

automotive industry; warehouse site;  
international strategic locations

**Sebastjan ŠKERLIČ\***

SL Logistika d.o.o.

Šalara 10, SI-6000 Koper, Republic of Slovenia

**Robert MUHA**

University of Ljubljana, Faculty of Maritime Studies and Transportation

Pot pomorščakov 4, SI-6320 Portorož, Slovenia

\*Corresponding author. E-mail: [sebastjan\\_skerlic@t-2.net](mailto:sebastjan_skerlic@t-2.net)

## WAREHOUSE SITE SELECTION IN AN INTERNATIONAL ENVIRONMENT

**Summary.** The changed conditions in the automotive industry as the market and the production are moving from west to east, both at global and at European level, require constant adjustment from Slovenian companies. The companies strive to remain close to their customers and suppliers, as only by maintaining a high quality and streamlined supply chain, their existence within the demanding automotive industry is guaranteed in the long term. Choosing the right location for a warehouse in an international environment is therefore one of the most important strategic decisions that takes into account a number of interrelated factors such as transport networks, transport infrastructure, trade flows and the total cost. This paper aims to explore the important aspects of selecting a location for a warehouse and to identify potential international strategic locations, which could have a significant impact on the future operations of Slovenian companies in the global automotive industry.

## WYBÓR POŁOŻENIA MAGAZYNÓW W ŚRODOWISKU MIĘDZYNARODOWYM

**Streszczenie.** Zmienione warunki w przemyśle samochodowym oraz produkcja przesuwać się ze zachodu na wschód zarówno na szczeblu globalnym, jak i europejskim, co wymaga ciągłego dostosowywania się przez słoweńskie firmy. Przedsiębiorstwa starają się pozostać blisko swoich klientów oraz dostawców, głównie przez utrzymanie wysokiej jakości i sprawności łańcuchów dostaw. Ich egzystencja w wymagającym przemyśle samochodowym jest gwarantowana w dłuższym okresie. Wybranie odpowiedniej lokalizacji dla magazynów w środowisku międzynarodowym jest zatem jedną z najważniejszych strategicznie decyzji, która bierze pod uwagę wiele powiązanych czynników, takich jak sieci transportowe, infrastrukturę transportową, przepływy handlowe oraz całkowite koszty. Ten artykuł ma na celu odkrycie ważnych aspektów wyboru lokalizacji dla magazynów i zidentyfikowanie potencjalnie strategicznych lokalizacji, które mogłyby mieć znaczący wpływ na przyszłe działania słoweńskich firm w globalnym przemyśle samochodowym.

### 1. INTRODUCTION

Despite the global economic crisis, which has had an adverse effect on the stability of business enterprises, the development of the fast-growing Chinese and Indian markets has also opened up new

business opportunities. This fact does not escape the automotive industry, which is deeply involved in the global economy. Because of its many connections within Europe, the USA and Asia, as well as its scope, the automotive industry represents an important driver of economic and social development.

Due to economic and social factors, the industry as a whole is currently at a turning point, as the market moves from west to east, both at the European and global level. In these changed conditions, companies operating in the automotive industry are seeking ways to retain their global presence and control costs, while maintaining the same level of flexibility in relation to their customers or even achieving a higher level of flexibility. Companies might find a solution to their problems in a more efficient management of their own logistics processes and maintaining a solid supply chain. Logistics is therefore one of the most important competitive factors in a company's daily operations and has a major impact on the costs and quality of its services, which are the most valuable assets a company has in the highly competitive environment of the global automotive industry. Warehousing is an important element in the logistics process, as it has the function of coordinator between the business functions of materials management within a company, by bridging the time difference between the time of manufacture of a particular product and the time the product is put to use by the consumer.

Warehousing has a major impact on a company's total costs and a number of international studies have shown that warehouse costs represent the second largest category of logistics costs, immediately after transportation costs. Warehousing also affects the total logistics costs of a company, as reducing warehousing costs can lead to an increase in transportation costs. Choosing the right location for a warehouse can prevent an increase of the total logistics costs and its positive effects may only become apparent over time. That is reason enough why the choice of a warehouse location in an international context is an issue that should be dealt with at a company's highest management levels.

### **1.1. Definition of the problem**

The changes that are taking place in the automotive industry have a major impact on export-oriented Slovenian companies. Due to the gradual migration of the upstream and downstream market from west to east, choosing the optimal location for a warehouse, which would ensure the lowest costs, guarantee quality customer supply and serve as a link between the upstream and downstream flows of a company, has become essential. Decisions regarding the right location of a warehouse have become important strategic decisions that every company must start making from the moment it is established, which is why this paper focuses on the most important aspects of warehouse site selection in an international environment.

### **1.2. Purpose and scope of the problem**

The main purpose of this paper is to combine the findings of Slovenian and foreign literature and practical experience from the field to provide a contribution on the subject of a systematic approach to the selection of a warehouse location in an international environment. The export orientation of Slovenian companies requires constant adaptation, making the selection of a suitable warehouse location one of the major strategic decisions they must face. This paper aims to outline the most important aspects of warehouse site selection and to identify some potential international strategic locations, which would have a significant effect on the future operations of Slovenian companies in the global automotive industry.

### **1.3. Existing research on the subject**

Slovenian and foreign expert literature features numerous contributions dealing with current issues and trends, as well as possible future developments. There are few studies on the subject of the micro and macro factors that influence the choice of warehouse location, which is surprising, considering how dependent the Slovenian economy is on export activities.

## 2. THE SLOVENIAN AUTOMOTIVE INDUSTRY AND THE ASPECTS TO BE CONSIDERED IN WAREHOUSE SITE SELECTION

This chapter will introduce the Slovenian automotive industry as one of the most important generators of Slovenian exports. According to data published by the Automotive Cluster of Slovenia, more than 80% of the industry's sales are generated in foreign markets, of which countries of the European Union represent the majority. Maintaining a presence in the demanding automotive market requires constant adapting, which is why selecting the optimal location for a warehouse is an important strategic decision that all Slovenian companies must face, taking into account a series of aspects, which will be presented below.

### 2.1. The Slovenian automotive industry

The automotive industry is now the world's leading high-tech industry, which generates almost one tenth of the world's gross domestic product (GDP). One in every seven jobs is directly or indirectly linked to the production of vehicles. Each year, 60 million new vehicles are produced worldwide and there are currently over a billion vehicles on the roads. The automotive industry represents the cornerstone of development in the European Union (EU). The EU is the largest manufacturer of vehicles in the world and nearly a third of all vehicles are made in the EU. The automotive industry in the EU is the largest investor in the private sector; 70 percent of all intellectual property is associated with research and development in the field of manufacture of vehicles. The automotive industry boasts a rich tradition and history in Slovenia, especially the Dolenjska region. The former *Industrija Motornih Vozil* (Industry of motor vehicles; IMV) was the basis on which other successful companies were established; Revoz - a manufacturer of cars for Renault, Adria Mobil - caravans and TPV - automotive parts and components. Only the company Revoz produces personal vehicles nowadays, but there are several producers of automotive components, particularly first-tier and second-tier supplies.

The Slovenian automotive industry connects nearly one hundred companies, over 600 contractors and knowledge institutions with almost 25.000 employees and 150.000 other indirectly related individuals. The companies export the large majority of their products, which accounts for more than a fifth of the total Slovenian exports and a tenth of the country's GDP. On average, the Slovenian automotive industry invests 5 percent of its turnover in research and development and over 12 percent in new technologies. Cimos, Iskra Hidria and Kolektor are some of the most noteworthy companies in the sector [6].

### 2.2. The aspects of warehouse site selection in an international environment

The key question that any company operating in an international environment must answer is where to position a warehouse in order to be able to supply to the largest possible number of customers. Selecting the right location for a warehouse not only enables the company to provide the desired level of service to the customer, but also results in lower total logistics costs. Due to the development of transport infrastructure, transport links and information technology, selecting the right warehouse site in an international environment becomes one of the main comparative advantages that a company has over its competitors, over the years.

#### 2.2.1. *Macro and micro aspects of warehouse site selection*

Decisions about warehouse site selection must take into account the macro and micro aspects. The macro perspective examines the issue of where to locate warehouses geographically within a general area so as to improve the sourcing of materials and the firm's market offering (improve service and/or reduce cost). The micro perspective examines factors that pinpoint specific locations within the large geographic areas. **Macro aspects** used three types of location strategies:

- market positioned strategy
- production positioned strategy,
- intermediately positioned strategy [3].

The **market positioned strategy** locates warehouses nearest to the final customer. This maximizes customer service levels and enables a firm to utilize transportation economies - from plants or sources to each warehouse location. The factors that influence the placement of warehouses near the market areas served include transportation costs, order cycle time, the sensitivity of the product, order size, local transportation availability, and customer service levels.

**Production positioned strategy** locates warehouses in close proximity to sources of supply or production facilities. These warehouses generally cannot provide the same level of customer service as that offered by market positioned warehouses; instead, they serve as collection points or mixing facilities for products manufactured at a number of different plants. The factors that influence the placement of warehouses close to the point of production include perishability of raw materials, number of products in the product mix, assortment of products ordered by customers and transportation consolidation rates.

The final location strategy places warehouses at a midpoint location between the final customer and the producer. Customer service levels for the **intermediately positioned strategy** are typically higher than for the production positioned facilities and lower than for market positioned facilities. A firm always follows this strategy if it must offer high customer service levels and if it has a varied product offering manufactured at several plant locations.

From a **micro aspects**, more specific factors must be examined. If a firm wants to use public warehousing that is generally used in the automotive industry, it will be necessary to consider:

- facility characteristics,
- warehouse services,
- availability and proximity to motor carrier terminals,
- availability of local cartage,
- other companies using the facility,
- availability of computer services and communications,
- type and frequency of inventory reports [7].

### 2.3. Specific aspects of warehouse site selection

In addition to the macro and micro aspects that influence the strategic direction of a company, when selecting the location of a warehouse, there are a number of other interrelated factors that need to be considered; transport links, transport infrastructure, trade in goods and total costs as a result of these factors.

#### 2.3.1. Transport Links and Transport Infrastructure

Transport infrastructure is an important driver of regional development. An efficient transport network is essential for ensuring the sustained economic growth and balance of a region. Less developed regions face difficulties related to economic development, which partly stem from inadequate transport systems and insufficient connections with other regions in the country and with other regions in the EU [4]. An adequate transport infrastructure and efficient transport links greatly influence the choice of warehouse location. Shorter routes, faster transportation and improved traffic safety are some of the main advantages that will eventually reduce the total cost.

Expected investments in transport infrastructure that vary from country to country and from region to region are also an important factor in selecting the right location for a warehouse. There is an ongoing trend of investments in Central and Eastern Europe (Poland, Czech Republic, Slovakia, Romania and Bulgaria), mainly due to the need for reducing the existing imbalances in the transport infrastructure in Europe (Figure 1) and the EU's plans regarding a new, wider transport infrastructure, which would connect all the European countries through a network of pan-European corridors.

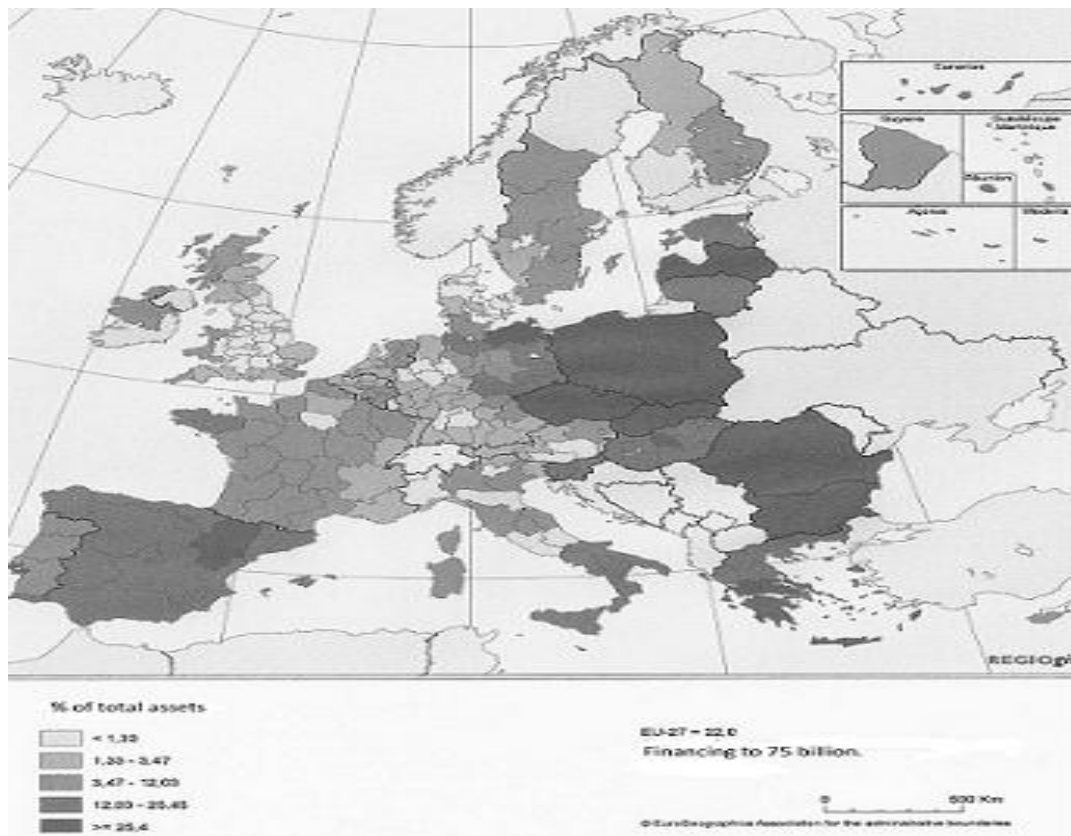


Fig. 1. Planned regional policy investments in transport infrastructure, 2007-2013

Rys. 1. Planowana regionalna polityka inwestycyjna w infrastrukturze transportu, 2007-2013

The pan-European transport corridors comprise road networks, railways, water and combined transport routes that were defined during several pan-European conferences, based on which EU authorities adopted the necessary decisions and documents for the strategic development of this network. The pan-European corridors were built in order to connect the transport routes of western European countries - the TEN-T network (Trans-European Transport Networks), with the countries of Central, Eastern and Southeastern Europe, where the pan-European transport corridors are located. TEN-T represents the guidelines for building a network of road and rail connections, combined transport and waterways and airports. The strategic objectives of the TEN-T are focused primarily on ensuring the sustainable mobility of people and goods between EU Member States and neighboring countries, eliminating bottlenecks or filling missing links in the main TEN-T transport routes, ensuring greater network efficiency and security, particularly by promoting a shift to rail transport, inland waterways and maritime transport [2]. Regions that are developed in terms of transport and infrastructure generally have more warehouse facilities, which increases competition among warehouse service providers and benefits companies. According to a study conducted by a Dutch consulting company [1], the availability of infrastructure is the most important criteria for selecting future storage locations. The majority of storage and distribution centers in Europe are concentrated in the Netherlands, France, Britain and Germany, as shown in Figure 2 [1].

### 2.3.2. Trade in goods

Data on the trade in goods in individual countries are among the most important indicators of economic performance, especially when it comes to small and open economies. These data serve as a support for a country's national and European economic and monetary policy, enable the implementation of a trade policy and trade negotiations, are the basis for market, sectorial and other

analyses by companies, as well as being a source of information for other statistics areas, such as balance of payments and national accounts [5]. Since the end of the nineteen eighties, we have witnessed great changes in trade flows between countries. Political changes in the so-called Eastern Bloc have shifted the trade flows, which started to gradually open to the west. In the Balkan area, trade flows between the former Yugoslav republics have died out completely, which was a major shock for the Slovenian economy. Slovenia tried to compensate for the loss of the Yugoslav market by participating in new markets, particularly in the EU area. Slovenia's trade flows with the European Union have started to increase after 1991 and were further strengthened by the year 2000.

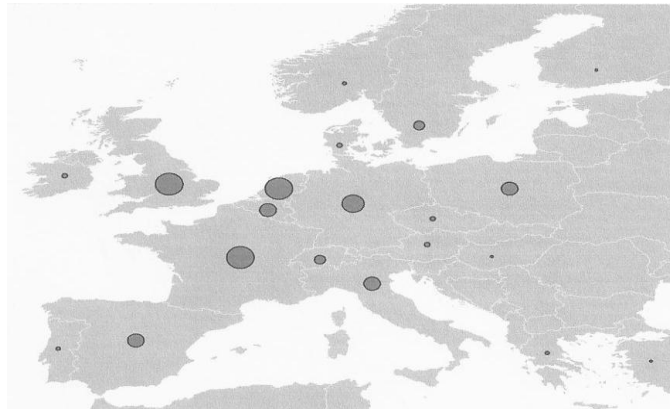


Fig. 2. Concentration of Storage and Distribution Centers in Europe  
Rys. 2. Koncentracja centrów składowania oraz dystrybucji w Europie

The share of Slovenian exports towards the EU Member States continued to decrease from 2000 to 2004 (in 2000, it amounted to 72.1%, in 2004 68.1% of total exports of goods), and then, with Slovenia's accession to the EU, it started to grow, also due to the abolition of customs formalities at internal EU borders [5].

Trade in goods between the countries also has a significant impact on logistics. In fact, it is the development of trade that leads to the development of logistics both in the narrow and broad sense of the word. In the broad sense, it has an impact on the development of the transport links and transport infrastructure of each country, while in the narrow sense, it directly impacts a company's logistics system. At the level of the logistics system in a company, trade has the greatest impact on handling and storage costs. A normally intense bilateral trade between two countries (with a ratio of exports and imports of approx. 1:1), reduces transportation and warehouse costs due to economies of scale and a systemic approach to logistics planning. The opposite effect is achieved when the trade flow is smaller or disproportionate (ratio of exports and imports 1,5:0,5). When planning the location of warehouses in an international environment, trade indicators have an important function. As previously mentioned, from a company's point of view, intense bilateral trade between two wide geographical areas means that the area has a well-developed transportation network, several storage facilities and a large number of logistics providers. However, trade indicators should be analyzed for a longer period of time of at least ten years.

### 2.3.3. Total costs

Besides a high quality supply chain, when selecting a suitable location for a warehouse, the total cost is also a determining factor. The costs that significantly affect the selection of a warehouse location are the following (Fig. 3):

- transportation costs,
- labor costs,
- warehouse costs,
- technology costs.

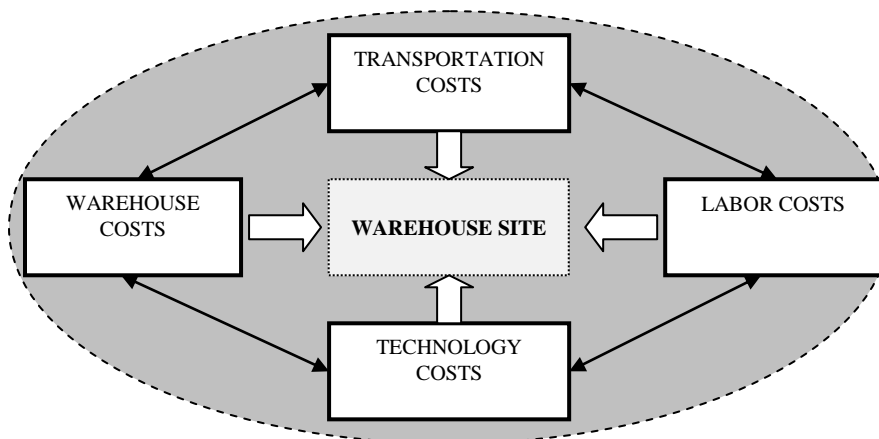


Fig. 3. Costs that affect warehouse site selection

Rys. 3. Koszty, które wpływają na wybór położenia magazynów

The distribution of the costs affecting the selection of a warehouse location depends on the area where the warehouse is located. For instance, in economically less developed areas, labor is usually cheaper, but transportation costs might be higher due to an outdated transport system and transport infrastructure. On the other hand, the cost of renting and maintaining a warehouse facility is usually lower in such areas, but various supporting technologies might be less available and more expensive to implement. When selecting the optimal location for a warehouse, it is necessary to compare the various costs and to select the combination that results in the lowest total cost for the company. The company should learn in advance all the costs associated with a potential warehouse location, regardless of its chosen strategy, which, in the automotive industry, is usually dictated by the consumers.

### 3. WAREHOUSE SITE SELECTION IN AN INTERNATIONAL ENVIRONMENT

To changes in the entire automotive industry and the gradual migration of the downstream and upstream market from west to east, have brought forth the issue of selecting the optimal warehouse location. The following chapters provide a systematic analysis that will identify the potential strategic locations of storage and distribution centers in an international environment. Based on the different aspects and macroeconomic data, the goal of the analysis presented in this paper is to determine the optimal location of storage and distribution centers, which will enable the Slovenian automotive industry to achieve the lowest possible costs, while maintaining the same quality of supply services for the customers and establish a system that would serve as a link between the downstream and upstream flows of Slovenian companies.

#### 3.1. Slovenia's trade in goods over the last ten years

In the observed 2000-2010 period, exports and imports of Slovenia, expressed in EUR were increasing until October 2008, after which they declined due to the financial and economic crisis that hit the country at the end of 2008, but from 2010 on they were increasing again. The values of imports were higher than the values of exports during all that time. In 2010, Slovenia exported most goods to EU Member States (71.7% of total exports of goods), followed by other European countries (20.1%) and non-European countries (8.2%). This is also true for the structure of exports in the entire 2000-2010 period. In 2010, Slovenia exported most goods to Germany (19.8% of total exports of goods), followed by Italy (12.2%), Austria (8.2%), France (8.1%) and Croatia (6.7%). In all the years of the 2000-2010 period, these countries were our most important trading partners at exports [5].

In 2010, Slovenia imported most goods from EU Member States (77.5% of total imports of goods), followed by other European countries (10.7%) and non-European countries (10.2%). This also applies to the structure of imports in the entire 2000-2010 period. The so-called combined concept of recording import goods flows revealed that in 2010, most goods were imported to Slovenia from Germany (18.4% of total imports of goods), followed by Italy (17.8%), Austria (12.1%) and France (5.5%).

This applies also to imports in the entire 2000-2010 period; but at that time, the imports from Croatia and Hungary also represented important shares. For the most important trading partner countries of Slovenia at imports, in 2010 the shares of imports presented by the country of origin of goods were as a rule lower than the shares of imports reached by these countries according to the combined concept of recording import goods flows. Despite this, in recording the trade in goods by the country of origin, most goods were imported from Germany (16.2% of total imports of goods), followed by Italy (15.8%), Austria (8.0%) and France (5.4%).

The same also applies to the entire 2000-2010 period, with the exception that substantial shares of imports in that period were represented also by imports of goods produced in China and imports of goods produced in Croatia. Imports of goods produced in China in the 2000-2010 period increased the most: in 2000, they amounted to 1.4% and in 2010 they increased to 5.3% of the total imports of goods [5].

### 3.2. Locations of the major car manufacturers

Given the level of trade in goods between Slovenia and Europe, which reached 91.8% of total exports and 88.2% of total imports in 2010, Table 1 shows the countries with the highest numbers of vehicles produced and the highest numbers of production plants [9] and [13].

Table 1

Total production of cars and commercial vehicles per year

Country	Total production of cars and commercial vehicles per year			Production plants
	2000	2005	2010	
<b>Czech Rep.</b>	455.492	602.237	1.076.385	11
<b>France</b>	3.348.361	3.549.008	2.227.742	38
<b>Germany</b>	5.526.615	5.757.710	5.905.985	47
<b>Italy</b>	1.738.315	1.038.352	857.359	20
<b>Poland</b>	504.972	625.443	869.376	16
<b>Russia</b>	1.205.581	1.354.504	1.403.244	27
<b>Spain</b>	3.032.874	2.752.500	2.387.900	15
<b>Turkey</b>	430.947	879.452	1.094.557	16
<b>UK</b>	1.813.894	1.803.109	1.393.463	32

The countries to which Slovenia exports the most are also the largest producers of vehicles and have the greatest numbers of production plants. These data show us that the focus is slowly shifting towards the east of Europe, since the production of vehicles in France, Spain and Italy is on the decline, while it is increasing in Poland and the Czech Republic. The exception is Germany, where production is increasing.

### 3.3. The level of development of the transport network and transport infrastructure

The level of development of the transport network and transport infrastructure will be assessed according to the following criteria: the length of the road network, the length of the railway network, the number of airports and the number of sea and river ports for the countries that dominate the market, based on the number of vehicles produced and the number of production plants.



Table 2 [8] shows that Germany, Spain and France have the most well-developed road and railway networks. If we compare the ratio between a country's size and the length of its transport network, we obtain similar results; with the Czech Republic showing the highest level of development in terms of its railway network (lower values indicate a higher level of development).

Table 2

Length of Road and Railway Network - 2008

Country	Motorways : Length of Road Network	Compared to the size of the country	Railways : Length of Lines in Use	Compared to the size of the country
Czech Rep.	691	114	9.486	8
France	11.042	49	29.901	18
Germany	12.645	28	33.855	11
Italy	6.629	45	16.861	18
Poland	765	408	19.627	16
Spain	13.515	37	15.041	34
UK	3.559	68	16.212	15

Table 3 [8] shows the number of airports and the number of sea and river ports, which are covered by the same category. France and Britain have the highest number of airports and ports, which is not surprising given their geographical location.

Table 3

Number of Airports and Ports - 2008

Country	Number of Airports	Number of Ports (sea and river)
Czech Rep.	5	5
France	61	334
Germany	41	74
Italy	38	86
Poland	10	100
Spain	41	182
UK	44	731

### 3.4. Number of Enterprises by Mode of Transport

An important aspect to be considered when choosing the location of a warehouse is definitely the concentration of transport companies, which has a significant impact on the quality and prices of services. Spain and Italy have the highest number of companies that operate in the field of road transport, while the sea transport and railway sectors are dominated by Germany. Most air transport companies are located in the UK, while Italy has the highest number of warehouses [8].

Spain and Italy have the highest number of companies that operate in the field of road transport, while the sea transport and railway sectors are dominated by Germany. Most air transport companies are located in the UK, while Italy has the highest number of warehouses.

### 3.5. Labor costs and labor productivity costs

Table 5 [10] shows the average gross annual earnings of full-time employees for the period from 2000 to 2009. The data in the table paint a clear picture of why production in the labor-intensive automotive industry is moving from west towards east Europe. For example, the annual employee salaries in Germany are nearly five times higher than in Poland and four times higher than in the Czech Republic.

Table 4

## Number of Enterprises by Mode of Transport - 2008

Country	Road transport	Sea transport	Railways	Air transport	Warehousing and support activities
Czech Rep.	28.375	0	-	32	4231
France	40.058	697	32	555	8804
Germany	36.442	1.894	290	521	15.605
Italy	89.466	639	36	240	21.544
Poland	87.241	161	104	111	8.567
Spain	139.527	272	8	157	14.082
UK	33.967	1.269	100	981	10.379

Table 5

## Average gross annual earnings of full-time employees (2000-2009)

Year	Czech Rep.	France	Germany	Italy	Poland	Spain	UK
2000	4.616,00 €	26.712,00 €	34.400,00 €	19.991,00 €	6.226,00 €	17.432,00 €	37.676,00 €
2005	7.405,00 €	30.521,00 €	38.700,00 €	22.657,00 €	6.270,00 €	20.333,00 €	42.866,00 €
2009	10.596,00 €	34.132,00 €	41.100,00 €	23.406,00 €	8.399,00 €	26.316,00 €	38.047,00 €

When we take a look at labor productivity numbers per employee and per hour worked [11], we get the opposite results. While the annual employee salary is almost five times lower in Poland than in Germany, labor productivity is also about three times lower. In this segment, France has the best results, as its labor productivity is 28% higher than the average of twenty-seven EU countries.

Table 6

## Labor productivity 2000-2010

	Per person employed (EU-27=100)			Per hour worked (EU-27=100)		
	2000	2006	2010	2000	2006	2010
EU 27	100	100	100	100	100	100
Euro area	112	109	109	117	114	114
Czech Rep.	60	70	72	52	59	62
France	126	121	120	135	132	128
Germany	107	109	105	124	128	124
Italy	127	111	108	116	102	101
Poland	56	61	67	46	49	54
Spain	104	103	110	103	104	106
UK	111	113	108	111	113	110

### 3.6. Selecting the Optimal Location of a Warehouse - Analysis of Results

Slovenia's trade in goods with EU countries is intense in both directions. Germany prevails in this aspect, as it represents 20.10% of the country's trade in goods by exports and 18.40% by imports. With 5,905,985 vehicles produced in and 47 production plants in operation in 2010, Germany is also at the forefront of development of the European automotive industry, as it is the only country that shows growth in production every year. Germany is the most developed European country in terms of transport and infrastructure, with a large number of logistics providers in all modes of transport. One negative aspect is the cost of labor, which is the highest in the EU, but Germany manages to compensate for that with high labor productivity (24% above the EU average of 27 countries). Based on these results, the optimal location for a warehouse is in western Germany near the border with the

Netherlands, Belgium and France. A warehouse located in the area expanding from Düsseldorf to Köln, and from Koblenz and Saarbrücken, would enable Slovenian companies in the automotive industry to provide quality supply services to the customers and would serve as a link between the downstream and upstream flows of Slovenian companies.

The location marked in Figure 4 would allow the introduction of a distribution warehouse, which would cover a third of the trade flows towards Slovenia. Groupage transports from Slovenia to the distribution warehouse would help service a strong base of customers that are located in Germany and France, while using the northern sea ports in the Netherlands, in Belgium and in Germany, would enable faster and more economical transportation to other continents. The distribution warehouse would be essential also following the import phase, as it would serve as a warehouse to collect goods intended for Slovenia, which would then be delivered to each individual Slovenian company using a return transportation service after being exported.



Fig. 4. Selecting the Optimal Location of a Warehouse [12]

Rys. 4. Wybór optymalnej lokalizacji magazynów [12]

#### 4. CONCLUSION

In a period of uncertainty and constant changes that are affecting the world economy, Slovenian companies are particularly vulnerable, due to their export-oriented production. As one of the most important generators of the Slovenian economy, the automotive industry in Slovenia is heavily involved in international trade, as it accounts for more than a fifth of the total Slovenian exports and a tenth of the country's GDP. Slovenian companies must be prepared to face the changes to come, as production and consumption in the automotive sector are gradually shifting to the east of Europe, which is why effective planning of logistics activities is essential to a company's survival in the highly demanding automotive industry.

Due to the development of transport infrastructure, transport links and information technology, over the years, warehousing has gained an important role within the logistics system, especially from the point of view of providing an adequate level of service at the lowest total cost. Warehouse management requires making important strategic decisions, which are mostly related to the size and location of the warehouse. Decisions regarding the right location of a warehouse are important decisions that every company must start making from the moment it is established. Only a few years ago, companies did not perceive the need to change the locations of their warehouses over the course of their long-term operations. The changes that are occurring in international trade today require companies to choose the locations of their warehouses wisely, as they can no longer be considered long-term. When selecting the appropriate warehouse site, companies must plan ahead and take into account the possible changes that may occur in the future such as; shifts in trade flows, changing customer requirements, high operating costs and other unforeseen factors.

The result of the analysis showed how important it is for companies to adopt a comprehensive approach to the selection of warehouse locations, which applies to all companies, regardless of their size. The changes that are occurring in the automotive industry did not fully impact the Slovenian automotive industry, which is still highly dependent on the German economy. On the one hand, this is a good thing, because Slovenian products are being exported to a technologically advanced country, but on the other hand it also means that our economy is highly dependent on another country's economy.

## Bibliography

1. *Europe's Most Wanted Distribution Center Locations*. Capgemini Nederland B.V. 2006. P. 21-27.
2. Godec, A. & Jurše, L. European traffic corridors crossing the Republic of Slovenia and the new railway line Divača – Koper. In: *10. Slovenski kongres o cestah in prometu*. Portorož. 2010. P. 373. [In Slovenian: *Slovenian Congress on Roads and Traffic*]
3. Lambert, Douglas, M. & Stock, James, R. & Ellram, Lisa, M. *Fundamentals of logistics management*. Boston: Irwin McGraw-Hill. 1998. P. 290.
4. Povezovanje Evrope. Prometna in regionalna politika. *Panorama inforegio*. 2011. Vol 38. P. 21-27. [In Slovenian: Connecting Europe. Transport and regional policy. *Panorama inforegio*.]
5. Perše, S. [et al.] *Blagovna menjava Slovenije*. Ljubljana: Statistični urad Republike Slovenije. 2011. P. 12-23. [In Slovenian: *Slovenia's trade*. Ljubljana: Statistical Office of the Republic of Slovenia.]
6. Savšek, T. Smernice razvoja v avtomobilski industriji. *Revija rast*. 2011. Vol. 5. P. 68-73. [In Slovenian: Guidelines for the development of the automotive industry. *Magazine growth*.]
7. Stock, James R. & Lambert, Douglas M. *Strategic logistics management*. Boston: Irwin McGraw-Hill. 2001. P. 414.
8. *Transport in figures*. European Commission. Directorate-General for Mobility and Transport, in co-operation with Eurostat. European Union. 2011.
9. *Automobile Assembly & Engine Production Plants In Europe*. ACEA. Available at: [http://www.acea.be/index.php/news/news\\_detail/automobile\\_assembly\\_engine\\_production\\_plants\\_in\\_europe/](http://www.acea.be/index.php/news/news_detail/automobile_assembly_engine_production_plants_in_europe/)
10. *Average gross annual earnings of full-time employees (2000-2009)*. European Commission EUROSTAT. Available at: [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php?title=File:Earnings\\_in\\_the\\_business\\_economy\\_\(average\\_gross\\_annual\\_earnings\\_of\\_full-time\\_employees\)\\_1\\_\(EUR\).png&filetimestamp=20111118123743](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Earnings_in_the_business_economy_(average_gross_annual_earnings_of_full-time_employees)_1_(EUR).png&filetimestamp=20111118123743)
11. *Labour productivity*. European Commission EUROSTAT. Available at: [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php?title=File:Labour\\_productivity\\_\(based\\_on\\_PPS\),\\_2000-2010\\_1.png&filetimestamp=20120110102809](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Labour_productivity_(based_on_PPS),_2000-2010_1.png&filetimestamp=20120110102809)
12. *Essen Map*. Available at: [www.greenwichmenatime.com/time-zone/europe/european\\_union/germany/map/index](http://www.greenwichmenatime.com/time-zone/europe/european_union/germany/map/index)
13. *Production statistics*. OICA. Available at: <http://oica.net/category/production-statistics/2010-statistics/>

Received 19.09.2011; accepted in revised form 09.06.2013