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THE RELATIONSHIP BETWEEN LOGISTICS AND ORGANIZATIONAL PERFORMANCE IN A SUPPLY CHAIN CONTEXT

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Abstract

The success of managing the distribution of goods, raw materials and the flow of information within a company directly determines the success in managing all operations along the supply chain. Supply chain performance has the status of one of the key organizational performance determinants, while logistics performance is an important determinant of the supply chain performance. The subject of this research is the analysis of impact of logistics performance on organizational performance, with special emphasis on supply chain management performance. Using the analysis of business practice of companies from the territory of the Republic of Serbia, the aim of the research is to crystallize the importance of logistics management for improving the determinants of organizational performance: supply chain management performance, marketing performance and financial performance. The results show that logistics performance is one of the key drivers of generating supply chain management goals, which is directly reflected in the improvement of all categories of organizational performance.

Keywords: logistics performance, supply chain performance, marketing performance, financial performance, organizational performance

1. INTRODUCTION

The supply chain includes not only supply and sales, but also the company's

relationships with suppliers, intermediaries and consumers, with a focus on the importance of relationships between companies and emphasizing the company's

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impact on the elements and processes of the external environment (Benotmane et al., 2018; Kain & Verma, 2018; Anca, 2019). The effect of the supply chain is determined by the logistics performance, which directly affects the marketing and financial performance of a particular company (Yuen & Thai, 2016; Benotmane et al., 2018). The broader subject of the paper deals with the determinants of organizational performance (supply chain management performance, marketing performance and financial performance), with an analysis of their interdependence. The narrower subject of the paper deals with the analysis of the interdependence between logistics performance- supply chain performance - organizational performance, in order to identify the strength of the connection between these variables, which will indicate the importance of efficient and effective internal process management and communication to generate improvements. The paper consists of three parts. The first part deals with the relationship between logistics management and supply chain management, with special emphasis on the correlation between their performances. The impact of supply chain management performance on marketing and financial performance, as indicators of organizational performance, is the topic of the second part of the paper. Within this part, special attention will be paid to previous research on the interdependence of determinants of organizational performance, which will be an introduction to empirical research on the example of business practice of manufacturing companies in the Republic of Serbia, which is the topic of the third part.

2. LITERATURE REVIEW

2.1. Relationship between logistics management and supply chain management

An integrated supply chain of an enterprise is based on the different flows that make up its bloodstream: physical material flows, information flows, equipment flows and flows of financial/human/intangible resources (Coyle et al., 2009; Milovanović et al., 2011). Logistics is part of an integrated supply chain (Sweeney et al. 2018) that is responsible for planning, implementing and controlling the efficiency and effectiveness of the flow and storage of goods and managing relevant information in order to meet customer requirements (Liu et al., 2018; Amin & Shahwan, 2019; Anca, 2019). Management of distribution flows of goods and raw materials, as well as management of information flows within the company, is the core of logistics management (Ghoumrassi & Tigu, 2017; Ristovska et al., 2017; Barczak et al., 2019). Logistics management is a narrower term than supply chain management (SCM) that integrates all business processes along the entire supply chain, not just within a single enterprise (Ballou, 2004; Habib, 2010; Christopher, 2015; Kain & Verma, 2018). Supply chain management, unlike logistics management, is based on the partnership of all participants who (directly or indirectly) participate in meeting the needs of consumers (Lambert & Cooper, 2000; Mentzer et al., 2001; Yu et al., 2017).

The efficiency and effectiveness of logistics management is monitored through the realized logistics performance, which can be viewed as a subset of all business and organizational performance of the company.

Logistics performance directly effects all indicators of organizational performance (supply chain performance, marketing performance, financial performance, performance of quality management system), but primarily it effects indicators of efficiency and effectiveness of the supply chain management (Yuen & Thai, 2016; Benotmane et al., 2018; Mensah et al., 2019). These indicators are the result of a defined business strategy, the dimensions of organizational design and IT solutions in a particular company. Effective measurement of logistics and supply chain performance, as well as the mutual influence on each other, is important because it provides a basis for understanding the supply chain, affects the functioning of the supply chain, provides information on the efficiency of internal processes in the company and information regarding business relationships between the company and its chain partners (Chen & Paulraj, 2004; Florian & Constanioara, 2013; Moons et al., 2019).

consists of financial and operational performance (Lummus & Vokurka, 1999; Chan et al., 2003; Chen & Paulraj, 2004; Vlajić et al., 2005; Cvetković, 2012). Operational performance is mostly logistics performance that is determined by the efficiency and effectiveness of processes within the company, but also along the entire chain: material flows, product flows and information flows (Groznička & Trkman, 2012; Truong et al., 2017; Sharma & Modgil, 2019; Jawabri et al., 2020). The efficiency and effectiveness of the previously listed flows are the basis for generating the following supply chain management performances: 1) successful integration with suppliers, 2) internal integration, 3) efficient control and cost savings, 4) employee motivation to contribute to quality improvement and 5) successful integration with customers (Chan et al., 2003; Flynn et al., 2010; Christopher, 2015; Erjavec et al., 2019; Sutduean et al., 2019; Jung & Kim, 2020). Each of the previously listed performances directly

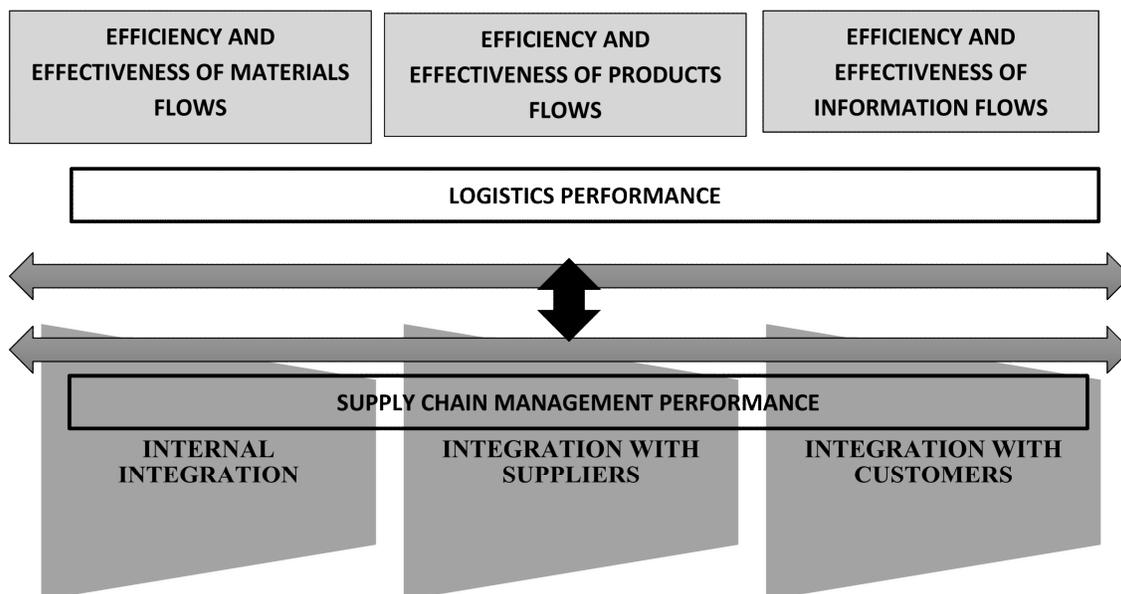


Figure 1. Relationship between logistics and Supply chain management performance

affects the financial performance of the business: productivity, economy and profitability (Wantao et al., 2013; Sopha & Hestiani, 2018; Mensah, Afum & Ahenkorah, 2020). Thus, there is a strong correlation between logistics performance and supply chain management performance because logistics performance is actually one of the key determinants of generating internal integration, integration with suppliers and integration with customers, key qualitative indicators of supply chain management performance (Figure 1). Internal integration is largely determined by logistics performance, as a category of operational performance, and it has crystallized as a variable that associates all categories of operational performance with supplier and customer integration (-Errassafi et al., 2019).

Christopher emphasizes that the quality of logistics services, costs (transportation costs, inventory costs and warehousing costs), logistics employee satisfaction and supplier reliability are key indicators of logistics performance, each of which affects the efficiency and effectiveness of material, product and information flows (Christopher, 2015). A strong correlation between logistics performance and integration within the supply chain has been proven, as qualitative indicators of supply chain management performance (Aharonovitz, Vieira & Suyama, 2018; Nilsson, 2019), emphasizing the strong impact of all supply chain risks on the level of both logistics performance and supply chain management performance (Niels & Moritz, 2017; Wang, 2018; Buz et al., 2019). It can be concluded that logistics performance is an integral part of SCM performance, which is due to the fact that logistics management is an integral part of supply chain management.

2.2. Supply chain performance as a part of organizational performance

Supply chain management performance is an important determinant of organizational performance, which is the subject of research by a large number of authors (Green et al., 2008; Deshpande, 2012; Kumar & Nambirajan, 2013; Gorane & Kant, 2017; Jutamat et al., 2019; Hamali et al., 2020; Lin et al., 2020). Research aims to establish effective and efficient SCM as key qualitative indicators of improving organizational performance (Teixeira et al., 2012; Roh et al. 2017; Sahin & Topal, 2018; Fernando & Danthanarayana, 2019). SCM performance, marketing performance, and financial performance simulate the status of dominant determinants of organizational performance (Green et al., 2008; Deshpande, 2012; Florian & Constangioara, 2013; Yu et al., 2013; Ahmad, 2017; Gorane & Kant, 2017; Mensah et al., 2019).

Green et al. point out that the fact that successful delivery of the right product, to the right place, at the right time, at reasonable cost, as a goal of SCM, is one of the key indicators of organizational performance that significantly determines marketing performance (relationship between price/quality, quality of promotion and quality of distribution) and financial performance (productivity, economy and profitability), considered categories of organizational performance (Green et al., 2008). Gorane and Kant agree with them, and they have proven that the supply chain management strategy has a positive effect on the level of logistics performance, which has a positive impact on organizational performance, and on marketing performance, which also affects financial performance (Gorane & Kant, 2017). Supply chain

management strategy has crystallized as one of the key predictors of establishing an efficient and effective SCM, and thus improving organizational performance (Deshpande, 2012; Sukati et al., 2012; Ilić & Tešić, 2016; Chen, 2018).

A large number of studies address the importance of managing information flows to generate logistics performance improvements, SCM performance, and organizational performance. Sutia et al. point out that information flows are an important predictor of generating employee motivation, which directly reflects on productivity, and thus on SCM performance and organizational performance (Sutia et al., 2020). The authors Alzoubi and Yanamandra agree with them, with additional emphasis on the mediating role of the information exchange strategy on the flexibility of the supply chain, which directly reflects on the level of organizational performance (Alzoubi & Yanamandra, 2020). A significant correlation between information flow for efficient decision-making in the field of resource allocation and the level of organizational performance of manufacturing companies was demonstrated in a study conducted by Lin et al., who analysed the business practices of Taiwanese manufacturing companies (Lin et al., 2020). This confirmed the results of a study in which Gorane and Kant proved how important the flow of information is for the successful implementation of decisions of top managers of Indian companies, which directly affects all levels of SCM integration, and thus the level of organizational performance (Gorane & Kant, 2017).

It can be concluded that previous research results have shown that the determinants of logistics performance determine the levels of supply chain integration, as an indicator of

SCM performance, which directly affects organizational performance through marketing and financial performance (Adnan, 2017; Silva & Borasto, 2017; Baah & Yin, 2019; Duong et al., 2019; Hussain et al., 2019; Priya et al., 2019; Hinasah & Nuryakin, 2020). Logistics performance is a segment of SCM performance, and SCM performance can be viewed as one of the key categories of organizational performance. It is on these conclusions that the initial research model is based, which is presented within the description of the conducted empirical research.

3. RESEARCH METHODOLOGY

During the period January-February 2021, an empirical research was conducted, using a survey method, in order to identify the relationship between logistics performance, SCM performance and organizational performance. Flows in the economy have, since the first impact of the Covid-19 pandemic, stabilized in the period December 2020-January 2021. The period January-February 2021 marked the start of the rampant prices of stock exchange goods, especially metals. It is then that the importance of managing logistics operations for generating savings in this domain, and therefore establishing an efficient and effective supply chain, which directly affects organizational performance. The online surveys were completed by representatives of 77 manufacturing companies in the territory of the Republic of Serbia, which is considered a representative sample when the respondents are companies. The structure of the sample is shown in Table 1.

The initial research model (shown in Figure 2) and previous research on the topic of the relationship between logistics

Table 1. Manufacturing companies that participated in the survey (n=77)

Sample structure	n	%
Classification of surveyed companies by size (according to the number of employees and generated income)		
Big companies	24	31%
Small/Medium companies	53	69%
Company headquarters (according to statistical regions of the Republic of Serbia)		
Belgrade	16	21%
Vojvodina	13	17%
West Serbia	17	22%
East Serbia	10	13%
Central Serbia	10	13%
South Serbia	11	14%

Source: Authors

performance, SCM performance and organizational performance, are the key basis for defining dependent/independent variables and initial research hypotheses, based on which the findings in the questionnaire are formulated. The statements in the questionnaire are formulated to measure the impact of logistics performance (independent variable) on SCM performance and organizational performance (dependent variables). Employees in the surveyed companies expressed their position based on the findings through a five-point Likert scale (5 indicates the highest and 1 the lowest score in terms of performance indicators).

The starting model presented above and the relevant literature were the basis for defining the three starting research hypotheses (Green et al., 2008; Teixeira, Koufteros, & Peng, 2012; Kumar & Nambirajan, 2013; Gorane & Kant, 2017; Jutamat et al., 2019; Hamali et al., 2020; Lin et al., 2020):

H₁: Logistics performance indicators have a statistically significant impact on SCM performance indicators.

H₂: Logistics performance indicators have a statistically significant impact on organizational performance indicators—marketing and financial performance

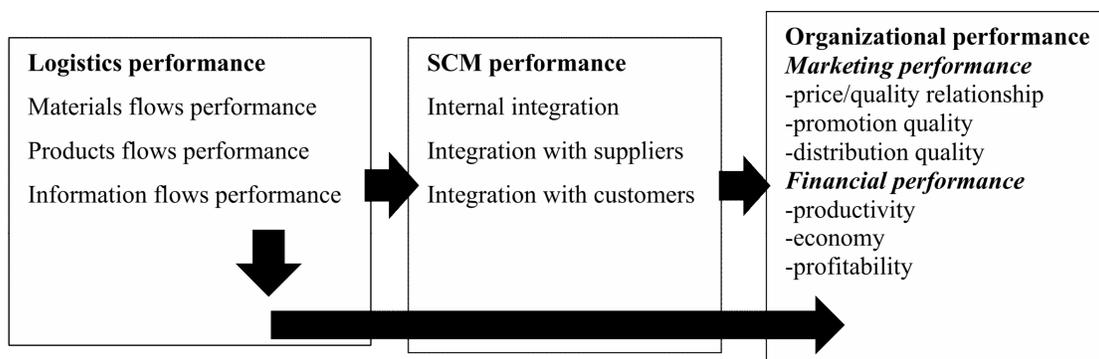


Figure 2. Initial research model

indicators.

H₃: Logistics performance and supply chain performance are an integral part of organizational performance.

The collected data were summarized and processed through the statistical software SPSS, with the implementation of descriptive, correlation and regression statistical analysis. Descriptive statistical analysis showed the degree of homogeneity of evaluation of performance indicators of surveyed companies. Correlation statistical analysis was conducted in order to crystallize the strength of the relationship between all variables that are the subject of the research. The aim of regression analysis is to identify the impact of logistics performance indicators on SCM performance indicators and organizational performance, i.e. to determine which of the indicators of logistics performance is predominantly determined by SCM and organizational performance of surveyed manufacturing companies in the Republic of Serbia.

4. RESULTS OF STATISTICAL ANALYSIS

The obtained results of descriptive statistics are shown in Table 2. For the determinants of each performance category, the arithmetic mean and standard deviation were calculated based on the ratings given by the representatives of the surveyed manufacturing companies.

The results of descriptive statistics show that the surveyed manufacturing companies pay the most attention to stimulating the efficiency of product flows (arithmetic mean 3.83), which is an indicator of logistics performance that most determines integration with customers, as the highest rated determinant of SCM performance (arithmetic mean 3.78). Other determinants of logistics and SCM performance were rated with significant average scores, which best presents the attention that surveyed companies pay to generating their improvement. Regarding marketing

Table 2. Descriptive statistical analysis - all variables

Variable	Mean	Std. deviation
Logistics performance		
*material flow efficiency	3.65	0.9702
*product flow efficiency	3.83	0.8014
*efficiency of information flows	3.34	1.0210
SCM performance		
*internal integration	3.39	0.9199
*integration with suppliers	3.66	0.9544
*integration with customers	3.78	0.8212
Organizational performance		
<i>*marketing performance</i>		
-price/quality relationship	3.49	0.8977
-quality of promotion	3.77	0.9583
-quality of distribution	3.75	0.9199
<i>*financial performance</i>		
- productivity	3.53	0.8205
-economy	3.46	0.9111
-profitability	3.83	0.9376

Source: Author's own calculations

performance, as a determinant of organizational performance, it can be seen that most attention is paid to the quality of promotion and distribution (arithmetic mean 3.8), which is directly related to the desire to improve product flows and integration with customers. Table 2. partially presents the correlation between all variables, clearly indicating that the average score of logistics and SCM performance indicators correlates with the average scores of marketing and financial performance. The values of the standard deviation range from 0.8014-1.0210, which is an indicator of the relative homogeneity of the estimates of the representatives of the surveyed companies.

For each of the variables, the reliability of the determinants was checked via the Cronbach' alpha coefficient. High values of Cronbach' alpha coefficients (ranges from 0.938-0.970) are an indicator of the high degree of reliability of the determinants by which each of the performance categories was measured: logistics performance, SCM performance, marketing performance and financial performance.

After the reliability analysis, a correlation analysis of all variables was performed in order to identify the relationship that exists between each of them. The results presented

the existence of a statistically significant correlation among all variables that are the subject of research. All statistically significant correlations are indicated in Table 3 with ** (** denotes $p \leq 0.01$). Correlation coefficients range from 0.865-0.988, which, according to Cohen's recommendation (Cohen, 1988), is considered to be very strong correlations. The results of the correlation analysis presented the existence of a statistically strong correlation in the relation logistics performance - SCM performance - marketing performance - financial performance. All correlations are positive, which implies that any improvement in logistics performance contributes to the improvement of SCM performance, which directly affects the improvement of marketing performance, and thus improve the productivity, economy and profitability of the surveyed manufacturing companies. The strongest correlation was identified between logistics performance and SCM performance ($r=0.988$), which is the best evidence that logistics performance is an important part of SCM performance.

Regression analysis aims to identify the impact of logistics performance on SCM performance, marketing and financial performance. Three simple regressions were

Table 3. Results of the correlation analysis

	Logistics performance	SCM performance	Marketing performance	Financial performance
Logistics performance	1	0.988**	0.886**	0.949**
SCM performance	0.988**	1	0.865**	0.949**
Marketing performance	0.886**	0.865**	1	0.955**
Financial performance	0.949**	0.949**	0.955**	1

Source: Author's own calculations

performed to see if the impact could be considered statistically significant. In the first regression, logistics performance has the status of independent, and SCM performance the status of dependent variable (Table 4). The model defined in this way explains about 97.6% of the variance of the dependent variable ($R^2 = 0.976$, $p < 0.01$), which proves the fact that logistics performance is an integral part of SCM performance. Improving the efficiency of material, product and information flows statistically significantly determines internal integration, integration with suppliers and integration with customers. Improving logistics performance is a key predictor of improving SCM performance, as evidenced by the results of both correlation and regression analyses.

The second and third regressions (Tables 5 and 6) aim to identify the statistical significance of the impact of logistics performance on key determinants of organizational performance, marketing and financial performance. The model presented in Table 5 explains 78.4% of the marketing performance variance, as dependent variables ($R^2 = 0.784$, $p < 0.01$). The regression showed the existence of a statistically significant impact of improving the efficiency of material, product and information flows, as well as the price/product quality ratio, the quality of promotion and the quality of distribution.

Logistic performance is a reflection of the company's competitiveness, which directly affects the marketing performance that is assessed by customer satisfaction. Customer satisfaction with price, quality, promotion and distribution, as instruments of the marketing mix, gives feedback to logistics management on what needs to be corrected and improved in the field of flows in order to improve the competitiveness of companies in conditions of fierce market competition.

Finally, the third regression analyses the impact of logistics performance on financial performance. The model defined in this way explains about 90.1% of the variance of the dependent variable ($R^2 = 0.901$, $p < 0.01$). A statistically significant impact of all flows on productivity, economy and profitability of the surveyed manufacturing companies was identified. The efficiency of material, product and information flows is an important predictor of employee motivation and cost efficiency of processes in the company, which directly affects each of the determinants of financial performance (Table 6). Improving logistics performance is an important predictor of improving the financial performance of manufacturing companies in the Republic of Serbia.

5. CONCLUSION CONDUCTED STATISTICAL ANALYSIS

Previously conducted analyses,

Table 4. Regression analysis – SCM performance as dependent variable

	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	.149	.064		2.329	.003
Logistics performance	.960	.017	.988	55.683	.000

Source: Author's own calculations

Table 5. Regression analysis – marketing performance as dependent variable

	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	.544	.195		2.792	.007
Logistics performance	.867	.053	.886	16.505	.000

Source: Author's own calculations

Table 6. Regression analysis – financial performance as dependent variable

	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	.372	.128		2.909	.005
Logistics performance	.897	.034	.949	26.075	.000

Source: Author's own calculations

correlation and regression analysis, are the basis for making relevant conclusions about the interdependence in the relationship of logistics performance - SCM performance - organizational performance. The results of the correlation analysis indicated the existence and strength of the link between the performance categories, while the results of the regression analysis enabled conclusions to be drawn on the impact of logistics performance on each of the determinants of organizational performance. Summarizing the conclusions of the previously described analyses, the final conclusions about the hypotheses set at the very beginning of the study are drawn:

- Logistics performance indicators have a statistically significant impact on SCM performance indicators - accepted hypothesis H1. The results of the correlation analysis proved the existence of a very strong correlation, and the results of the regression analysis had a statistically significant influence of logistic performance

on SCM performance. Improving the efficiency and effectiveness of all flows in the company directly determines the achievement of supply chain management goals. Logistics management is an integral part of supply chain management, and logistics performance is an integral part of SCM performance. The flows of materials, products and information affect the cost efficiency of the process and the motivation of employees to contribute to the improvement of the process, the competitiveness of the company and the building of long-term partnerships with suppliers and customers.

- Logistics performance indicators have a statistically significant impact on organizational performance indicators – marketing and financial performance indicators - accepted hypothesis H2. Logistic performance is an important predictor of generating improvements in price/product quality ratio, quality of promotion and quality of distribution, which directly

reflects on improvements in productivity, economy and profitability of surveyed manufacturing companies. Since it has been proven that logistics performance is an integral part of SCM performance, generating supply chain management goals directly leads to improved organizational performance. The efficiency of information flows determines the motivation of employees, which directly affects the internal integration, productivity and cost efficiency of the process, which determines the improvement of competitiveness and profitability of manufacturing companies. This confirmed the results of all studies that served as relevant sources for defining the initial research hypotheses.

- Logistics performance and supply chain performance are an integral part of organizational performance - accepted hypothesis H3. The absolute confirmation of the previous two hypotheses directly confirms the third hypothesis. Logistics management is an integral part of supply chain management, which implies that logistics performance is an integral part of SCM performance. Internal integration, integration with suppliers and integration with customers is a predictor of improving all elements of the marketing mix, which directly affects the improvement of marketing performance and competitive position of the company, and thus its productivity, economy and profitability. It can be concluded that SCM performance, marketing performance and financial performance measure the same construct, and these are organizational performance determinants as the complete performance of one manufacturing company.

It can be concluded that the determinants of logistics performance are statistically significant predictors of SCM performance,

marketing performance and financial performance. The results of correlation and regression analysis proved that logistics performance is an integral part of SCM performance, and generating their common goal of "delivering the right product, in the right place, at the right time and at reasonable costs", directly leads to improved marketing and financial performance. team and organizational performance of the surveyed companies. Logistics performance and SCM performance can therefore be considered as categories of organizational performance of manufacturing companies.

6. THEORETICAL / PRACTICAL IMPLICATIONS, RESEARCH LIMITATIONS AND FURTHER LINES OF RESEARCH

The results of the research are the basis for making relevant theoretical and practical conclusions about the importance of improving the efficiency of material, product and information flows to generate improvements in SCM performance, marketing performance and financial performance. The practical contribution of the study is reflected in providing guidance to the management of manufacturing companies on how efficient supply chain management generates an improvement in competitive advantage and financial results. The research crystallized the importance of information flows to stimulate employee motivation to contribute to the cost efficiency of the process and improve long-term partnerships with customers and suppliers, which directly affects the business results of the company.

The lack of research is reflected in the fact that the questionnaire was completed by

one employee as a representative of the company, and the objectivity of the respondents cannot be guaranteed. Based on the answers, a starting point was formed for the analysis of the current situation in the domain of performance relations, without taking into account external factors that determine the business of companies, and thus the relationship between determinants of organizational performance (such as the current situation with the Covid-19 pandemic). Monitoring the relationship between performances from year to year would create a clear picture of the correlation between the determinants of organizational performance, while considering the impact that external factors have on it.

Research on the interdependence of organizational performance categories would significantly improve the monitoring of quantitative indicators for a period of x years and comparison between years. In this way, the impact of logistics performance on SCM performance, marketing performance and financial performance of manufacturing companies would be fully crystallized. This type of research is complex, but would fully explain the interdependence of all predictors of organizational performance. Future research should move in this direction, with the aim of deeper research, with a stronger connection between qualitative and quantitative research on this topic.

7. CONCLUSION

Logistics management is an integral part of supply chain management and they are jointly focused on the realization of the same goal which is "delivering the right product, to the right place, at the right time and at reasonable costs". The efficiency of material,

product and information flows directly determines the cost efficiency of the process and the motivation of employees to contribute to building long-term partnerships with customers and suppliers, and thus improve the competitive position of the company (marketing mix instruments) and financial performance indicators (productivity, economy and profitability). Logistics performance is a statistically significant determinant of all categories of organizational performance, which implies that logistics performance is an integral part of the organizational performance of manufacturing companies.

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ОДНОС ИЗМЕЂУ ЛОГИСТИЧКИХ И ОРГАНИЗАЦИОНИХ ПЕРФОРМАНСИ У КОНТЕКСТУ ЛАНЦА СНАБДЕВАЊА

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Извод

Успех управљања дистрибуцијом робе, сировина и протоком информација унутар компаније директно одређује успех у управљању свим операцијама дуж ланца снабдевања. Перформансе ланца снабдевања имају статус једне од кључних детерминанти перформанси организације, док су перформансе логистике важна детерминанта перформанси ланца снабдевања. Предмет овог истраживања је анализа утицаја логистичких перформанси на перформансе организације, са посебним акцентом на перформансе управљања ланцем снабдевања. Користећи анализу пословне праксе предузећа са територије Републике Србије, циљ истраживања је да се искристалише значај управљања логистиком за унапређење детерминанти перформанси организације: перформансе управљања ланцем снабдевања, маркетиншке перформансе и финансијске перформансе. Резултати показују да су перформансе логистике један од кључних покретача генерисања циљева управљања ланцем снабдевања, што се директно одражава на унапређење свих категорија организационих перформанси.

Кључне речи: логистичке перформансе, перформансе ланца снабдевања, маркетиншке перформансе, финансијске перформансе, перформансе организације

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