STRUCTURE OF LOGISTIC SERVICES DEMAND IN CROATIAN ECONOMY

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Abstract

Changes in the Croatian economy, introduced upon accession to the European Union occurred, significantly influenced the needs for logistics services, and thus the logistic industry. In planning investments and development of their business, companies mainly rely on their own marketing activities and experience, which are of limited scope, without scientific approach and analysis. For this reason, a systematic research on the current demand for logistics services has been initiated, along with guidelines and projections of further development of the logistics industry in Croatia. The input data for the research were collected through a web survey and from relevant public institutions. The results of the data processing and analysis enable defining elements for formulating projections of further development of the logistics industry in Croatia and defining guidelines for enterprises in making strategic business decisions in the area of logistics. Also a basis of information and knowledge necessary for the improvement of curricula and conducting further research in this area has been created.

Keywords: accession to the EU, logistic services demand, logistic infrastructure, projections

1. INTRODUCTION

Croatia is approaching the first anniversary of the membership in the European Union. Changes in the Croatian economy, introduced upon accession, significantly influenced the needs for logistics services and thus the logistic industry, freight forwarding at the first place. In planning investments and development of their business, companies mainly rely on their own marketing activities and experience, which are of limited scope, without scientific approach and analysis. For this reason, a systematic research of the current demand for logistics services has been initiated, along with guidelines and projections of further development of the logistics industry in Croatia.

This paper is focused on analysing the logistic demand structure in the period since accession and identifying development trends of the logistic industry in Croatia. Conclusions set forth in this paper are based on the research carried out within the project Analysis of logistics services in the Republic of Croatia with guidelines for cooperation with the economy, approved and financed by the University of Zagreb. Input data for the research (facts, knowledge and attitudes about the logistic needs of the Croatian economy) were collected by using available statistical data, case studies of particular logistic solutions and implementation of survey which included the relevant users of logistics services. The survey was performed via Internet, in order to provide a convenient interface for answering the survey questions. Time required for filling out the survey was estimated 20 minutes.

Objectives of the research carried out within the a.m. project and the most important issues to be covered by this paper can be summarized as follows:

- Outlining current structure of the logistic needs, as well as formulating projections of further development of the logistics industry in Croatia;
- Defining guidelines for enterprises in making strategic business decisions in the area of logistics;
- Creating a database of information and knowledge necessary for improvement of curricula and conducting further research in this area.
2. IMPACT OF EUROPEAN INTEGRATIONS TO THE STRUCTURE OF LOGISTIC SERVICES DEMAND IN CROATIAN ECONOMY

It is still too early for an ultimate analysis of the effects to the logistic services demand of the Croatian economy, since Croatia has joined the EU less than a year ago. However, some preliminary assessments should be made, in order to facilitate further research of logistic industry and planning of logistic infrastructure. These assessments could be based on the results of the inquiry outlined in this paper and on the available data and relevant experience from the neighboring countries, Slovenia at the first place.

In this respect, the most important aspects of European integrations affecting the logistic industry in Croatia could be summarized as follows:

- Customs borders with neighboring EU countries have been eliminated, while Croatian border against Serbia, BiH and Monte Negro has become a part of the customs border of the EU;
- Port of Rijeka has become an EU port, i.e. an entry point to the European market;
- Croatia has become a convenient transshipment station for European distribution networks in supplying markets of former Yugoslavian countries.
- Geographical position of Croatia has major importance not only for transit corridors towards the Central European Countries, but also to Baltic (Route 65) and to the rest of former Yugoslavian countries.

In order to analyze the new situation on the market and outline prospective changes in the structure of logistic services demand, the authors have carried out an inquiry among relevant logistic operators and users of logistic services in Croatia. The information acquired refers to the actual traffic in the period of the year 2013, and to the expectations of the examinees. Based on that, the main issues to be taken in consideration are outlined in the following paragraphs.

2.1. Logistic infrastructure

Business expansion on the single European market, with respective increase in the volume of trade flows, provides new opportunities for planning, development and implementation of intermodal transport, which is a standard in developed economies [1], as well as setting up modern customs terminals and cross docking centers at suitable points of transport routes.

By integration into the single EU market, the Port of Rijeka becomes an EU port and the logistics infrastructure in Croatia is gaining importance. Also the market positions previously acquired by global logistic operators will be strengthened up, which will result in further attracting of transit cargo flows. Hence, the need for further development of the Corridor Vb occurs (Figure 1), as well as setting up a modern logistics center & customs terminal in continental Croatia, which could also act as a background terminal of the Port of Rijeka [2].
2.2. Customs operations

The first visible impact of accession to the EU refers to elimination of customs borders against the neighboring European countries, while the Croatian borders against third countries became borders of the EU. It resulted with decrease in number of customs operations, which is expected to correspond with the fact that more than 60% of Croatian foreign trade refers to the EU countries [2]. Also the customs procedures have been greatly simplified by implementing NCTS (New Computerized Transit System), AIS (Automated Import System) and ECS (Export Control System).

Total number of customs declarations related to import and export hasn’t been significantly decreased immediately upon the accession due to the transport & customs procedures started before 1st of July 2013, which therefore needed to be finalized according to the old regulations. At first, it caused traffic jams at the borders against third countries and at the customs terminals, as most of the freight forwarders had already cut down the staff or closed some of their offices. Also the new customs software needed some time to adopt. The situation began to normalize by the end of July 2013. Significant decrease of the number of customs declarations was registered in August and has remained on that level.

Since Croatia holds the part of EU border on its territory, customs operations in transit (NCTS – New Computerized Transit System) over Croatia are to be done at Croatian part of EU border. Also the customs clearance of goods at import from third countries and export to third countries, for any EU country can be done in Croatia. It makes a great difference for international road transport at the first place, but also for combined transport (air – road and sea – road). Major routes of international road transport across Croatian territory are depicted on the Figure 2.
Croatian economy should benefit from these changes, however the opportunities greatly depend on the available logistic infrastructure and effectivity of the Croatian customs and logistic operators who are expected to speed up the customs procedures.

2.3. Distribution networks

For similar reasons as with the customs operations, distribution centers with customs warehouses have remained busy in the first part of July 2013, but with negative trend started in August. Operations in non bonded warehouses and local delivery/collection operations have remained at the same level. Customs warehouses are no longer needed for transshipment of goods originated from or destined to EU countries, so the transshipment operations are shifted to non-bonded warehouses. However, there are significant trade flows between the EU and third countries, which could be a substratum for stronger involvement of Croatian logistic infrastructure (ports and inland cargo centers at the first place) into the European distribution networks. It refers mainly to the Port of Rijeka, which has become an entry point to the European market and to a prospective new cargo center near Zagreb [5].

2.4. Intrastat reporting

While the customs procedures in trade with the EU countries were eliminated, another way of control has been implemented. Every entering or arrival of goods from one member country to another or every leaving or dispatch of goods from one member country to another is being reported to Intrastat, a system of collecting statistics on the trade in goods between the member countries of the EU. Intrastat form is a statistical report that contains less data than a custom declaration and is issued on monthly basis (up to 15th for the previous month).

Every company included in the VAT system, whose value of trade in goods with the member countries exceeds the exemption threshold, either for dispatches or arrivals, or for both trade flows, is obliged to declare Intrastat data. Many companies haven’t been included in the system due to relatively high threshold value (1,7 million kn), which was determined based on the simulation data [6] shown in the Table 1.
Table 1. Simulation of the Intrastat coverage based on data from 2012.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Export</th>
<th>Import</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies involved in foreign trade with EU</td>
<td>22.788</td>
<td>6.945</td>
<td>20.991</td>
</tr>
<tr>
<td>Companies included in Intrastat system</td>
<td>4.289</td>
<td>1.240</td>
<td>3.779</td>
</tr>
<tr>
<td>Percentage share in total number of companies</td>
<td>18,8%</td>
<td>17,9%</td>
<td>18,0%</td>
</tr>
<tr>
<td>Percentage share in total value of trade</td>
<td>97,0%</td>
<td>95,0%</td>
<td></td>
</tr>
</tbody>
</table>

The threshold value has been decreased to 1.2 million kn for the period of 2014, which will include more companies. Intrastat data can also be utilized by the companies that provide data, in analysis and planning of production, purchasing and sales, market research and making strategic business decisions.

3. RESEARCH PLAN

The research involves selecting relevant sources of information, defining a representative sample, determining methods of collecting, processing and analysis of the information, in order to obtain conclusions about the common features and connections between certain categories of the examinees, actual structure of the logistics needs, and projections of the logistic industry development, as outlined in the Figure 3.

Selecting relevant sources of information.

Defining a representative sample.

Determining methods of collecting, processing and analysis of the information.

Processing and analysis of the information.

Conclusions:
- common features and connections between certain categories of the examinees,
- actual structure of the logistics needs,
- projections of the logistic industry development.

Figure 3. The research plan
Data, knowledge and attitudes about the logistic needs of the Croatian economy were collected by using available statistical data, case studies of particular logistic solutions and implementation of survey which included the relevant users of logistics services, as explained in the following paragraph.

3.1. Development of the survey

The survey was performed on a sample of the first 1,000 firms in Croatia, ranked by the annual sales in international trade. The companies with insignificant logistic needs were excluded that way and the criterion was implemented based on the data provided by the Croatian Financial Agency (FINA) and the Croatian Bureau of Statistics.

In order to achieve the aims of the research, a suitable data base structure was needed, to be used as the substratum. With reference to that, the survey questionary was designed to cover the following groups of information:

1. **Company profile** (number of employees, core business, market scope) – information needed for segmentation and categorization of examinees. A sample of user interface (window) for data input is shown on the Figure 4.

![Figure 4. Company profile window](image)

2. **Current logistic needs** (activities, volumes, quality) – information needed for assessment of actual logistic needs of the Croatian economy. The user interface for data input consists of several windows, as partially shown on the Figure 5.

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1 Screen shots are displayed. As the survey is designed for Croatian companies, the questions are in Croatian language (there is no English version).
3. **Current logistic solutions and level of satisfaction** (internal resources, outsourcing, partial outsourcing) – information needed for assessment of current potential of the logistic market. The input data related to the implemented logistic solution are entered via several windows, like the one shown on the Figure 6, while the data related to the level of satisfaction with the implemented solutions are entered via the windows shown on the Figure 5. Each window refers to the respective logistic activity, such as customs clearance, intrastate reporting, different mods of transport, warehouse operations, etc.

4. **Prospective logistic needs and desirable solutions** – information needed for forecasting and determining development trends in logistic industry. The input data are entered via several different windows, related to the respective logistic activities, as partially shown on the Figure 7.
The tool used to design the questionnaire and carry out the survey was Lime Survey, an open source on-line survey application written in PHP (Hypertext Preprocessor - a server-side scripting language designed for web development) based on SQL (Structured Query Language) database and hosted by the University Computing Centre (SRCE).

It enables automated sending of invitations, reminders and tokens by email, as well as exporting data in various formats: text, CSV (Comma Separated Value), PDF (Portable Document Format), SPSS (Statistical Package for Social Studies), R (programming language for statistics), queXML (questionnaire toolkit, Extensible Markup Language) and Microsoft Excel, which was essential for realization of the survey.

3.2. Data processing methods

Although a number of routines for basic statistical and graphical analysis are available within the Lime Survey, the survey data were exported in Excel format, in order to utilize some more advanced features included in the Excel Analysis ToolPak, such as:

- **Descriptive statistics** - providing information about the central tendency and variability of the data, in order to determine an average profile of current logistic services demand and to identify expectations of the examinees.
- **Ranks and percentiles** - defining the ordinal and percentage rank of each value in a data set in order to analyze the relative standing of values in the data set, in order to outline the survey sample structure and to quantify proportional representation of a particular logistic solution.
- **Regression analysis** - analyzing how a single dependent variable is affected by the values of one or more independent variables, in order to identify a development trend. The method is used to predict development trends of the logistic industry in Croatia, i.e. prospective structure of the logistic services demand.

Selected results of the survey data processing (only the most relevant for this paper) are briefly outlined in the following paragraph.
4. OUTLINE OF THE LOGISTIC SERVICES DEMAND STRUCTURE

In order to get a representative survey sample, various companies were included, from micro enterprises to big enterprises, food and non-food sector, in production and commerce business. The conclusions regarding current and prospective structure of the logistic services demand were mainly based on analysis of current logistic solutions implemented by the examinees and respective level of satisfaction, prospective logistic needs of the examinees and desirable solutions, scale of logistic services used.

4.1. Segmentation of the survey sample

Segmentation of the survey sample (companies that responded to the survey) is defined according to company profile. Implemented criteria and respective percentage share are listed below:

1. Main criteria: Core business
   - Production: 45%
   - Commerce: 55%
   Sub criteria: Food/Non-Food, Wholesale/Retail/Both

2. Main criteria: Number of employees
   - Micro Enterprise; up to 10 employees: 7%
   - Small Enterprise; 11 to 50 employees: 31%
   - Middle Enterprise; 51 to 250 employees: 29%
   - Big Enterprise; 251 and more employees: 33%

4.2. Results of the survey data analysis

Current logistic needs, logistic solutions implemented and respective level of satisfaction were analyzed for the following logistic operations, as well as prospective logistic needs in the following two years period indicated by the examinees:

- Customs clearance;
- Intrastat reporting;
- Maritime transport (FCL/LCL separately);
- Waterway transport (containerized/non-containerized cargo separately);
- Air freight;
- Rail transport;
- Road transport (international/local and FTL/LTL separately);
- Courier service (international/local and docs/packages/pallets separately);
- Warehousing (bonded/non-bonded, warehouse space and basic operations/VAS separately).

Outlining full scale results of the data analysis would exceed the work frame of this paper, so two representative logistic operations, customs clearance and warehousing, were sorted out to illustrate the results of the survey data analysis.

Percentage share of a particular logistic solution, level of satisfaction with the implemented logistic solution and expectations for the following two years period (import and export separately) regarding the customs clearance are outlined in the Figure 8.
Percentage share of a particular logistic solution for warehouse operations (basic), level of satisfaction with the implemented logistic solution and expectations for the following two years period regarding the warehouse space are outlined in the Figure 9.
4.3. Scale of logistic services usage

Logistic outsourcing break down against frequency of a particular logistic service usage is outlined in the Figure 10. The examinees were also asked to indicate which logistic services they get from a single operator, as well as about their preferable solution regarding logistic outsourcing.

![Figure 10. Usage of logistic services](image)

With reference to the logistic outsourcing, majority of the examinees (73%) answered they would prefer an integrated logistic solution, i.e. package of complementary logistic services with a single point of contact, instead of different operators providing particular logistic services.

4.4. Integration of logistic services

Fourth-party logistics providers, abbreviated 4PL, are consulting firms offering logistics consulting, transportation and supply chain management services. A fourth party logistics provider (4PL) is an independent, singularly accountable, non asset based integrator who assembles the resources, capabilities and technology of its own organization and other organizations, including 3PLs and 2PLs, to design, build and run comprehensive supply chain solutions for clients. They are different from the lower three levels: 3PL, 2PL that are actual operators/carriers, and 1PL that are final users (Figure 11).

Integrating and coordinating logistic operations within the structure of the supply chain can be frustrating and time consuming. Suppliers shipping dates, executing and changing orders, giving instructions to carriers, consolidators or 3PLs are just some of the challenges dealt with. It is a great opportunity for 4PLs to develop their business [7].

![Figure 11. Integration of logistic providers into the supply chain](image)
5. CONCLUSION

Results of the research primary reflect the recent changes in the structure of logistic services demand in the Croatian economy. Comparing to the situation prior to accession to the European Union, users of logistic services tend not to fully define logistic solutions, but to extensively exploit the know-how and resources of logistic operators. They prefer an integrated logistic solution, i.e. package of complementary logistic services with a single point of contact, instead of different operators providing particular logistic services.

Logistic operators are expected to participate in defining the supply chain strategy and to provide for a suitable integrated package of logistic services, hence it makes logistic operator responsible for the outcome (results), instead of their performance. Integration into the single European market yields some new business opportunities for Croatian logistic operators which mainly refer to the providing 4PL services, an emerging business segment on the integrated European market.

Upgrading their competences and expertise towards 4PL segment would require the logistic operators to make additional efforts in professional education and training of staff. A closer cooperation with educational institutions in the field of traffic and transport engineering could successfully facilitate such efforts, in order to improve their market position.

It is a good opportunity for logistics operators in Croatia, to improve their business portfolio by adopting more advanced logistics services developed according to the guidelines outlined in this paper.

6. REFERENCES