THE IMPACT OF SUPPLIER RELATIONSHIPS ON SUPPLY CHAIN PERFORMANCE OF TRADE COMPANIES IN BOSNIA AND HERZEGOVINA

Safet Kozarević[*]

Šejla Kovačević[**]

Received: 2. 11. 2020.
Accepted: 21. 11. 2020.
DOI https://doi.org/10.30924/mjcmi.26.2.1

Original scientific paper
UDC 658.7(497.6)

Abstract

The need for companies' interconnection and advantages of mutual business cooperation led to the development of supply chain management in the 1980s. Along with the intensified market globalization process, companies have become aware of the need to develop efficient supply chains. A supply chain includes a series of activities from planning and organizing to controlling the flow of material and services from suppliers to the final customer. The supply chain effectiveness depends to a large extent on relationships with suppliers. Thus, relationships with suppliers and supply chain performance management are important topics in academic research due to their impact on supply chain profitability. It is particularly evident in the trade industry. Therefore, the purpose of this paper is to establish the relationship between supplier relationships and supply chain performance in the trade industry in Bosnia and Herzegovina. The empirical research is based on the primary data, collected by using a questionnaire. The respondents are 200 trade companies from the entire territory of Bosnia and Herzegovina. Various statistical analysis methods have been applied to answer the research questions addressing the issues of a potential relationship between supplier relationships and supply chain performance. The results have shown that supplier relationships positively impact flexibility, costs, and supply chain quality. There is a statistically significant interdependence between partnership and information exchange, as supplier relationships dimensions, and flexibility, costs, and supply chain quality, as supply chain performance dimensions. There is, also, a statistically significant impact of some companies' characteristics on the information exchange, supplier partnership, flexibility, costs, and quality.

Keywords*: supply chain, supplier relationships, supply chain performance, trade companies.*

1. INTRODUCTION

Instability of trade companies, as well as the growing competition, stimulate integration and cooperation processes. Consequently, there is a trend of weakening the position of independent and small trade companies in Bosnia and Herzegovina, while the role of dependent forms of business organization is becoming more influential. Large trade companies enter the

[*] Safet Kozarević, PhD, professor, University of Tuzla, Faculty of Economics, Urfeta Vejzagića 8, 75000 Tuzla, Bosnia and Herzegovina, Phone: ++ 387 61 179536, E-mail: safet.kozarevic@untz.ba, ORCID: https://orcid.org/0000-0002-3126-4653

[**] Šejla Kovačević, MA, Faculty of Economics, University of Tuzla, Urfeta Vejzagića 8, 75000 Tuzla, Bosnia and Herzegovina, Phone: +387 61 679 354, E-mail: sejla.kovacevic@gmail.com

scene and take a dominant position in business channels. The above-mentioned processes of integration and concentration have brought about the enormous circulation of goods and services. A modern business environment requires the products to be provided and produced according to customers' desires and requirements, as quickly as possible, and at the best possible prices. Integration and supply chain management can save substantial amounts of money and time. This paper will focus on the relationship between supplier relationships and supply chain performance in the trade industry.

Supply chain involves all material and product flows from suppliers to customers, connecting orders, production, marketing, distribution, and other activities in companies. Supply chain management should be proactive, with business results being actively managed. In modern supply chains, adequate choice of suppliers is an issue of strategic importance for the overall business and a key strategic factor. Supplier relationships are defined as long-term relationships established to ensure individual companies' balanced strategic and operational capacities to benefit all entities involved (Monczka et al., 2015). We shall take a two-dimensional view of it: partnership with suppliers and information exchange with suppliers.

The supply chain management process and the performance measurement process are increasingly in the researchers' spotlight. The supply chain performance measurement represents a systematic process of measuring the effectiveness and efficiency of conducted supply chain operations. As for indicators of supply chain performance in this work, we shall concentrate on supply chain flexibility, costs and quality. Based on the research sample of 200 trade companies from Bosnia and Herzegovina, we analyzed the impact of the selected dimensions of supplier relationships on their supply chain performance. We included companies of all sizes into the sample, and different statistical methods were used for the analysis. Similar to Jaaskelainen (2021), who used company size, service orientation, and relationship length as control variables, we tested the impact of different characteristics of companies (gender of management, size of company, management age, qualifications, and business continuity) on supplier relationships and supply chain performance.

Following the Introduction, in Section 2, there is an overview of previous research on supplier relationships and supply chain performance. Section 3 describes the research methodology, while Section 4 describes the empirical research results, followed by a discussion and recommendations in Section 5 and the conclusion.

2. LITERATURE REVIEW

A supply chain consists of a series of activities and organizations, moving materials through on their journey from initial suppliers to final customers (Waters, 2003). It implies the involvement of producers, suppliers, transporters, warehouses, merchants, even the buyers themselves. Globalization and market dynamism pointed up the importance of information for the supply chain functioning. Supply chain partners who regularly exchange information can work as a single organization. Together, they can better understand the final customer's needs and, thus, react more rapidly to market changes. Information is frequently used as a substitute for assets or labor, simultaneously reducing the costs. Therefore, it should be considered a strategic tool that could provide an advantage over the competition

(Srića and Spremić, 2000). Mulyaningsih et al. (2021) and Cherono and Keitany (2021) showed that supplier selection and the existence of the supplier's long-term commitment and cooperation strategy is essential in determining supply chain performance of the manufacturing sector.

Christopher (2011) emphasizes the importance of four determinants of the effective supply chain: responsibility, reliability, flexibility, and partnership. Furthermore, Kozarević and Puška (2015) stress the importance of the relations between supply chain practice, relations with partners, and competitiveness of the small and medium companies. The success of the entire supply chain largely depends on the choice of suppliers. Supplier selection is a critical purchasing activity in supply chain management, due to the significant impact of supplier's characteristics on the price, quality, distribution, and service in accomplishing the supply chain goals (Hakan, 2006).

Contemporary trade companies are dependent, to a large extent, on their suppliers since it has become a challenge to retain a competitive position in the constantly changing market, with ever more rigorous requirements. This is only possible if an adequate supply is ensured, including the lowest possible price of a product, highest possible quality, high-level accuracy of deliveries to final users, reliability, response to customers' specific requirements, i.e., flexibility, and collaboration with both customers and suppliers. Considering specific characteristics of Bosnia and Herzegovina and its economy, an analysis of the impact of the supplier selection and relationships on trade companies' performance becomes particularly important.

According to Croxton et al. (2001), supplier relationship management is a process, defining how a company interacts with its suppliers. The goal of establishing supplier relationships is a long-term continuity of cooperation, in order to keep the supply chain and other supply chain members' activities flexible so they can quickly react to competitive and other market requirements. Under the current market conditions, characterized by dynamic changes, many trade companies find it difficult to survive. To achieve the stability and competitiveness, they have to focus on two dimensions of the supplier relationship management: partnership with suppliers and information exchange. The goal of the partnership with suppliers in a supply chain is to increase benefits for all supply chain members, by reducing the costs of acquisition, possession, and disposal of goods and services (Maheshwari et al., 2006). Information exchange is a level of information distributed to the supply chain participants or partners. The level of information exchange was defined by Li et al. (2006) as the extent to which critical and proprietary information details are shared with one's partners in the supply chain.

According to Anand and Grover (2015), supply chain performance measurement is the process of qualifying the efficiency and effectiveness of the supply chain operation and takes an important position in academic literature. Akyuz and Erkan (2010) provide a critical overview of the literature on supply chain performance measurement. The results show that performance measurement of supply chains remains under-researched. It particularly relates to the development of frameworks for measurement, cooperation, flexibility, and IT support. Various studies suggested and applied new measures in order to respond to current needs for performance measurement. Mangla et al. (2019) identified a few key performance dimensions, including flexibility, collaboration, transparency, innovation, and relational

capabilities of the supply chain. Asamoah et al. (2020) measured performance by using the dimensons of reliability, efficiency, and flexibility. Stevens (1990) presents the supply chain performance measurement in terms of the level of services, costs, effectiveness, transparency, stock levels, and suppliers' performance. Spekman et al. (1998) used customers' satisfaction and cost reduction as a measure of the supply chain performance management. Beamon (1999) identified qualitative performance management measures, such as flexibility, information and material flow integration, customer satisfaction, suppliers' performance, and effective risk management. The goal of the supply chain performance measurement and management is to help decision-makers better manage, plan, understand, and increase performance. Kozarević and Puška (2018) analyzed the following dimensions of supply chain performance: flexibility, agility, quality, innovation, and sustainability.

The most important dimensions of the supply chain performance in this study are: flexibility, costs, and quality. Flexibility in the supply chain is the ability to react to occasional market changes, in order to acquire or retain competitive advantage (Wisner, Tan, and Leong, 2012). According to Koh et al. (2007), flexibility is defined as a "company's ability to adapt to changes in its environment". Many researchers included "velocity" in their definition of flexibility, emphasizing that flexibility means getting things done quickly (Li et al., 2006). In the trade industry, one could say the supply chain is effective, if it is associated to minimum costs and generates the highest effects. The supply chain costs comprise all chain operation expenses, including merchandise expenditures and total supply chain management costs (Bolstorff and Rosenbaum, 2003). The main goal of supply chain management is to reduce the costs of manufacturing and resources.

The supply chain quality defines to which extent the supply chain members' expectations are satisfied. Quality measurement is frequently mentioned as a problem, as it is based on a subjective assessment, instead of objective indicators, measuring the intensity of established relationships among all supply chain participants. Partnership quality can be measured by using the following indicators: delivery speed, delivery cycle time, the accuracy of customer responses, frequency of vendors' complaints, and overall customer satisfaction.

3. METHODS

Starting from supplier relationships as an independent variable and supply chain performance as a dependent variable, we set the following hypothesis:

H1. Improved supplier relationships lead to better supply chain performance of trade companies in Bosnia and Herzegovina.

The following sub-hypotheses have been defined (see Figure 1):

H1.1: There is a statistically significant and positive correlation between supplier relationships and supply chain flexibility.

H1.2: There is a statistically significant and positive correlation between supplier relationships and supply chain costs.

H1.3: There is a statistically significant and positive correlation between supplier relationships and supply chain quality.

H1.4: There is a statistically significant difference in supplier relationships,

considering the characteristics of companies in the trade industry.

H1.5: There is a statistically significant difference in supply chain performance, considering the characteristics of companies in the trade industry.

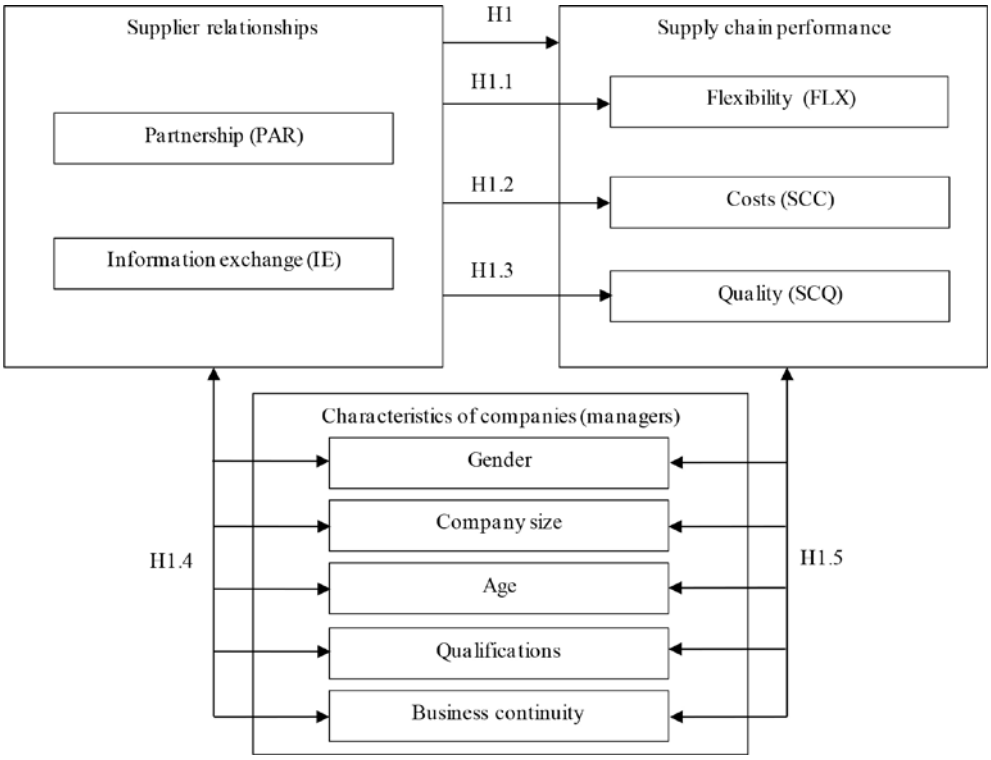

Figure 1. Conceptual framework

Review and analysis of the existing studies indicated that these issues have not been adequately analyzed in Bosnia and Herzegovina.

We have collected empirical data by using a questionnaire as a data collection tool, which consisted of multiple items, measured with the standard Likert scales with five levels of agreement. The population consisted of trade companies, registered as Value Added Tax (VAT) payers. After a formal request for access to the unified register of indirect taxpayers, we received a list of all 5,478 registered trade companies in Bosnia and Herzegovina from the Indirect Taxation Authority. Using this list, we had established a selection framework and then, using the random number generator, formed a random sample of trade companies in Bosnia and Herzegovina. The questionnaire was delivered to respondents (company managers) by e-mail, inviting them to fill in an online form. Invitation to participate in the survey was sent to 280 e-mail addresses, of which 200 respondents provided their responses, 30 refused participation, while 50 did not provide any response. Trade companies were grouped according to the following industry classification:

non-specialized wholesale trade, retail sale in non-specialized stores, motor oil retail sales in specialized stores, retail sale of information and communication equipment in specialized stores, and other types of trade. Sample included companies of all sizes, defined by using the criteria of the number of employees and generated income.

Descriptive analysis was the initial step of the statistical analysis. Regression analysis was applied to test the influence of supplier relationships on the supply chain performance. Pearson and Spearman coefficients of correlation and analysis of variance were used to establish the interdependences among variables.

4. RESEARCH RESULTS

Following the descriptive analysis, the results of the empirical research on the impact of supplier relationships on supply chain performance are presented below.

4.1. Descriptive analysis

Results presented by Table 1 show that 200 companies in Bosnia and Herzegovina were included to the research sample. The surveyed companies were represented by 48.00% male and 52.00% female respondents. Out of the total number of companies, included in the study, small companies make up the majority of 64.50%, medium-sized companies account for 29.00%, while there were 6.50% of large companies.

Table 1. Number and structure of respondents according to gender and company size

Gender	Company size							
	Small		Medium		Large		Total	
	f	%	f	%	f	%	f	%
Male	69	34.50	23	11.50	4	2.00	96	48.00
Female	60	30.00	35	17.50	9	4.50	104	52.00
Total	129	64.50	58	29.00	13	6.50	200	100.00

Figures in Table 2 show the dominant participation of respondents, belonging to the 30-40-year age group.

Table 2. Number and structure of respondents according to age and company size

Age	Company size							
	Small		Medium		Large		Total	
	f	%	f	%	f	%	f	%
20-30	23	11.50	14	7.00	2	1.00	39	19.50
30-40	59	29.50	21	10.50	11	5.50	91	45.50
40-50	17	8.50	8	4.00	0	0.00	25	12.50
50 and more	30	15.00	15	7.50	0	0.00	45	22.50
Total	129	64.50	58	29.00	13	6.50	200	100.00

Table 3 shows the dominant participation of highly qualified respondents (with a university degree) in the sample (63.00%).

Table 3. Number and structure of respondents according to qualifications and company size

Qualifications	Company size							
	Small		Medium		Large		Total	
	f	%	f	%	f	%	F	%
Elementary education	3	1.50	0	0.00	0	0.00	3	1.50
High school	36	18.00	14	7.00	0	0.00	50	25.00
College degree	13	6.50	2	1.00	0	0.00	15	7.50
University degree	77	38.50	40	20.00	9	4.50	126	63.00
MA/MSc degree	0	0.00	2	1.00	4	2.00	6	3.00
Total	129	64.50	58	29.00	13	6.50	200	100.00

Companies with 20 or more years of continued business operation dominate in the sample (59.00%).

Table 4. The structure of companies according to their business continuity and size

Business Continuity	Company size							
	Small		Medium		Large		Total	
	f	%	f	%	f	%	f	%
0-5	11	5.50	0	0.00	0	0.00	11	5.50
5-10	10	5.00	6	3.00	0	0.00	16	8.00
10-20	43	21.50	12	6.00	0	0.00	55	27.50
20 or more	65	32.50	40	20.00	13	6.50	118	59.00
Total	129	64.50	58	29.00	13	6.50	200	100.00

Table 5 shows the descriptive statistics (mean, standard deviation, median, mode, and Cronbach's alpha coefficient) for independent and dependent variables.

Table 5. Descriptive statistics

Descriptive statistics for supplier partnerships	M	SD	Median	Mode	α
Company relies on several reliable suppliers.	4.22	0.74	4.00	4.00	0.878
Company relies on several high quality suppliers.	4.23	0.68	4.00	4.00	
Company considers quality as the most important criterion in choosing a supplier.	4.29	0.72	4.00	4.00	
Company strives to establish long-term relationships with its suppliers.	4.65	0.73	5.00	5.00	
Company helps suppliers to improve the quality of their product or service.	3.83	0.93	4.00	4.00	
Key suppliers are involved in the planning process and strategic business development.	3.35	1.27	4.00	4.00	
Company actively involves its key suppliers in the process of developing new products or services.	3.40	1.06	4.00	4.00	
Suppliers often visit the company.	3.80	1.12	4.00	4.00	
Relationships with suppliers in the supply chain can be assessed as satisfactory.	4.23	0.65	4.00	4.00	
We share the risks with suppliers in the supply chain.	3.33	1.12	4.00	4.00	
Suppliers deliver goods on time.	4.10	0.85	4.00	4.00	
Company regularly solves problems together with the suppliers.	4.04	0.81	4.00	4.00	
Suppliers have sacrificed for us in the past.	3.07	1.13	3.00	3.00	
Suppliers are reliable.	3.93	0.85	4.00	4.00	
Suppliers share professional/specialized knowledge with the company.	3.76	1.01	4.00	4.00	
Suppliers are open for cooperation.	4.19	0.75	4.00	4.00	
Company has put a lot of effort into building a fair relationship with suppliers.	4.52	0.69	5.00	5.00	
Company is developing continuous improvement programs that include its suppliers.	3.86	0.90	4.00	4.00	
Descriptive statistics for information exchange	**M**	**SD**	**Median**	**Mode**	**α**
Information exchanged between your supply chain partners is timely	4.09	0.63	4.00	4.00	0.907
Information exchanged between your supply chain partners is accurate	4.20	0.68	4.00	4.00	
Information exchanged between your supply chain partners is complete	3.91	0.76	4.00	4.00	
Information exchanged between your supply chain partners is adequate	3.96	0.71	4.00	4.00	
Information exchanged between your supply chain partners is reliable	4.11	0.67	4.00	4.00	

Descriptive statistics for supply chain flexibility	**M**	**SD**	**Median**	**Mode**	**α**
Ability to respond and adapt to variations in demand. such as seasonality.	3.73	0.58	4.00	4.00	0.746
Ability to respond and adapt to periods of poor supplier performance.	3.46	0.65	3.00	3.00	
The ability to adapt to a period of poor business operations.	3.42	0.54	3.00	3.00	
Ability to match and adapt to new products. new markets or new competitors.	3.37	0.71	4.00	4.00	
Flexibility in relation to volume of delivery.	3.83	0.78	4.00	4.00	
Descriptive statistics for supply chain costs	**M**	**SD**	**Median**	**Mode**	**α**
Total operating costs	3.28	0.68	3.00	3.00	0.671
Total distribution costs. including transport and handling costs	3.26	0.65	3.00	3.00	
Costs associated with the return of goods by the buyer	3.36	0.76	3.00	3.00	
Return on invested business assets	3.30	0.72	3.00	3.00	
Descriptive statistics for supply chain quality	**M**	**SD**	**Median**	**Mode**	**α**
The quality of delivered products and services provided	4.23	0.65	4.00	4.00	0.883
Product compliance with specifications	4.36	0.69	4.00	5.00	
Account entry accuracy	4.26	0.73	4.00	5.00	
Delivery accuracy	4.23	0.71	4.00	4.00	
Accuracy of document invoicing	4.44	0.70	5.00	5.00	
Availability of information	4.24	0.75	4.00	5.00	
Accuracy of information	4.30	0.71	4.00	5.00	
Frequency of credit claims	3.15	0.80	3.00	3.00	
Frequency of errors in product delivery and service delivery	3.39	0.95	3.00	3.00	
Sales volume	3.71	0.65	4.00	4.00	
Speed of fulfillment of the received order	4.19	0.73	4.00	4.00	
Delivery cycle duration	4.04	0.80	4.00	4.00	
Completeness of deliveries per order	4.18	0.80	4.00	4.00	
Frequency of complaints	3.12	1.06	3.00	3.00	

4.2. Supplier relationships and the supply chain performance

Table 6 shows coefficients (Pearson's and Spearman's rank correlation coefficient) of correlation between partnership and the information exchange, as dimensions of supplier relationships, and flexibility, as a dimension of supply chain performance.

Table 6. Correlation between supplier relationships and the supply chain flexibility

		Coefficient value	Significance (p)
Partnership and flexibility	Pearson's	0.331	0.000
	Spearman's	0.389	0.000
Information exchange and flexibility	Pearson's	0.429	0.000
	Spearman's	0.422	0.000

The resulting coefficients and the level of significance ($p<0.05$) indicate a statistically significant association with a weak positive relationship between partnership and flexibility and a moderate positive relationship between information exchange and flexibility.

Regression analysis was further applied in establishing the impact of supplier relationships to the supply chain performance. Results of multiple regression analysis of the effect of supplier partnership and information exchange, as dimensions of the supplier relationships, on supply chain performance are presented by following tables. The first regression model (Model 1), presented by Table 7, describes the influence of supplier partnership and information exchange, as dimensions of the supplier relationships, to supply chain flexibility.

Table 7. Influence of supplier relationships to supply chain flexibility (Model 1)

	R	R^2	F	df	p
Model	0.438	0.191	23.324	(2;197)	0.000
Independent variables (predictors): Supplier partnership, information exchange with suppliers					
Dependent variable: Supply chain flexibility					
Predictors B se (B) β T					**p**
Constant		2.104	0.242	8.704	0.000
Supplier partnership		0.098	0.072	0.110	1.359	0.176
Information exchange with suppliers		0.284	0.064	0.361	4.462	0.000

Note: R- correlation coefficient; R^2- multiple determination coefficient; B-non-standardized regression coefficient; se (B)-standard error of non-standardized regression coefficients; β-standardized regression coefficients; t-test

The regression model is statistically significant ($p<0.001$). Multiple determination coefficient (R^2) shows that a group of predictor variables explains 19.10% of the variance of the supply chain flexibility as dependent variables. Regression coefficient values indicate that individual predictors (sub-scales of the independent variable) provide an important contribution to the explanation of the average score of the supply chain flexibility as a dependent variable. Out of the two predictors (independent variables), an average score of the information exchange with suppliers is stronger ($\beta = 0.361$; $p=0.000$) and provides a considerable predictive contribution to the explanation of the average score of the supply chain flexibility. As the regression coefficient is positive, we can say that a high level of information exchange with suppliers contributes to the above-average supply chain flexibility. We cannot confirm that supplier partnership is an adequate predictor of the supply chain flexibility.

Correlation analysis shows a statistically significant association, with a weak positive relationship, only between information exchange (supplier relationships) and the costs (supply chain performance).

Table 8. Correlation coefficients between supplier relationships and supply chain costs

		Coefficient value	Significance (p)
Partnership and supply chain costs	Pearson's	0.130	0.068
	Spearman's	0.145	0.042
Information exchange and supply chain costs	Pearson's	0.309	0.000
	Spearman's	0.286	0.000

The second regression model (Model 2) describes the impact of supplier partnership and information exchange, as dimensions of supplier relationships to the supply chain costs.

Table 9. Influence of supplier relationships to supply chain costs (Model 2)

	R	R^2	F	df	p	
Model	0.318	0.101	10.946	(2.195)	0.000	
Independent variables (predictors): Supplier partnership, information exchange with suppliers						
Dependent variable: Supply chain costs						
Predictors		**B**	**se (B)**	**β**	**T**	**p**
Constant		2.375	0.278		8.547	0.000
Supplier partnership		-0.090	0.082	-0.094	-1.094	0.275
Information exchange with suppliers		0.314	0.073	0.366	4.271	0.000

Note: R-correlation coefficient; R^2-coefficient of multiple determination; B- non-standardized regression coefficient; se (B)- standard error of non-standardized regression coefficients; β- standardized regression coefficients; t-test.

The regression model is statistically significant ($p<0.001$). The coefficient of multiple determination (R^2) shows that a group of predictors explains 10.01% of the variance of the supply chain costs as a dependent variable. The regression coefficient values, presented in Table 9, indicate that individual predictors (sub-scales of the independent variable) provide an important contribution to the explanation of supply chain costs as a dependent variable. Out of two predictors (independent variables), the information exchange with suppliers is stronger ($\beta = 0.366$; $p=0.000$) and provides a considerable predictive contribution to the explanation of supply chain costs as a dependent variable. Supplier partnership does not appear to be an adequate predictor in explaining the supply chain costs.

Table 10. Correlation coefficients between supplier relationships and supply chain quality

		Coefficient value	Significance (p)
Partnership and supply chain costs	Pearson's	0.239	0.001
	Spearman's	0.280	0.000
Information exchange and supply chain costs	Pearson's	0.245	0.000
	Spearman's	0.235	0.001

There is a statistically significant correlation with a weak positive relationship between partnership and information exchange (supplier relationships) and supply chain quality (supply chain performance), with the correlation significance at the 0.05 level (see Table 10).

The third regression model (Model 3) describes the influence of supplier partnership and information exchange, as dimensions of supplier relationships, on supply chain quality, viewed as a dimension of the supply chain performance.

Table 11. Influence of supplier relationships to supply chain quality (Model 3)

	R	R^2	F	df	p
Model	0.270	0.073	7.735	(2.197)	0.001
Independent variables (predictors): Supplier partnership, information exchange with suppliers					
Dependent variable: Supply chain quality					
Predictors		**B**	**se (B)**	**β**	**T**	**p**
Constant		2.945	0.270		10.926	0.000
Supplier partnership		0.133	0.081	0.143	1.649	0.101
Information exchange with suppliers		0.129	0.071	0.157	1.815	0.071

Note: R- correlation coefficient; R^2- coefficient of multiple determination; B- non-standardized regression coefficient; se (B)- standard error of non-standardized regression coefficients; β- standardized regression coefficients; t-test.

The regression model is statistically significant ($p<0.001$). The coefficient of multiple determination (R^2) shows that a group of predictors explains 7.30% of the supply chain quality variance, while the regression coefficient values indicate that individual predictors (sub-scales of the independent variable) provide an important contribution to the explanation of supply chain quality as a dependent variable. Out of two predictors (independent variables), the information exchange with suppliers is the stronger one ($\beta = 0.157$; $p=0.071$), and it provides a considerable predictive contribution to the explanation of supply chain quality as a dependent variable. On the other hand, the same predictor is statistically significant at the level of 10%, instead of the 5% level. Supplier partnership did not appear as an adequate predictor in explaining the supply chain quality.

According to the result presented above, there is a significant influence of the supplier relationships to its performance, meaning that information exchange has been confirmed as an important predictor for supply chain flexibility and costs, at the significance level of 5%. Also, the information exchange has been confirmed as statistically significant at the significance level of 10% for predicting the supply chain quality. Supplier partnership did not appear as an adequate predictor in explaining any dimension of the supply chain performance.

4.3. Analysis of variance

For the purpose of establishing patterns of supplier relationships due to trade companies' characteristics, Table 12 presents the distribution of respondents according to gender.

Analysis of variance (ANOVA) shows a statistically significant difference in information exchange, as a dimension of supplier relationships, between male and female respondents ($p<0.05$). As for supplier partnership, there is a statistically significant difference between male and female respondents, but at the significance level of 10% ($p=0.062$). Results show that female respondents attribute a higher importance to supplier partnership and information exchange.

Table 12. Trade companies' supplier relationships according to respondent gender

Variables	Gender	μ ± σ	F-test	df	p
Partnership (PAR)	Male	3.859 ± 0.527	3.533	(1;198)	0.062
	Female	3.996 ± 0.508			
Information exchange (IE)	Male	3.958 ± 0.585	4.711	(1;198)	0.031
	Female	4.138 ± 0.588			

According to the ANOVA results (Table 13), there are no statistically significant differences in supplier partnership and information exchange among the companies, considering their size ($p>0.05$).

Table 13. Trade companies' supplier relationships according to company size

Variables	Company size	μ ± σ	F-test	df	p
PAR	Small	3.950 ± 0.548	1.130	(1;198)	0.325
	Medium	3.934 ± 0.411			
	Large	3.722 ± 0.663			
IE	Small	4.067 ± 0.632	0.226	(1;198)	0.798
	Medium	4.041 ± 0.428			
	Large	3.954 ± 0.817			

According to the ANOVA results, shown in Table 14, it has been confirmed that at the significance level of 10% there is a statistically significant distinction in supplier partnership assessment, according to respondent age ($p=0.060$), while such difference does not exist in information exchange evaluation ($p>0.1$). Respondents aged between 20-30 and older than 50 attribute a higher importance to supplier partnership.

Table 14. Trade companies' supplier relationships according to respondent age

Variables	Age	μ ± σ	F-test	df	p
PAR	20-30	4.041 ± 0.394	2.511	(3;196)	0.060
	30-40	3.831 ± 0.541			
	40-50	3.911 ± 0.566			
	50 or more	4.046 ± 0.522			
IE	20-30	4.159 ± 0.492	1.602	(3;196)	0.190
	30-40	3.996 ± 0.618			
	40-50	3.912 ± 0.578			
	50 or more	4.151 ± 0.611			

According to ANOVA results (Table 15), there is a statistically significant difference in supplier partnership and information exchange, when considering the respondent qualifications ($p<0.05$). Respondents with high school qualifications attribute the highest importance to supplier partnership.

Table 15. Trade companies' supplier relationships according to respondent qualifications

Variables	Qualifications	μ ± σ	F-test	df	p
PAR	Elementary	3.167 ± 0.000	5.827	(4;195)	0.000
	High school	4.144 ± 0.489			
	College	3.787 ± 0.508			
	University	3.903 ± 0.482			
	MA/MSc	3.463 ± 0.878			
IE	Elementary	4.000 ± 0.000	3.316	(3;196)	0.012
	High school	4.308 ± 0.542			
	College	3.987 ± 0.691			
	University	3.968 ± 0.577			
	MA/MSc	3.867 ± 0.723			

According to the ANOVA results (Table 16), there is a statistically significant difference in information exchange among the companies according to business continuity ($p<0.05$), while such difference does not exist in supplier partnership ($p>0.05$). The highest level of information exchange importance is attributed by companies with business continuity of 10-20 years.

Table 16. Trade companies' supplier relationships according to business continuity

Variables	Business continuity	μ ± σ	F-test	df	p
PAR	0-5	3.702 ± 0.734	1.256	(3;196)	0.291
	5-10	3.958 ± 0.511			
	10-20	4.013 ± 0.540			
	20 or more	3.909 ± 0.488			
IE	0-5	4.291 ± 0.493	3.571	(3;196)	0.015
	5-10	3.850 ± 0.447			
	10-20	4.226 ± 0.680			
	20 or more	3.976 ± 0.552			

According to the ANOVA results (Table 17), there is a statistically significant difference of supply chain cost estimation, as a dimension of supply chain performance, between the perception of male and female respondents ($p<0.05$). The same cannot be found for the flexibility and supply chain quality dimensions, as estimated by male and female respondents ($p>0.05$). Male respondents attribute a higher importance to supply chain costs.

Table 17. Trade company performance according to respondent gender

Variables	Gender	μ ± σ	F-test	df	p
Flexibility (FLX)	Male	3.633 ± 0.499	0.038	(1;198)	0.846
	Female	3.646 ± 0.433			
Supply chain costs (SCC)	Male	3.365 ± 0.738	5.459	(1;198)	0.020
	Female	3.169 ± 0.411			
Supply chain quality (SCQ)	Male	0.000 ± 0.598	2.210	(1;198)	0.139
	Female	3.936 ± 0.477			

According to ANOVA results (Table 18), there is no significant difference in flexibility, costs, and supply chain quality among the companies according to their size ($p>0.05$).

Table 18. Trade company performance according to the company size

Variables	Company size	μ ± σ	F-test	df	p
FLX	Small	3.586 ± 0.496	2.630	(1;198)	0.075
	Medium	3.752 ± 0.375			
	Large	3.677 ± 0.444			
SCC	Small	3.227 ± 0.646	0.791	(1;198)	0.455
	Medium	3.312 ± 0.515			
	Large	3.404 ± 0.402			
SCQ	Small	3.976 ± 0.500	0.457	(1;198)	0.634
	Medium	4.035 ± 0.417			
	Large	3.916 ± 0.611			

According to the results of the ANOVA test, shown in Table 19, there is a statistically significant difference in cost estimation among the respondents, according to their age ($p<0.05$), while such difference does not exist in flexibility and supply chain quality assessment ($p>0.05$). Respondents aged 30 to 40 attribute a higher importance to supply chain costs.

Table 19. Trade company performance according to respondent age

Variables	Age	μ ± σ	F-test	df	p
FLX	20-30	3.621 ± 0.372	0.982	(3;196)	0.402
	30-40	3.591 ± 0.496			
	40-50	3.736 ± 0.350			
	50 or more	3.702 ± 0.522			
SCC	20-30	3.327 ± 0.605	3.596	(3;196)	0.015
	30-40	3.346 ± 0.488			
	40-50	3.314 ± 0.409			
	50 or more	3.011 ± 0.798			
SCQ	20-30	4.047 ± 0.551	0.433	(3;196)	0.730
	30-40	3.959 ± 0.488			
	40-50	4.044 ± 0.433			
	50 or more	3.970 ± 0.448			

According to the ANOVA results (Table 20), there is a statistically significant difference in flexibility among the respondents, according to their qualifications ($p<0.05$), while such difference does not exist for the evaluation of supply chain costs and quality ($p>0.05$). Flexibility is the most recognized by the respondents with the MA/MSc degree.

Table 20. Trade company performance according to respondent qualifications

Variables	Qualifications	μ ± σ	F-test	df	p
FLX	Elementary	3.400 ± 0.000	3.098	(3;196)	0.017
	High school	3.724 ± 0.435			
	College	3.800 ± 0.713			
	University	3.573 ± 0.435			
	MA/MSc	4.067 ± 0.273			
SCC	Elementary	2.500 ± 0.000	1.688	(3;196)	0.154
	High school	3.267 ± 0.627			
	College	3.233 ± 0.522			
	University	3.268 ± 0.600			
	MA/MSc	3.583 ± 0.342			
SCQ	Elementary	3.430 ± 0.000	1.745	(3;196)	0.142
	High school	3.978 ± 0.491			
	College	4.081 ± 0.373			
	University	3.982 ± 0.480			
	MA/MSc	4.287 ± 0.691			

According to the ANOVA results (Table 21), there is a statistically significant difference in flexibility among the companies according to business continuity ($p<0.05$), while such a difference does not exist in supply chain costs and quality ($p>0.05$). The highest level of importance of flexibility is noted with companies, being in business for 10, up to 20 years.

Table 21. Trade companies' performance according to business continuity

Variables	Business continuity	μ ± σ	F-test	df	p
FLX	0-5	3.618 ± 0.756	3.684	(3;196)	0.013
	5-10	3.400 ± 0.386			
	10-20	3.789 ± 0.339			
	20 or more	3.605 ± 0.476			
SCC	0-5	3.227 ± 0.720	1.524	(3;196)	0.210
	5-10	3.313 ± 0.382			
	10-20	3.400 ± 0.410			
	20 or more	3.196 ± 0.673			
SCQ	0-5	3.743 ± 0.492	2.347	(3;196)	0.074
	5-10	3.874 ± 0.300			
	10-20	3.928 ± 0.523			
	20 or more	0.475			

5. DISCUSSION AND RECOMMENDATIONS

This study confirms the hypothesis, which claims that improved supplier relationships lead to better supply chain performance of trade companies in Bosnia and Herzegovina, especially in the segment of the impact of information exchange. The descriptive analysis shows that trade companies are highly dedicated to establishing partner relationships through supplier partnership and information exchange. It is essential to establish, develop and maintain relationships with suppliers for normal business functioning. Such relations are crucial for supplying the companies with equipment, raw material, reproductive material, and all other things necessary for the regular operation of the production, trade, and distribution.

Li et al. (2006), in their analysis of the American manufacturing companies, show that their sample was more oriented towards establishing supplier partnership than to information sharing and establishing relationships with customers. According to Chavez et al. (2012), results from processing industry in the Republic of Ireland confirmed that supplier relationships, out of all dimensions of the supply chain practices, are given priority. Considering those, as well as our results, one can conclude that the attention in the supply chain is mainly focused on supplier partnership, regardless of the industry or the country of origin.

Cooperation with partners facilitates and improves business operations by increasing company flexibility and enabling them to better respond to market needs. Information exchange may support the increased flexibility. When a company possesses the correct information, it can postpone or increase production according to market demand and reduce its costs.

Research studies have used different measures of supply chain performance, which prevents comparison of the research results. According to the results of this research, trade companies in Bosnia and Herzegovina are more oriented to achieve flexibility, in the sense of adapting to the changes in delivery volume and adjusting to demand variations, including seasonal variations, than towards flexibility (i.e. adapting to the periods of inadequate suppliers' operation and low business activity). As a second dimension of the supply chain performance, analysis of costs shows that supply chain costs in trade companies are generally average. The analysis within the scope of supply chain quality indicates that trade companies focus most on accurate invoicing and adjusting to product specifications.

Correlation analysis results show a statistically significant association between partnership and information exchange (supplier relationships) and flexibility, supply chain quality, and costs (supply chain performance). However, the strength of association is higher between the information exchange and the analyzed dimensions of the supply chain performance.

While determining the impact of supplier relationships on supply chain performance variables, such as flexibility, as one of the analyzed dimensions of the supply chain performance, results of regression analysis show that the information sharing companies have a higher level of flexibility, since the information exchange has been proven a statistically significant predictor. In the analysis of the influence of supplier relationships to costs, as a measure of supply chain performance, information sharing companies have been proved to have a better or much better cost value than average. Analysis also confirmed that supplier partnership does not considerably impact the supply chain flexibility and costs. Regarding the relationship of supply chain quality and supplier relationships, we concluded that information exchange, as a predictor, substantially contributes to the explanation of supply chain quality as a dependent variable. This is not the case with the supplier partnership, as companies can form long-term relationships with a limited number of partners only.

Previous research has established an important role of supply chain relationships in improving operative performance. Therefore, it is necessary to develop partnerships with suppliers and all other supply chain members to raise the level of information exchange and improve the company overall performance.

Considering the abovementioned and the presented research results, the following recommendations can be issued:

- To achieve higher effectiveness, trade companies need to integrate information exchange to their supply chains, as it builds better partnerships and promotes integration with suppliers, which leads to better overall performance.
- Information exchange must have all required characteristics such as promptness, accuracy, reliability, and adequacy.
- Trade companies need to make additional efforts to ensure the information exchange is comprehensive and complete.
- Trade companies need to establish, develop, and maintain supplier relationships. They are essential for supplying the companies with equipment, materials and other inputs, necessary for regular production, trade, and distribution. The existing research has confirmed

that these supply chain elements are in focus, regardless of the industry or the company's geographic position.

6. CONCLUSION

Results of empirical research on supplier relationships and supply chain performance of trade companies in Bosnia and Herzegovina have shown that supplier relationships positively influence flexibility, costs, and supply chain quality, as supply chain performance dimensions.

Analysis of trade companies' supplier relationships indicates the companies pay attention to supplier partnership and information exchange dimensions. Simultaneously, they are trying to establish long-term relationships with their suppliers, stating that they have invested considerable effort into developing honest relationships.

Analyzing the influence of supplier relationships on supply chain performance, by using the regression analysis, has shown that information exchange, as a dimension of supplier relationships, is a statistically significant predictor, as it has a statistically significant impact on flexibility, costs, and supply chain quality. On the other hand, as a dimension of supplier relationships, supplier partnership has not proven to be a statistically significant predictor, meaning it does not have a considerable impact on flexibility, costs, and supply chain quality.

Study of companies' characteristics' impact on supplier relationships' differences led to a statistically significant differences according to respondent gender, qualifications, and business continuity in the information exchange. There is a statistically significant difference for supplier partnership evaluations, regarding the respondent gender, age, and qualifications. Analyzing the impact of company characteristics to supply chain performance, one may conclude that there is a significant difference in the company size, respondent qualifications, and business continuity, when it comes to company flexibility. As for the operation costs, there is a significant difference in its evaluation, regarding the respondent gender, age, and qualifications. For quality, there is a significant difference only regarding the business continuity.

This study is limited both by the sample of trade companies in Bosnia and Herzegovina, as well as by the specific dimensions of supplier relationships and supply chain performance. Future research should focus on other types of companies, as well as to other aspects of supply chain management.

References

1. Akyuz, G. A., & Erkan, T.E. (2010). Supply chain performance measurement: a literature review. *International Journal of Production Research*, 48(17), 5137-5155.
2. Anand, N., & Grover, N. (2015). Measuring retail supply chain performance. *Benchmarking An International Journal,* 22(1), 135-166.
3. Asamoah, D., Agyei-Owusu, B. Andoh-Baidoo, F. K., & Ayaburi E. W. Y. (2020). Inter-organizational systems use and supply chain performance: Mediating role of supply chain management capabilities. *International Journal of Information Management*, August, 1-29.
4. Beamon, B. M. (1999). Measuring Supply chain performance. *International Journal of Operations & Production Management,*19(3), 275-292.

5. Bolstorff, P., & Rosenbaum, R. (2003*). Supply Chain Excellence – A handbook for dramatic improvement using the SCOR model*. New York: AMACOM.
6. Chavez, R., Gimenez, C., Fynes, B., Wiengarten, F., & Yu, W. (2012). Internal lean practices and operational performance of industry clockspeed. *International Journal of Operations & Production Management*, 33(5), 562-588.
7. Cherono, N., & Keitany, P. (2021). Effects of the supplier selection on supply chain efficiency in county government of Nandi. *International Journal of Supply Chain Management*, 6(5), 64-73.
8. Christoper, M. (2011). *Logistics & Supply Chain Management*. (3rd ed.) London: Prentice Hall & Financial Times.
9. Croxton, K. L., García-Dastugue, S. J., Lambert, D. M., & Rogers, D. S. (2001). The supply chain management processes. *The International Journal of Logistics Management,* 12(2), 13-36.
10. Hakan, K. C. (2006). A fuzzy multiobjective programming approach for supplier selection in a supply chain. *The Business Review,* 6(1), 107-115.
11. Jaaskelainen, A. (2021). The relational outcomes of performance management in buyer-supplier relationships. *International Journal of Production Economics*, 232, 1-14.
12. Koh, S. C. L., Demirbag, M., Bayraktar, E., Tatoglu, E., & Zaim, S. (2007). The Impact of Supply Chain Management Practices on Performance of SMEs. *Industrial Management & Data Systems,* 107(1), 103-124.
13. Kozarević, S., & Puška, A. (2015). Povezanost primjene lanca opskrbe, partnerskih odnosa i konkurentnosti. *Ekonomska misao,* 10(2), 579-596.
14. Kozarević, S., & Puška, A. (2018). Use of fuzzy logic for measuring practices and performances of supply chain. *Operations Research Perspectives*, 5, 150-160.
15. Li, S., Ragu-Nathan, B., Ragu-Nathan, T. S., & Subba Rao, S. (2006). The Impact of Supply chain Management Practices on Competitive Advantage and Organizational Performance. *Omega*, 34(2), 107-124.
16. Maheswari, B., Kumar, V., & Kumar, U. (2006). Optimizing success in supply chain partnership. *Journal of Entreprise Informtion Management*, 9(3), 36-41.
17. Mangla, S. K., Kusi-Sarpong, S., Luthra, S., Bai, C. Jakhar, S. K., & Khan, S. A. (2019). Operational excellence for improving sustainable supply chain performance. *Resource, Conservation & Recycling*, 142, 277-278.
18. Mulyaningsih, M., Hermina, T., Akbar, G. G., & Ulumudin, A. (2021). Analysis of the effects of supplier-company's long-term commitment, communication and strategy on supply chain performance in manufacturing sector. *Uncertain Supply Chain Management*, 9, 513-520.
19. Monczka, M. R., Handfield, B. R., Giunipero, C. L, & Patterson, L.J. (2015). *Purchasing and supply chain managem.* (6th ed.) Boston: Cengage Learning.
20. Spekman, R. E., Kamauff, Jr. J. W., & Myhr, N. (1998). An empirical investigation into supply chain management: A perspective on partnerships. *Supply Chain Management,* 3(2), 53-67.

21. Srića, V., & Spremić, M. (2000). *Informacijskom tehnologijom do poslovnog uspjeha.* Zagreb: Sinergija.
22. Stevens, G. C. (1990). Successful supply-chain management. *Management Decision,* 28 (8), 25-30.
23. Waters, D. (2003). *Logistics: an Introduction to Supply Chain Management.* New York: Palgrave Macmillian.
24. Wisner J. D., Tan K. Ch., & Leong G. K. (2012). *Supply chain management: A balanced approach.* (3rd ed.). Boston, MA: South-Western Cengage Learning.

ODNOS S DOBAVLJAČIMA I PERFORMANSE LANCA OPSKRBE TRGOVAČKIH PODUZEĆA U BOSNI I HERCEGOVINI

Sažetak

Potreba za povezivanjem poduzeća i prednosti poslovne suradnje dovode 1980-ih godina do pojave razvoja upravljanja lancem opskrbe. Intenziviranjem procesa globalizacije tržišta, poduzeća sve više shvaćaju nužnost razvoja efikasnih lanaca opskrbe, koji podrazumijevaju niz aktivnosti od planiranja, organiziranja, pa do kontroliranja tijeka materijala i usluga od dobavljača do krajnjeg kupca. Uspješnost lanca opskrbe u velikoj mjeri ovisi o odnosu s dobavljačima. Stoga danas odnosi s dobavljačima i upravljanje performansama lanca opskrbe postaju značajna tema u akademskim istraživanjima, s obzirom na njihov utjecaj na profitabilnost lanca opskrbe. Navedeno posebno dolazi do izražaja u trgovinskoj djelatnosti. Stoga je cilj ovog rada utvrditi vezu između odnosa s dobavljačima i performansi lanca opskrbe u trgovačkim poduzećima u Bosni i Hercegovini. Empirijsko istraživanje provedeno je na osnovu prikupljenih primarnih podataka, korištenjem metode anketiranja, pri čemu je korišten anketni upitnik kao istraživački instrument za prikupljanje podataka. Ispitanici su bila poduzeća iz područja trgovinske djelatnosti, pri čemu je anketirano 200 poduzeća, s cijelog teritorija Bosne i Hercegovine. Kako bi se dali odgovori na postavljena istraživačka pitanja, koja se odnose na stupanj povezanosti odnosa s dobavljačima i performansi lanaca opskrbe, korištene su različite metode statističke analize, u skladu s definiranim istraživačkim problemima. Rezultati su pokazali da odnosi sa dobavljačima imaju pozitivan utjecaj na fleksibilnost, troškove i kvalitetu lanaca opskrbe. Potvrđena je statistički značajna međuovisnost partnerstva s dobavljačima i razmjene informacija, kao dimenzija odnosa sa dobavljačima te fleksibilnosti, troškova i kvalitete, kao dimenzija performansi lanaca opskr-be. Postoji i statistički značajan utjecaj pojedinih karakteristika poduzeća na razmjenu informacija, partnerstvo s dobavljačima, fleksibilnost, troškove i kvalitetu.

Ključne riječi*: lanac opskrbe, odnosi s dobavljačima, performanse lanca opskrbe, trgovačka poduzeća.*