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JEL: A11, D39

Preliminary communication

Received: March 30, 2019

Accepted for publishing: October 31, 2019

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DEVELOPMENT OF BUSINESS STRATEGIES BASED ON LOGISTICS PERFORMANCE OF THE REPUBLIC OF CROATIA

ABSTRACT

Croatia, as a moderately new member of the EU, has recognized the prospects offered by the membership. The participation of Croatian enterprises in European supply chains is an important opportunity for the country's economic growth. The analysis of its logistics performance, based on the World Bank data, suggest a positive change in recent years. That proves a beneficial evolution of the business environment in Croatia. The primary research presented in the paper considers the improved logistics infrastructure and other subfactors included in the analysis, the support offered to business activities and the increased readiness of the country for a potential upturn of logistics services. Using logistical advantages of Croatia as a location or improved infrastructure may be a stimulus for creating relationships with business partners in the EU. A country that applies the adaptable concept of a logistics platform is in a good position to use new possibilities on the EU market, especially the growing e-commerce sector. Free flow of information on the Internet and unrestricted access to customers in the single market, guaranteed by EU law, opens new possibilities for trade development and finding one's niche. Recently the European Parliament adopted the regulation forbidding geo-blocking and thus created potential for e-commerce growth in Europe. Croatia may benefit from its location and rise in logistics performance. In this relatively new sector, the ability to use all logistical advantages has become an asset. Employing advanced analytical techniques of simulation and visualization for logistics applications has become a prerequisite for growing e-commerce on the EU market. The questions arising from such a perspective concern the abilities of the Croatian business to exploit the described potential. How should managers of business entities adjust their strategies to logistics standards? How strongly is business intelligence correlated with supply chain management? The purpose of this paper is to formulate a protocol for creating a logistics strategy for Croatian enterprises. Preliminary research for this article included logistics performance index (LPI) analysis, literature, and data mining. Variables examined in the primary research of Croatian companies' practice were categorized as business intelligence, supply chain management, information visibility and integration of logistics function. Factor analysis was used to connect these variables, i.e. to reduce the number of variables. The authors have tested the correlation between variables. There was a significant statistical correlation between business intelligence, supply chain management, information visibility and integration as prerequisites for a competitive logistics strategy of the company.

Keywords: Logistics, strategy, international trade, market

1. Introduction

Modern market requirements focus on fast and cost-effective delivery of products and services. Competitiveness between supply chains is becoming one of the most important paradigms of modern business. The business excellence of supply chains is directly correlated with the increase in value for shareholders (Slone et al., 2010; ECAP, 2013; Murray 2018; Ju et al., 2019). Time is a critical factor in the process of serving a modern customer who appreciates the effort in providing reliable delivery and other additional services. Information management and the ability to exchange it represent a strategy for achieving the cohesion of all functions among parties in the flow of materials and services (Luetić, 2017). Business logistics services are an important factor of creating a strategic advantage over traditional distribution (Min, Mentzer, 2004; Murray, 2018; Ju et al., 2019). The innovative web-based approach to the process of serving the customer increases the requirements posed to the logistics

services of the company or its supply chain. Since the accession in 2013, Croatia has become a valuable partner for business development in the European single market. Its location and availability to transship cargo, thanks to the access to the Adriatic Sea, opens up new possibilities in term of logistics services and business opportunities. Connecting western and central Europe, the Black Sea region with south-eastern Europe and Baltic regions while passing central Europe, with Pannonian and Mediterranean region – all this determines the multidirectional character of this country (Figure 1). Moreover, access to the Adriatic Sea creates the shortest and the most cost-effective route between Europe and Africa and Asia via the Suez Canal (Popescu (Bizoi) and Sipos, 2014; Roso et al., 2015: 501). The location of the port Rijeka provides excellent opportunities for transshipment to rail, road and inland waterway, which may be important due to the development of Central European Boomerang region of intensive logistic and manufacturing activities (Bentyn, 2016).

Figure 1 European Traffic Corridors in Croatia



Source: Stanković et al., 2013

The area in the map spans from Gdansk through Prague, reaching Budapest and reflects the development of a similar structure in Western Europe called *Blue Banana* (Gorzelać, 2012: 127; Nicita et al., 2013). Local advantages open up new perspectives for businesses to access the European supply chain. The trend to improve logistics performance is a clear indicator of business activities that began in the region after the series of accessions to the European Union in years 2004, 2007 and 2013. The opportunity that has been created allows Croatian companies to participate in the European supply chain. Thanks to the improvements in the logistics performance, it is possible to take advantage of the location of the country and to provide services on the European level.

The investment in the logistic infrastructure, both private and through European funds has a positive influence on basic logistic activities, fulfilling in this way the requirements of modern customers. The EU business creates a unique opportunity by eliminating physical barriers between merchandise and the customer. Similarly, virtualization of business practices allows for faster flow of information, thus improving agility in the supply chain. Employing Internet applications helps supply chain partners to improve its performance and at the same time to better connect the whole supply net with the final customers. Transferring the basic commercial operations to the virtual world opens up new possibilities for the customer such as:

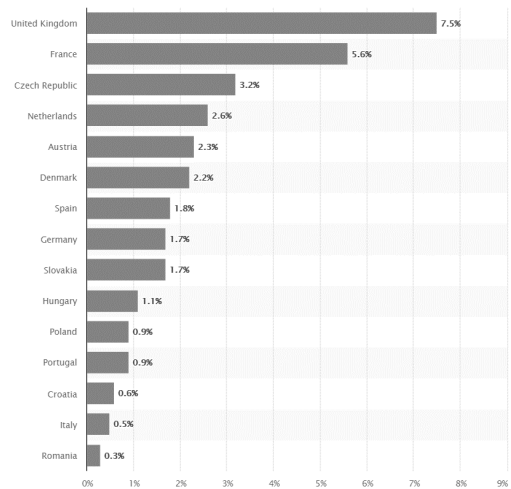
- Searching for products and services;
- Comparing them in a multicriterial way;
- Assessing the availability of required value.

The relative ease of acquiring goods and services in e-commerce draws the attention of growing numbers of customers. Since Croatia's accession to the EU in 2013, commerce started to grow. It took five years to reach the current level. The data describing this market, gathered in 2017, indicate a promising perspective¹:

- The number of online buyers in Croatia is 1,75 million;
- The growth rate in 2017 is 18%;
- 60% of all internet users are e-customers;
- 6-10% of those e-customers buy at least once a month;
- The value of the e-commerce market in Croatia is estimated at \$446 million;
- Online transactions generate approximately \$30 million in revenue yearly.

In view of this information, conservative logistics strategy in Croatian companies needs to be changed. The alterations noted in 2017 assure the increase in the trends. The observed 9% increase in the number of regular e-customers illustrates the growth rate in this market. Still, the comparison of the Croatian market to the markets of other European countries offers a perspective on the size and potential ahead.

Figure 2 Share of global online grocery sales based on value in leading European Union (EU) countries in 2017



Source: Statista - The Statistics Portal (2018), "Share of global online grocery sales based on value in leading European Union (EU) countries in 2017", available at: <https://www.statista.com/statistics/614717/online-grocery-shopping-in-the-european-union-eu> (Accessed on: September 18, 2018)²

Changes in business philosophy of companies which are the result of the global impact of a highly competitive external environment and the internal characteristics and factors of the micro environment are strongly reflected in the functioning and management of supply chains (Luetić, 2017; World Bank, 2018). The steady growth of customer's interest implies the need for reliable logistics services (Lee, Hau, 2004; Yildiz, 2014; Ju et al., 2019). The performance in delivering the expected value is a precondition for the development in this area of business. All physical activities including transport, warehousing and additional value-adding logistics services are critical for providing the customer satisfaction. The superiority of e-distribution derives from expected convenience and price attractive-

ness. As expected, prices are the most appreciated advantage of e-commerce. E-customers expect lower prices than in the physical store. Moreover, the added cost of delivery should be minimized as much as possible, concerning the fact that 28% of e-customers expect free shipping³. Additionally, the e-channel of distribution should provide detailed information about the product, customer reviews and feedback, maintaining the exchange of information and securing the transfer of the value. A characteristic feature of e-distribution is the ability to return the product. National and European laws secure the rights of customers in this matter and build the trust in this new way of distribution. On the other hand, they increase the requirements on the logistics services designed for e-commerce. Return policy of e-business should be clearly stated on company website because e-customers pay additional attention to this fact. Unreliability in the process of return of the products is the most criticized behavior by e-shoppers in Croatia. A part of this depends on logistics performance in the region.

Modern distribution centers are a crucial part of the logistics systems. Thanks to the available space and functional opportunities, it is possible to process many orders in the right way, saving time by the way and gaining competitive advantage over the physical, traditional way of distribution. The existing infrastructure, both logistical and informational, determines the time and cost of logistics operations. Therefore, the era of e-customers relies heavily on readiness of logistics services. The advantage of geographical location of Croatia may be critical for the future development of e-business. Already an estimated 40% of Croatian e-customers order from e-shops outside of Croatia, such as China and other EU countries. Online retailers from Croatia provide services locally and globally (about 40% for local customers and 60% for global markets). The already globalized trade relations may become even more pronounced thanks to the abolishing of geo-blocking. In February 2018, the European Parliament adopted the regulation forbidding geo-blocking and other forms of discrimination based on customer nationality, place of residence or place of establishment⁴. This may unlock the potential for e-commerce to grow in Europe while Croatia may benefit from its location. The idea of maintaining cohesion inside the Single European Market may further decrease the barriers and produce the impulse for supplementary development in trade relations. New business perspective lying in the location and status of Croatia as an EU member is supported by the development of e-business

speeding the trade relations and describing a new competitive area based on the logistics advantages.

However, the readiness of Croatian enterprises requires adjusting their strategies in a certain way (ECAP, 2013; European Bank, 2019).

It is expected that better performance of a company will be based on logistics performance, which demands high quality information sources and reliable data, thus building agility in supply chain (Murray, 2018; Ju et al., 2019).

Business intelligence variables such as intuition and time improvements are direct logistical values leading to better performance of a company. Additionally, advanced analytics used in logistics activities of a business will lead to adaptability and improved responsiveness of the company. All the above statements should be verified by the research, providing information concerning enterprises in Croatia.

2. Methodology

The preliminary research explains the rising logistics performance in Croatia.

The logistics performance index measures the ability of a country to participate actively in the trade exchange and global supply chains. The measurement is designed and repeated every two years by the World Bank (World Bank, 2018). Thanks to that, it helps to assess the position of the country and the development in the given time. Investors use the LPI to make sure that the location of intensive production activities will meet the logistics competence in the region. That may be precognition to further business development and participation of the local business in global supply chains. The analysis will compare the change in Croatian overall LPI from 2010 to 2018 (Figure 4) and describe changes according to two subfactors: Infrastructure (Figure 5) and Timeliness (Figure 6). Measurements for Croatia across the observed years, as presented by the World Bank, show a steady development in LPI. A greater increase occurred between the years 2010 and 2012. This change may be caused by the development of neighboring countries, which were already members of the EU, namely Slovenia and Hungary. Both countries joined the EU in the biggest accession in this part of Europe in 2004. That was a great stimulus to start the development of the Central European Boomerang (CEB), an area described by Gorzelak (2012: 127), and Croatia benefited as a logistics partner. Croatia is an EU member from 01.07.2013. Since its accession to the

EU, Croatia has ranked 55-51 in the global ranking in logistics performance. According to the most recent research in 2018, the country's LPI of 3.16 is identical to the 2012 measurement.

The primary research consists of two stages. In the first stage, the authors verified claims related to variables of business intelligence required for improving the logistics potential of an enterprise. Among them are the sources and reliability of data and information, access to data and information, advanced analytics, intuition and time and the organization of business intelligence. The second stage allowed us to analyze the correlation of variables chosen in the first stage related to the variables associated with logistics strategy and supply chain management. Among them are agility, adaptability, alignment, proactivity, performance.

For the purpose of this paper, the most interesting empirical statistical research involves survey sampling. The questionnaire was verified by general managers of Croatian companies that have experience in export business. Before the final definition of the survey, preliminary research was conducted to test the questions for the primary research. The purpose of the preliminary research was to verify the research instrument. In addition to the implementation, the purpose was to determine its clarity and appropriateness for the research. In total 321 companies responded to the questionnaire. The main instrument of this study was a questionnaire consisting of closed questions with multiple-choice answers that involve using a Likert scale with five degrees of intensity. Likert scale attitude is based on the assumption that every statement/particle on the scale has equal importance and weight in terms of how much it reflects the attitude toward a particular issue or problem. The survey participants have to choose the answer from 1 = strongly disagree to 5 = strongly agree. For this research, a measurement of the perception of respondents was employed.

A deliberate sample was used to conduct this empirical research, and the population is represented by the set of 1000 largest companies in the Republic of Croatia by revenue in 2010. The survey was conducted in 2018. The purpose of this research was to cover companies that apply the concept of business intelligence in their business.

Several recent studies that have explored business intelligence or supply chain management were taken into account and only companies that apply the concept studied were included in the sample. Teo and Choo (2001) investigated only those companies

that use the internet, while Howson (2008) used as a sample companies whose names she received from business intelligence tool manufacturers, or PI consultants. Taskov (2009) chose a random sample; however, in the cover letter, he explained the definition of business intelligence and asked respondents who do not practice business intelligence not to answer the questionnaire but to return it. Grawe et al. (2011) in their cover letter asked a question about the relevance of the company so that it can participate in the research. Isik (2009) also chose a sample consisting of businesses that apply business intelligence to making strategic, tactical or operational business decisions.

Based on the above findings, a pre-test memo was drafted explaining business intelligence. In the context of research, business intelligence is seen as the concept of the conscious, organized, continuous, legal and legitimate collection, analysis and use of data and business information. It is implemented using information technology but also in other ways. It provides insights about customers, suppliers, competitors, industry, technology, institutional regulation and other factors that directly or indirectly affect the business of the enterprise, in order to support the management in decision making.

Four findings were made and respondents were invited to participate in the survey if they could give at least one affirmative answer to the following statements:

- 1) Apply business intelligence at the system level or at the strategic level of certain business units (e.g. marketing, development, finance and accounting, manufacturing, commercial, procurement, etc.);
- 2) Apply business intelligence only to specific business processes or projects;
- 3) Use one of the storage technologies and platforms in your business (Data Warehouse), Data Mining, OLAP tools;
- 4) Use advanced analytical techniques, and simulation and visualization programs.

This form has been verified by several professors at the Faculties of Economics in Split and Zagreb, Faculty of Humanities and Social Sciences in Zagreb and practitioners of business intelligence (Šerić, Luetić, 2016).

For the purposes of this research, measurement of respondents perceptions was conducted (Akintoye

et al., 2000; Wixom, Watson, 2001; Skjoett-Larsen et al., 2003; Vickery et al., 2003; Benton, Maloni, 2005; Wieder et al., 2006; Sanders, 2007; Elbashir et al., 2008; Sodhi, Son, 2009; Trkman et al., 2010). This is the chosen tool for two reasons: (1) the effects of using business intelligence are intangible, but rather qualitative, which is why they are not suitable for objective measurement, (2) most information in its own right is of a confidential or strategic nature and are therefore not appropriate for public disclosure (Williams, Williams, 2007; Elbashir et al., 2008).

The survey started with three basic indicators regarding the company: its activity, number of employees and legal form.

Activity	Frequency	%
Primary production	10	3.4
Manufacturing	107	36.5
Trade	91	31.1
Tourism and hospitality industry	6	2.0
Construction	17	5.8
Banking, insurance and financial services	26	8.9
Telecommunications	10	3.4
Business services	18	6.1
Other	8	2.7
Total	293	100.0
Number of employees		
Up to 10	2	0.7
11 to 50	27	9.2
51 to 250	98	33.4
Over 251	166	56.7
Total	293	100.0
Legal form		
Joint-stock company	122	41.6
Limited liability company	159	54.3
Foreign founder	5	1.7
Institution	6	2.0
Other	1	0.3
Total	293	100.0

The intention was to research those businesses that use business intelligence in their operations. An-

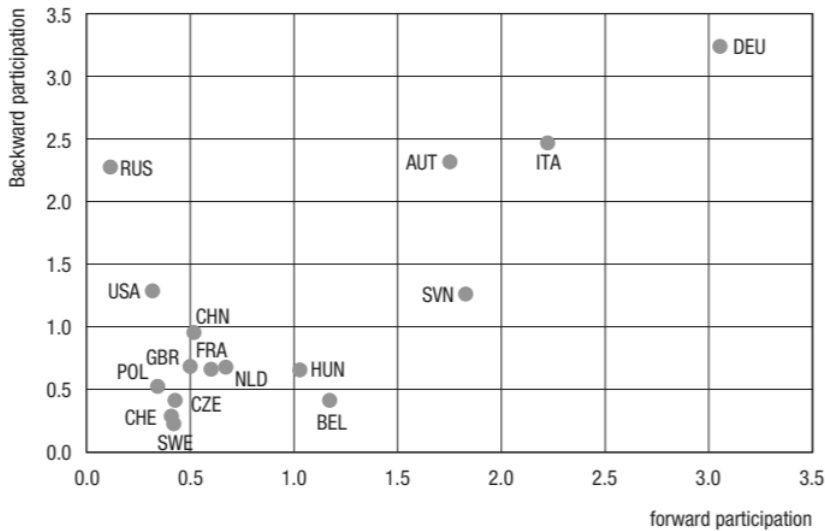
swers of 25 companies were excluded before processing when the companies that made the most recent PI, claimed in the questionnaire that business intelligence has not yet been systematically organized. In addition to these companies, another three were excluded, which did not answer the above question. Finally, there were 293 usable responses, that is, a response of 29.3%.

3. The preliminary research

3.1 Participation of Croatian businesses in the European supply chain

The evaluation of the importance of Croatian logistics performance could be seen through its participation in the European supply chains. The direction of cooperation in supply chains and location of the countries who are critical partners for Croatia support the ongoing effort to improve its logistics potential. The report presented by the Croatian National Bank mentioned the most important partners (Figure 3). Germany represents the most balanced partnership in terms of equilibrium between forward and backward participation. Italy is similar in this position but on a smaller scale. These two countries, thanks to the equal backward and forward participation, create the movement of cargo in both directions, increasing the importance of transport corridors between them and Croatia and logistics infrastructure along the way. Austria and Slovenia are slightly away from previous balanced positions but are also important for Croatia because of their scale of participation. The location of these countries covers the directions designated for Germany and Italy, which is helpful in assessing the importance of those transport corridors. For example, Russia, USA and China represent a weak forward participation. It translates to much bigger imports (up to several times) of intermediaries from these countries. The Location of these countries entails the necessity of developing marine ports and additional logistics infrastructure in case the reported imbalance would change for greater participation of export from Croatia. The scale of trade in this case proves the international role Croatia plays in the global supply chains and is promising for the development of other trade exchange partnerships.

Figure 3 Main GVC partner countries for Croatia in 2014 in %



Source: Vidaković-Peruško I., Kovač K., Jošić, M. (2018), "Croatia in Global Value Chains", Surveys S-32, Croatian National Bank, available at: <https://www.hnb.hr/documents/20182/2348886/s-032.pdf/3edf751b-07a1-45ab-997e-ff7de-8ce76cf> (Accessed on: February 6, 2019)⁵

After Slovenia, there are other countries noticeable as partners in global value chains from the CEE part of the Europe (Hungary, Belarus, Poland and the Czech Republic). The developing partnerships in supply chains among those countries support the concept of CEE boomerang located between Gdansk, Poznan, Prague, Brno, Bratislava, Vienna and Budapest. Central European Boomerang (CEB) described in 2012 was divided into a more attractive and developed southern part near Budapest and Prague and less developed infrastructural part of the northern part starting in Gdansk and including Poznan and Wroclaw (Gorzelać, 2012: 127). Gorzelać pointed out the directions of transport from the industrial part of the CEB zone. It should connect the area between Bratislava and Budapest towards Zagreb and the ports of Rijeka and Trieste on the Adriatic Sea (Bentyn, 2016). The development of this area of logistic and manufacturing cooperation would create an axis starting from the port of Gdansk, passing corridor VI along important distribution hubs: Poznan, Lodz, Wroclaw, Tychy, Brno, Bratislava, Budapest and Zagreb. At the other end, the axis would finish in the Croatian port of Rijeka and promote the development of the international logistics hub located there. Croatia offers a greater share of domestic value added in the production of food, beverages, tobacco industry, pharmaceuti-

cal products, and computers and electronics. Being a part of global supply chains nowadays means to cope with requirements of modern markets and at the same time optimizing costs of logistics services. These demands become more important in the FMCG (Fast-Moving Consumer Goods) markets which reveal the tendency to search for time-based competitiveness (Nicita et al., 2013; Šerić et al., 2014; European Bank, 2019; Ju et al., 2019). Therefore, goods may be distributed by e-commerce channels and, thanks to the above-mentioned linkage between partner countries, they can bring great benefits to the Croatian economy. For this reason, conservative logistics strategy needs to be changed⁶.

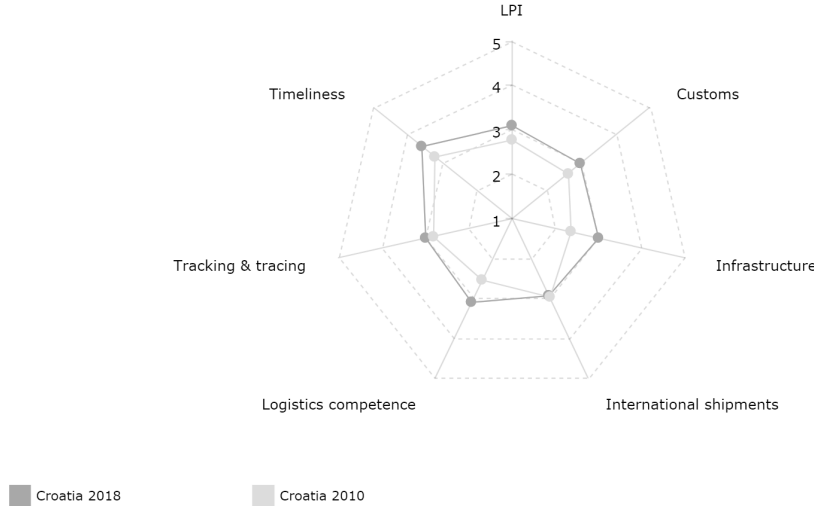
3.2 Current logistics performance index (LPI) 2018 and future perspective

In the global ranking of Logistics Performance Index based on research carried out by the World Bank, Croatia rose from No. 51 in 2016 to No. 49 in 2018. Although the overall LPI score decreased from 3.16 to 3.10, the comparative position in the ranking is dependent also on the outcome of other countries. Since 2010, when most neighboring countries were EU members, Croatia noted a bigger improvement in logistics performance. Joining the European supply chain on the terms of EU member

became possible from 1 July 2013. Creating greater cohesion among the CEE countries with access to the developed western part of Europe was an im-

portant stimulus to increase foreign investment and adequately manufacturing and logistics operations (Yildiz, 2014; Ju et al., 2019).

Figure 4 Croatia overall LPI 2010 - 2018

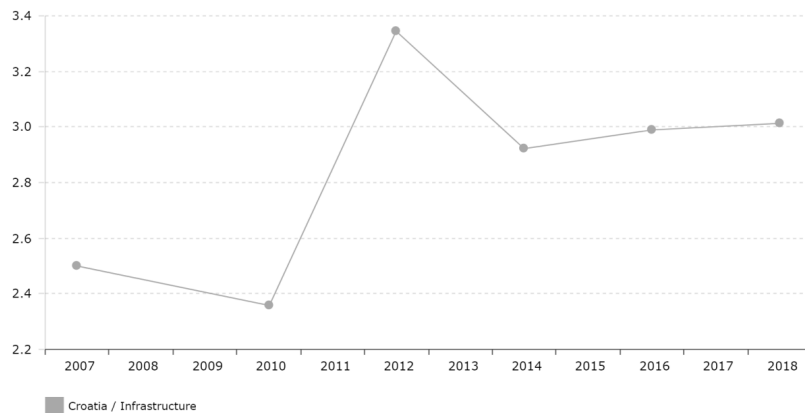


Source: Own, based on The World Bank (2018), "Logistics Performance Index", available at: lpi.worldbank.org (Accessed on: January 8, 2019)⁷

What is critical for the logistics performance of a country is the development of logistics infrastructure (European Bank, 2019). Moreover, modern distribution requires a quick reaction and reliable time of performed logistic operations, which is an additional argument for further infrastructural development (Murray, 2018). Figure 5 represents con-

secutive research in infrastructural subfactor of LPI and shows that 2012 was significant for the logistics infrastructure. Another three measurements after that year indicate a steadily growing trend. Those translate into a more balanced increase rather than a radical change visible in the years around the accession to the EU.

Figure 5 Infrastructure developments in Croatia 2010-2018



Source: Own, based on The World Bank (2018), "Logistics Performance Index", available at: lpi.worldbank.org (Accessed on: January 8, 2019)⁸

The undertaken infrastructural projects such as Rijeka Gateway Project, Zagreb Pier Deep Sea Container Terminal (ZCT), Waterdrome Network and Air Carrier, Port of Ploče, as well as the construction and upgrading of infrastructure at the inland port of Slavonski Brod, may make a difference in next periods under research. Some specific objectives written in the Transport Development Strategy of the Republic of Croatia (2017 – 2030) include the development of the following main logistics centers:

- Rijeka maritime port,
- Ploče maritime port,
- Split maritime port,

- Vukovar inland port,
- Osijek inland port,
- Zagreb hub.

Another objective is even more promising for the development of an international logistics hub. A strategic goal is the strengthening of Croatia as a logistics hub for the wider region, with focus on Zagreb. This statement leads to the logical implication of aiming to harmonize transport operations with neighboring countries: Bosnia and Herzegovina, Slovenia, Serbia, Italy, Montenegro and Hungary⁹.

Figure 6 Timeliness subfactor of LPI in Croatia 2010-2018



Source: Own, based on The World Bank (2018), "Logistics Performance Index", available at: lpi.worldbank.org (Accessed on: January 8, 2019)¹⁰

The important factor from the perspective of e-commerce is timeliness. This subfactor has improved significantly in two recent measurements (Figure 6). The reliability of cargo flow is in fact the result from all subfactors of logistics performance combined. The time-based competitiveness is a condition forcing cooperating enterprises to create synchronized supply chains. Customers compare and choose the better offer, also in terms of delivery and standard of logistics services (Yildiz, 2014). The effort in this area is visible in Croatia and may be an important factor for the future development of modern distribution centers ready for serving the most valuable branches of Croatian industry.

4. The primary research

4.1 Findings of the first stage

The primary research was a part of another research by one of the authors (Šerić et al., 2014), but this part was conducted on the sample of export Croatian companies. Claims related to logistics potential are divided into five groups. Internal consistency was examined using Cronbach's alpha.

The first group includes claims related to the sources and reliability of data and information. Initially, there is a total of eight variables. Cronbach's alpha was calculated to examine internal consistency and it was concluded that one variable should be dropped.

Thereafter, a satisfactory size Cronbach's alpha (0.715) was obtained. The second group includes claims related to access to data and information. There were four claims. Cronbach's alpha was 0.77. The third group of variables is made up of claims relating to advanced analytics. There were also four claims. Cronbach's alpha was 0.778. The fourth group includes claims related to intuition and time and consists of five claims. Cronbach's alpha was 0.765. The fifth group consists of claims related to the organization of business intelligence and consists of five claims of which one was dropped because of internal inconsistencies. Cronbach's alpha was 0.64.

Having tested the internal consistency, factor analysis was performed in order to create five latent variables to facilitate handling in the later stage of analysis. All the results were satisfactory in accordance with the requirements of factor analysis. The main indicators considered about the validity of factor analysis were Kaiser-Meyer-Olkin measure of sampling adequacy, Bartlett's test of sphericity, Kaiser's criterion on the size of eigenvalues and the percentage of variance explained. Factor loadings were all greater than 0.5, which is very satisfactory.

Claims relating to the management of the supply chain were grouped into five dimensions. The first dimension was related to agility and had four claims. Cronbach's alpha was 0.894. The second dimension was related to the adaptability and had three claims. Cronbach's alpha was 0.817. The third dimension was related to the alignment and had three claims. Cronbach's alpha was 0.732. The fourth dimension was related to the proactivity and consisted of four variables. Cronbach's alpha was 0.900. The fifth dimension was related to the performance and consisted of six statements. Cronbach's alpha was 0.896. After testing the internal consistency, the factor analysis was performed in order to create five latent variables in order to facilitate handling in the later stage of analysis. All the results were satisfactory in accordance with the requirements of factor analysis.

4.2 Conclusions of the second stage

Creating a logistics strategy represents a crucial phase in management. The research has shown that different strategies are used in Croatian business practice (Šerić, Luetić, 2016). According to the findings of the first stage, the most complex phase in creating a competitive logistics strategy is linked to possibilities of its implementation. Different criteria can be considered as prerequisites for an effective logistics strategy, such as – accuracy, measurability,

and applicability of information. Another important aspect is the suitability of information which is used in existing marketing information system of a company. Companies that satisfy those criteria make prompt decisions to eliminate business risks and fulfill the goals of the Supply Chain Management defined as follows: "The task of coordinating material flow and information across the supply chain to meet end-customer needs" (Harrison, Hoek, 2011).

Business intelligence and supply chain management contribute to the competitiveness of the logistics strategy. Such competitiveness assumes constant collection of information on competitors' supply. Devising a successful logistics strategy based on the application of business intelligence in the management of supply chain is more efficient and responsible. All logistic tools need to be adapted in accordance with the strategy.

The research has shown that creating a competitive logistics strategy based on business intelligence is generally conducted through four phases. The first phase is the analysis of the company's environment. The second phase includes defining the frames of the final marketing decision. In the third phase, correction decisions are made according to the feedback. In the fourth phase, consequences of the final marketing decision are estimated.

The logistics strategy should perform the function of maximizing the perception of the value of the company. The efficiency of data collection and analysis of competition in this sense are imperative.

Positive experiences of several companies in the research sample indicate the convenience of business intelligence analysis for creating the logistics strategy through five levels: early warning intelligence, intelligence as support for creating a logistics strategy, intelligence as support in tactical logistics operations on the market, evaluation of competitors, and intelligence as support in planning and creating the logistics strategy.

Although Herring (1999) was the first one who, according to the results of the conducted research, had formed important intelligence application areas for logistics decisions, in this approach access stratification through multiple platforms is evident. The research conducted for the purpose of this study confirmed that relevant information about consumers, competitors, potential partners, suppliers and other influential groups is the first and the last line in defending the market position. As a result, here is a suggested protocol for creating the logistics strategy (Table 1).

Table 1 Recommended protocol for creating the logistics strategy

1.	Estimation of tactical and strategic competitor's logistic activities.
2.	Estimation of competitor's SCM praxis.
3.	Guidelines for improving own SCM praxis.
4.	Decisions related to the business development.
5.	Guidelines for improving company image on the market.
6.	Guidelines for shaping competitive logistics strategy.
7.	Simulations and evaluation of the implementation for logistic decisions.

Source: Original, based on the conducted research

After reducing the number of variables in the business intelligence and supply chain management, the association between latent variables related to busi-

ness intelligence and supply chain management was investigated. The following matrix of Pearson's correlation coefficients was obtained as shown in Table 2.

Table 2 Correlation between business intelligence and supply chain management for creating the logistics strategy

		SCM Agility	SCM Adaptability	SCM Alignment	SCM Proactivity	SCM Performance
BI Reliability of data and information	Pearson Correlation	0.400**	0.465**	0.321**	0.287**	0.429**
	Sig. (1-tailed)	0.000	0.000	0.000	0.000	0.000
	N	270	275	270	273	270
BI Access to data and information	Pearson Correlation	0.330**	0.330**	0.211**	0.201**	0.252**
	Sig. (1-tailed)	0.000	0.000	0.000	0.000	0.000
	N	283	289	283	285	280
BI Advanced analytics	Pearson Correlation	0.247**	0.380**	0.162**	0.397**	0.295**
	Sig. (1-tailed)	0.000	0.000	0.004	0.000	0.000
	N	274	280	274	278	273
BI Intuition and time	Pearson Correlation	0.420**	0.473**	0.313**	0.296**	0.402**
	Sig. (1-tailed)	0.000	0.000	0.000	0.000	0.000
	N	282	288	282	285	280
Organization of BI	Pearson Correlation	0.308**	0.333**	0.235**	0.242**	0.265**
	Sig. (1-tailed)	0.000	0.000	0.000	0.000	0.000
	N	276	282	275	280	275

** Correlation is significant at the 0.01 level (1-tailed).

Source: Original, based on the conducted research

As can be discerned from Table 2 above, in all cases there is a statistically significant correlation between variables that are related to business intelligence and variables related to supply chain management ($p < 0.001$). It may also be noted that correlation coefficients are not very large. The difference has been investigated in the arithmetic means of business intelligence through one-way analysis of variance in relation to the company's activity, number of employees, and legal form. Statistically significant differences in the mean of business intelligence were obtained only in the analysis of the activity of the company shown in Table 3.

Table 3 Analysis of variance of business intelligence with respect to the activity of the company for creating the logistics strategy

Variable	Significance
Source and reliability of data and information	0.013
Access to data and information	0.080
Advanced analytics	0.061
Intuition and time	0.927
Organization of business intelligence	0.967

Source: Original, based on the conducted research

The differences among companies that have significantly more developed business intelligence were found in the first three groups of questions related to business intelligence and were statistically significant. As regards the number of employees and legal form of companies, there was no statistically significant difference regarding the application of the concept of business intelligence, and thus these results are not displayed.

In Table 4, all variables showed a statistically significant difference except proactivity. As with business intelligence, better results were achieved in services companies. As with business intelligence, there was no statistically significant difference considering the number of employees and legal form of enterprise, therefore these results are not displayed.

Table 4 Analysis of variance of supply chain management regarding the activity of the company for creating the logistics strategy

Variable	Significance
Agility	0.007
Adaptability	0.062
Alignment	0.001
Proactivity	0.394
Performance	0.002

Source: Original, based on the conducted research

5. Conclusion

Traditional supply chains are increasingly turning into supply networks, which is best characterized by their complexity. The added complexity of the relationship is noted when analyzing the levels of established relationships within the enterprise and between the company and its partners in the chain itself. The research presented here is based on the experience of Croatian companies. The chosen variables are assessed to be useful toward creating a competitive logistics strategy for the EU market. The results show that there is a statistically significant correlation between variables that are related to business intelligence and variables related to supply chain management. Facilitating strategies of enterprises toward these values may fulfill the constructed protocol for a logistics strategy of Croatian enterprises. It was found that there are not enough experiences in creating a logistics strategy on the platform of the main variables (such as business intelligence etc.) in Croatian business practice. In many approaches analyzed in the research, the most complex phase is where business decisions are made for logistics strategy implementation.

To time-prove planned changes in the strategies of enterprises, it would be advisable to employ values critical for the development of e-business as a rising sector in the European economy. Therefore, it is necessary to ensure accuracy, measurability, and applicability of information on the basis of which logistics decisions are made. Companies included in the sample, which fulfill these criteria, take prompt measures to eliminate different market risks. The research has shown that business decisions in lo-

gistics based on business intelligence implementation in supply chain management is efficient and responsible. Creating a logistics strategy for the EU market has to be in the function of maximizing the perception of the company's value supply.

Aggregate correlation coefficients show a statistically significant correlation between the two actual sets of variables. Correlation dimensions that constitute the observed variables also indicate some interesting elements:

- Quality of sources and reliability of data and information is effectively connected with better agility, adaptability and better performance of the company;
- Use of intuition and time improvements based on the use of business intelligence is effectively connected with better agility, adaptability and better performance of the company;
- Widespread use of advanced analytics is actually associated with better adaptability and greater supply chain proactivity of the company.

With the exception of the correlation between advanced analytics and compliance, which is defined as low, all other mutual correlations are strong and statistically significant. It can be concluded that there is a positive correlation between the use of business intelligence and efficient supply chain management. Croatian companies do not have enough time to adapt and their efforts need to go in several directions: towards the development of integration (vertical and horizontal), to achieve greater visibility between the involved process participants, to achieve greater flexibility, better matching and adaptability to the conditions in which they operate. Such an effort may lead to an improvement in logistics performance of a country and create synergy for economic development. Further analysis may verify an occurrence of the described relation.

The relationship between business intelligence and supply chain management should be strengthened in order to maximize the correlation coefficients in the practice of creating a competitive logistics strategy of Croatian companies for the EU market.

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RAZVOJ STRATEGIJE POSLOVANJA PODUZEĆA ZA TRŽIŠTE EUROPSKE UNIJE TEMELJEN NA LOGISTIČKIM PERFORMANSAMA REPUBLIKE HRVATSKE

SAŽETAK

Republika Hrvatska, kao relativno nova članica Europske unije, spoznaje i nove mogućnosti koje članstvo pruža razvoju nacionalne ekonomije. Rast udjela hrvatskih gospodarskih subjekata u europskim opskrbnim lancima je jedan od načina poticanja nacionalnoga ekonomskog rasta. Analiza logističkih performansi Republike Hrvatske temeljena je na recentnim podatcima Svjetske banke te ukazuje na pozitivne promjene, kako u užem, tako i u širem poslovnom okruženju. Unaprjeđenje logističke infrastrukture i njezinih temeljnih sastavnica obuhvaćenih ovom analizom u radu, podrška razvoju gospodarstva i jačanje kompetencija u logističkoj sferi predstavljali su okvire za primarno istraživanje autora čiji su nalazi također predstavljeni u radu. Postojeće logističke prednosti Republike Hrvatske i kontinuitet unaprjeđenja logističke infrastrukture preduvjet su uspostavi novih poslovnih kontakata i poslovne suradnje hrvatskih tvrtki s europskim partnerima. Implementacija koncepta logističke platforme nacionalnoga gospodarstva prilagodljivog poslovnim standardima tržišta ekonomske integracije preduvjet je iskorištenju novih poslovnih mogućnosti. Ovo se posebno odnosi na područje e-trgovine. Sloboda razmjene informacija putem svemrežja, kao i sloboda izravnog pristupa kupcima na tržištu Europske unije sukladno definiranim regulativama pružaju svakom gospodarskom subjektu nove mogućnosti za razvoj i rast poslovanja, te pozicioniranje u konkurentnoj tr-

žišnoj niši. Ovome doprinose i nove regulative Europske unije koje zabranjuju ograničavanje e-trgovine na nacionalnim tržištima svojih članica. Perspektivi gospodarskog rasta Republike Hrvatske doprinosi njezina geografska pozicija i izgrađenost cestovne mreže, ali se pri tome ne smije zanemarivati unaprjeđivanje logističkih performansi gospodarskih subjekata, kako bi se optimalno prilagodili standardima nacionalnih tržišta članica Unije. O ovome posebno treba voditi računa u segmentu e-trgovine koja pokazuje visoki trend rasta. Implementacija naprednih analitičkih tehnika i simulacija u logističkim aplikacijama prerasta u preduvjet održavanja i rasta ostvarenog udjela u području e-trgovine na tržištu Europske unije. Predmet istraživanja ovoga rada je fokusiran na procjenu koliko hrvatsko gospodarstvo može iskoristiti mogućnosti koje danas pruža tržište Europske unije. Na koji način menadžer poslovnog subjekta treba prilagoditi poslovnu strategiju logističkim standardima u cilju održavanja i rasta tržišnog udjela na razini Europske unije? Koliko je značajan utjecaj *business intelligencea* i kako korelira s postojećim modelima opskrbnih lanaca? Svrha i cilja rada su bila oblikovati preporučljiv protokol za kreiranje generalne logističke strategije za hrvatska poduzeća koja teže rastu tržišnog udjela u postojećim europskim opskrbnim lancima. Preliminarna istraživanja su obuhvatila analizu indeksa logističkih performansi (LPI), recentna istraživanja ove problematike, te deskriptivnu analizu prikupljenih sekundarnih podataka. Konstrukti istraženi u primarnom istraživanju provedenom na relevantnom uzorku hrvatskih poduzeća koja posluju na tržištu Unije su kategorizirani kao *business intelligence*, upravljanje opskrbnim lancem, te vidljivost i integracija logističke funkcije poslovnog subjekta. Za povezivanje ovih varijabli korištena je faktorska analiza, autori su testirali i korelaciju među navedenim varijablama. Nalazi istraživanja su dokazali značajnu statističku korelaciju među varijablama *business intelligencea*, upravljanja opskrbnim lancem, vidljivosti i integracije logističke funkcije kao temeljenim sastavnicama u kreiranju konkurentne logističke strategije gospodarskog subjekta koji teži rastu udjela na tržištu Europske unije. Nalazima je potvrđena kompetentnost predloženog modela kreiranja logističke strategije za hrvatska poduzeća.

Ključne riječi: logistika, strategija, međunarodna trgovina, tržište