. Tukker [5] in his study presents the process of the transformation of product-oriented firms towards service-oriented firms until PRS presents the important thing in the first phase of transformation.

Figure 1 – Position of product-related services in transformation of manufacturing industry [5]

Prior study presents that implementing of product-related services is very complex in manufacturing industries [9]. Moreover, an previous study provides the evidence base underpinning PRS adoption. This research shows that diversification impacts between revenues from products and revenue from services are typically split 50/50 and enables overall business growth [10]. In developed economies, there is considerable debate about the terminology, ideas, and concepts which describe and differentiate products and services in manufacturing firms, but in transitional economies this topic is not sufficiently investigated [6]. Prior studies show the positive effect of PRS on the manufacturing firm performance in developed economies [11]-[12]. Based on these findings authors proposed two research questions:

- *RQ1: Which manufacturing industry uses the most number of PRS?*
- *RQ2: Which PRS is most used by manufacturing firms?*

3. METHODOLOGY

The survey was conducted under the international project EMS which was coordinated by Fraunhofer ISI Institute from Germany. The dataset used in this paper was built from 2018 data collection. Manufacturing companies (NACE Rev 2 codes from 10 to 33) having at least 20 employees in Serbia were considered, taking into account 230 responses in total. Table 1 presents the classification of manufacturing sectors according to share in the total sample.

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Table 1: Classification of manufacturing sectors according to share in the total sample

NACE Rev. 2	Manufacturing industry	Share in total sample (%)
10	Manufacture of food products	17.2
25	Manufacture of fabricated metals products, except machinery and equipment	13.2
22	Manufacture of rubber and plastic products	9.3
28	Manufacture of machinery and equipment n.e.c.	6.6
27	Manufacture of electrical equipment	6.6
14	Manufacture of wearing apparel	5.8
	Other industries	41.3

To analyze the role of PRS in the manufacturing sector of Serbia, the author employed in-depth descriptive analyses. With all of this information, the author presented which PRS are the most used in manufacturing industries in Serbia. Moreover, he will presented which manufacturing industries used the highest percent of PRS.

4. RESULTS AND DISCUSSION

The results of the research were analyzed using the in-depth descriptive statistic. According to *RQ1*, Table 2 depicts how many PRS are used per firm in all manufacturing industry.

Table 1: Product-related services per firm in the manufacturing industry

Manufacturing industry	Number of PRS per one firm
Manufacture of other transport equipment	4
Manufacture of machinery and equipment n.e.c.	3.5
Manufacture of computer, electronic and optical products	3.3
Manufacture of electrical equipment	3
Manufacture of printing and reproduction of recorded media	2.75
Manufacture of motor vehicles	2.6
Manufacture of fabricated metals products, except machinery and equipment	2.4

Results presented that *Manufacture of other transport equipment* use the most PRS - 4, followed by *Manufacture of machinery and equipment n.e.c.*, *Manufacture of computer, electronic and*

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optical products, Manufacture of electrical equipment between 3-4 PRS, and *Manufacture of printing and reproduction of recorded media, Manufacture of motor vehicles, Manufacture of fabricated metals products, expect machinery and equipment* between 2-3 PRS, other industry are under 2 PRS per firm. Moreover, it's important to note that Manufacture of machinery and equipment n.e.c., Manufacture of electrical equipment and Manufacture of fabricated metals products, expect machinery and equipment are in the top five in the share of total sample. According to RQ2, Figure 2 depicts which PRS is most used by manufacturing firms.

Figure 2 – Share of product-related services in manufacturing industry of Serbia

Results presented that *Maintenance and repair* and *Design, consulting, project planning* are the most used PRS in manufacturing sector of Serbia. They are followed by *Training, Installation, start-up* and *Remote support for clients*, other PRS are under 10% in the share of total sample.

5. CONCLUSION

Paper evaluates the use of PRS in manufacturing firms in Serbia. Findings contribute to the existing literature by presenting the position of PRS in manufacturing firms of transitional economies. The results showed that the Manufacture of other transport equipment used the most PRS per firm. Moreover, the results showed that Maintenance and repair and Design, consulting, project planning are the most used PRS in Serbian manufacturing firms. This research is limited only to the in-dept descriptive statistic, with some advanced analyses can see the impact of PRS on the manufacturing firms' performance. Future research should take into consideration different data sets from developed and transitional economies to compare it. Furthermore, this findings will help manufacturing firms in transitional economies for the successful transformation of product-oriented firms towards service-oriented firms.

6. REFERENCES

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