

## ANALYSIS OF THE COMPETITIVENESS OF RAILWAY FREIGHT SERVICES BY THE KNOWLEDGE HOUSE METHOD

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DOI: 10.13165/PSPO-20-24-28

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**Annotation.** Purpose –To assess competition and trends of the global rail freight market. Research methodology. The paper employes empirical research statistical data analysis and Knowledge House analysis. This paper analyzes the competitiveness of the railway sector using the Knowledge House method, and assesses international trends and risks. Findings – the main findings discover advantages of railway sector in freight transportation. Practical implications – research results allow to perceive business environment and to attract new freight services to Lithuania. Originality / Value - The publication presents an original application of a new method for assessing the international competitiveness of the railway sector.

**Keywords:** “Knowledge House”, strategic planning, railway freight services.

**JEL Classification:** C12, D53, F31, O31.

### INTRODUCTION

A triad of economic concepts - competition, competitive advantage and competitiveness, reveals essence of modern market economy and forms economy as a system that stimulates optimal distribution of economic resources and their efficient use, and operates towards direction of economic growth and increase of users' welfare (Dalydka, 2009; Butkevicius, 2009).

The analysis of business environment and competitiveness becomes more and more challenging due to the lack and quality of information.

Different approaches, methods and instruments can be used in order to analyse competitiveness. Li *et al* (2019), Wang (2020), Yu (2019) highlight the importance of

sustainability for competitiveness of railway services. According to Antturi *et al* (2016) companies have to pay attention to services impact on human health. Lian *et al* (2020) analysed competitiveness of the China-Europe Railway Express and liner shipping under the enforced sulfur emission control convention. The authors note, that the competitiveness of railway sector can be improved by enhancing several aspects, such as time and freight rate increments effectiveness. Avetisyan et al. (2015) estimated the impact of change in wait time for changes in freight costs through a logistical model. Djankov, (2010) confirmed a strong relationship between transport costs and the transit time required to ship goods from origin to destination. Also, macroeconomic effects of the tariff policy, infrastructure and private investment were determined by Xia (2013), Betarelli (2020), Kim (2017), Marzano *et al* (2018). Kim (2017) developed a Financial Computable General Equilibrium (FCGE) model as a new approach to assess economic contributions of transportation projects. Transportation investments positively effects on economic values. These effects can be classified into construction and operation and maintenance impacts (Kim *et al*, 2004; Kim *et al*, 2002).

In accordance to Gasparėnienė *et al* (2013) and Gaidelys&Dailydka (2013) creative processes and instruments such as “brainstorm”, “systemic structural organization”, STAGE-GATE and GOPP methodology, which is polarized towards the goals of a project are widely used in practice.

Also, adaptive methods of competitive intelligence, which could provide the optimum of the set tasks realization can be used (Jeremiah 1998). Nakajima (2006) highlights that the analysis of the business environment can be done by using such instruments as DSS - Decision Support Systems, EIS - Executive Information Systems, OLAP - On-Line Analytical Processing, DWS - Data Ware-house systems, DMS - Data Mining systems, TOWS - Threats, Opportunities, Weaknesses, Strengths, ACH - Analysis of Competing Hypothesis, SPI - Service Performance Insight, SLM - Service Lifecycle Management, SLM3 - Service Lifecycle Management Maturity Model.

According to Gaidelys (2011) and Gaidelys& Dailydka (2013) the system “Knowledge house” aims is to collect and analyze information about the business environment using the available instruments for the purpose of timely reaction to changes in the business environment. Moreover, the decisions might be taken quicker, more effectively and exactly (Homburg, 2012; Meidute&Gaidelys, 2012; Gaidelys&Valodkienė, 2011.).

The purpose of this paper is to perform an assessment of railway sector competitiveness by using „Knowledge House“ method.

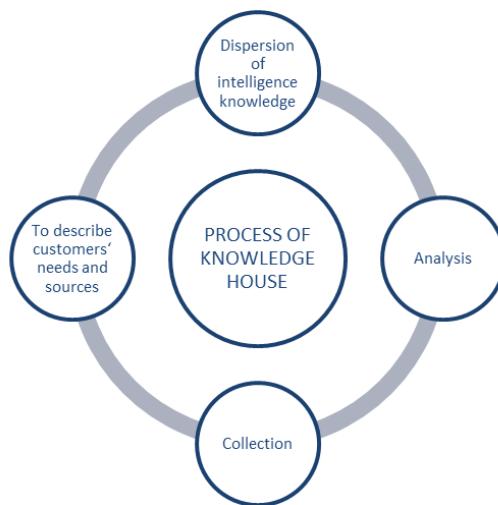
The objectives include:

- identification and assessment of problematic areas of competitiveness and those for improvement;
- elaboration of competitiveness model;
- development of a strategy of railway competitiveness development.

The publication was prepared on the basis of the up-to-date scientific researches performed, analysis and assessment of external statistical data, in accordance with the legislation of the Republic of Lithuania, the European Union and other countries and organizations.

### „KNOWLEDGE HOUSE“ METHOD

The "Knowledge House" method is aimed at collection and management of data on the market situation. Comparative profiles of market participants are detailed data on their products or services, their strengths and weaknesses, priorities in the markets, attitudes and sales tactics, which could be used by a company's management while planning responsive actions to actions of the market participants. A diagram of the process of application of the "Knowledge House" method is presented in the Figure 1.



**Figure 1.** The process of application of the "Knowledge House" method

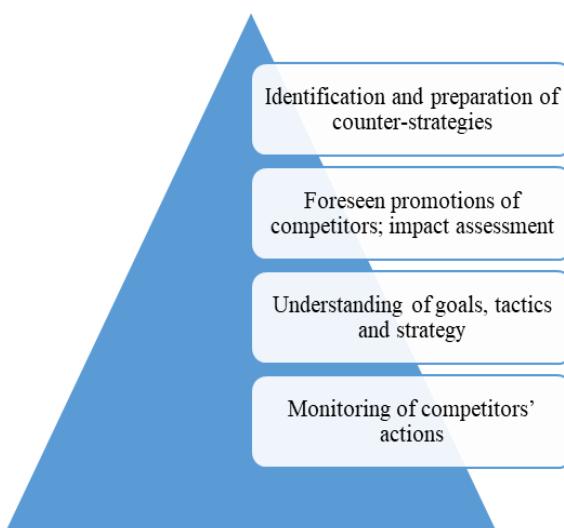
Source: Prescott, J.E. (2001). Proven Strategies in Competitive Intelligence. New York: John Wiley & Sons.

The main advantage of the method is the fact that it can be efficiently used by the decision-making persons in the company. A prerequisite – decision-makers have to be trained to use information of this system; only then decisions can be taken more quickly, precisely and efficiently. A principled diagram of the method application results presented in Figure 2.

The "Knowledge House" method consists of three main levels:

1. Standard components;
2. Components under research;
3. Components of knowledge management;

In turn, these levels consist of 16 modules in total.



Source: Prescott, J.E. (2001). Proven Strategies in Competitive Intelligence.  
New York: John Wiley & Sons.

**Figure 2.** The result of the “Knowledge House” method application

The “Knowledge House” method involves three levels of main components such as Standart components (level I), "Components under research" (level II), "Management of knowledge components“ (level III). Below we will discuss each level and its modules.

**The first level "Standard components"** uses the following modules.

*The module „Knowledge mediator“* is a set of instruments, used by the "Knowledge house of competitive intelligence" system. It is this module that covers the so-called "electronic news agency", it indicates essential sources of collected information, including websites, and it also covers the websites used by other market participants.

**Table 1.** Main levels and modules of the Knowledge House system

<b>Level</b>	<b>Components</b>
<b>Components of knowledge management</b>	Competitive intelligence practitioners“ „Fight for contracts / contract tactics“ „Comparison with competitors“ „Environment“ „Researches“ „Events and occasions“ „Requests“ „Information transmission“
<b>Components under research</b>	„Data for managers“ „News“ „Description of competitors“ „Yellow file“ „Personnel management“
<b>Standard components</b>	„Knowledge mediator“ „Best experience“ „Reference guide“

*The module "Best experience" usually describes the main directions of activity in the company, also the sequence of activity of analysts and the tasks they need to implement regularly. This allows new analysts of competitive intelligence to be trained in methodology of competitive intelligence more quickly, even if they are far from the headquarters and never participated training programmes with the main group of competitive intelligence.*

*The module "Reference guide" covers all conceptions and terms of the system. It explains the characteristics based on which the market participants are being classified. The market participants, as indicated in the second level, are grouped into "First level competitors", "New competitors", "Regional competitors" and "Segmental competitors". Further it explains "Strategy", "Scenario", "Proactive and retroactive researches" and "Yellow file", which stores the stories about the market participants and events in their activity when they can't satisfy customers needs. The section "Topics for managers" presents information on the market and positions of market participants in regard to the company.*

**The second level "Components under research" uses the modules:** "Data for managers", "News", "Description of competitors", "Yellow file" and "Personnel management".

The module "Data for managers" is designed for comparison of generalized profiles of the market participants by reviewing the market situation, competitive positions of market participants

**Table 2.** Description of the Knowledge House system modules

System's main levels	System's modules	Description of system's modules
<b>Level I. "Standard components"</b>	"Knowledge mediator"	The module covers a so-called "electronic news agency", which indicates substantial information sources, including websites.
	"Best experience"	The module describes a sequence of competitive intelligence analysts' activity and the tasks they have to perform regularly. This allows new employees to be trained in competitive intelligence methodology more quickly.
	"Reference guide"	The module covers all conceptions and terms used by the system. There is an explanation based on which the market participants are being classified.
<b>Level II. "Components under research"</b>	"Data for managers"	The module is designed to compare generalized profiles of the market participants by reviewing the market situation, competitive positions of the market participants.
	"News"	The module assesses all information that was intended for the main users in weekly news.
	'Description of competitors"	The module assesses information of the market participants' profiles.
	"Yellow file"	The module complements the module "Data for managers". Attention is paid to the standard behaviour of the market participants as well as their operational deficiencies. Having studied weaknesses of other market participants, the possibility appears to react properly.
	'Personnel management"	The module assesses personnel management information of the market participants (recruitment, provision, training, etc.).
<b>Level III. "Management of knowledge components"</b>	"Practitioners of competitive intelligence"	The module talks about the company's employees applying the competitive intelligence methodology (e.g., disposition of information necessary).
	"Fight for contracts / contract tactics"	The module assesses the tactics and strategy applied by the market participants.
	"Comparison with competitors"	The module is designed to compare the main areas of competing companies.
	„Environment“	The module covers personal discussions of employees on the problems arising while performing work tasks.
	"Researches"	The module covers assessment of information on potential client and market participants who work with such clients.
	"Events and occasions"	The module analyses and assesses information on the conferences and other events that may interest potential clients.
	"Requests"	The module assesses all implemented projects, analyses the reasons why the projects' implementation is unsuccessful.
	"Information transmission"	The module assesses data on companies that collect and analyse the market information.

The module "News" assesses all information that was intended for the main users in the weekly news. The module "Description of competitors" assesses information of the market participants' profiles, which are also divided into four categories: "First level competitors", "New competitors", "Regional competitors" and "Segmental competitors".

The module "Personnel management" assesses information on the market participants from another angle, i.e. it presents practical information on personnel management, and also information on personnel recruitment, provision and training.

The module "Marketing communication of competitors" informs on how the market participants organize their marketing communication. In this way, it gives a possibility to trace particular marketing actions of the market participants and thus prepare counter-actions.

The module "Yellow file" complements the module „Data for managers“. Special attention should be given to the standard behaviour used by the market participants, also to activity deficiencies of the market participants. Having studied weaknesses of other market participants, the possibility appears to react properly.

**The third level –"Management of knowledge components".** The purpose of modules at this level is to give new possibilities to potential users of competitive intelligence methodology. This is achieved through such modules as "Practicians of competitive intelligence", "Fight for contracts / contract tactics", "Comparison with competitors", "Environment", "Researches", "Events and occasions", "Requests" and "Information transmission". The module „Practicians of competitive intelligence“ covers the company's employees who in one or another way make their contributions to application of competitive intelligence methodology (e.g., disposition of information necessary).

The module „Fight for contracts / contract tactics“ assesses the tactics and strategy used by the market participants. The module „Comparison with competitors“ is designed for substantial comparisons. The module „Environment“ covers private discussions of the employees on the problems the employees are facing while performing their tasks. The module „Researches“ covers the assessment of information about the potential clients and market participants working with those potential clients. The module „Events and occasions“ analyses and assesses information about the conferences and other events that may interest potential clients. The module "Requests" assesses all implemented projects and the reasons why the projects were not implemented in full or their implementation is unsuccessful. The module "Information transmission" assesses in detail information about the companies that collect and analyse information in the market.

Generalization of the modules of the "Knowledge House" method is presented in Table 2.

## RESEARCH

In order to apply "Knowledge House" method and assess competitive environment, the main competitor of the Lithuanian railway sector company was selected. Research results are provided in the Table 3.

**Table 3.** Assessment of LDZ competitive environment by applying the *Knowledge House* methodology

Module	Application of the module
	Standard components
<b>Knowledge mediator</b>	While collecting information on competitors, the employees of LDZ usually use an open access system of information collection or secondary sources. Having performed analysis of primary and tertiary information sources, a presumption can be done that LDZ uses following data bases: <i>Data Warehouse, Data Marts, Temporal Databases and Virtual Data</i> as well as following analytic systems: <i>Analytical Information Systems and Decision Support System</i> . By using the mentioned data bases, information is being collected on related companies and their shareholders owning the controlled interest directly or through mediators.
<b>Best experience</b>	The main directions of LDZ activity: freight transport by railways, passengers transport by railways, charges for the use of infrastructure of LDZ, additional services of infrastructure management (maintenance of train carriages; train documentation procedures; shunting). Other services: freight operations; electricity supply; fuel supply; rolling-stock cleaning. While performing separation of operators and infrastructure, LDZ uses a vertical integration by distinguishing operational units (AS LatRailNet and SIA LDZ Cargo) and infrastructure creation units (SIA LDZ Infrastruktūra, SIA LDZ ritošā sastāva serviss, SIA LDZ apsardze).
<b>Reference guide</b>	The company has no separate analytical units. The main tasks of the analysts is analysis of competitors. The competitors are grouped by regional affiliation, type of cargo.
<i>Applied components</i>	
<b>Data for managers</b>	<ul style="list-style-type: none"> <li>The LDZ management does not accept the position of the European Union to liberalize the market and follows the position of favourable relationship with Russia.</li> <li>In search for new markets, LDZ began cooperation with <i>Nordic Investment Bank</i> (NIB).</li> <li>Countries of Northern Europe have interests in developing of the East-West transport corridor and in particular in upgrading of the <i>Skriveri-Krustpils</i> section.</li> <li>The main cargo flows are going through the only freight corridor with Belarus, two freight corridors with Russia being underdeveloped.</li> <li>Long-term passenger transport on both local and international routes decreases competitiveness of the passenger transport services.</li> <li>In cooperation with the Polish railways, the Latvian government signed a contract for passenger transportation for the period of the next 10 years.</li> <li>LDZ provides the company with necessary resources through tenders and potentially signs direct contracts with customers.</li> <li>LDZ focuses on the same markets and the same products as LG.</li> <li>LDZ actively cooperates with both RZD and international organizations and CIS members. Partners of LDZ: Kazakhstan railway, Russian logistics company <i>Infotrans, Bombardier Transportation, Belam Riga, Alcatel</i>, the concern <i>Belneftchim</i> and others.</li> </ul> <p>Competitors of LDZ: the biggest private competitors of <i>LDZ Cargo</i> in this sector are: <i>A/S Baltijos Tranzīta Serviss</i>, which owns the majority of the freight terminal in Riga, and <i>A/S Baltic Express</i>. In addition, <i>UAB Euro RailTrans</i>, established in 2012, founders of which are the Russian company <i>RZD Logistics</i> and two Estonian companies, which also own <i>SIA Transtrade Riga</i>. The purpose of the newly established company is to ensure cargo transport from the Latvian border to the seaport in Riga. This company is a direct competitor of <i>SIA LDZ Cargo Logistika</i>.</p>
<b>News For You</b>	Foresees weekly reporting to management, competitors do not use this module.
<b>Description of competitors</b>	With regard to LDZ, first level regional competitors can be identified as <i>competitors-partners</i> , i.e. East European railway companies such as LG, RZD, BŽD, ER and PKP. According to geographic position in regard to railway corridors, there could be distinguished Latvian and Lithuanian railways, which directly compete for freights with customer's company.
<b>Personnel management</b>	It is estimated that LDZ employs around 12 000 employees and personnel turnover is low. One of the reasons is the salaries of employees higher than average, which make up a larger part of the

	<p>company's costs. Trainings and refreshment of qualification are organized for employees constantly, however, according to the company's orientation directions, most employees are oriented towards the specifics of the markets of the Eastern Europe and CIS countries, which does not reflect orientation of Rail Baltica II towards the Western European markets.</p> <p>Minimal salaries of LDZ employees (in comparison to international companies providing analogous services) with which collective agreements usually are signed, which also include particular provisions regarding the scope of employees activity, also could be named as a competitive advantage</p> <p>In the same way as railway companies in Lithuania, Belgium, Hungary and Luxembourg, LDZ is ascribed to the category of the companies where a collective agreement of employees has no provisions regarding the transfer of employees to other areas of public transport sector.</p> <p>Since turnover of LDZ employees is low and most employees are working since the time of independence, they have a good understanding of business mentality of the CIS countries and have sufficient personal contacts in those markets, and they are very valuable sources of information.</p>
<b>Marketing communication of competitors</b>	LDZ does not perform a continuous monitoring of competitors' marketing activity, but takes into account competitors' promotions and advertising in the markets of Russia, Belarus, Kazakhstan, Lithuania and Poland during decision-making. It was noticed that LDZ has interests in the freight transport market of Sweden and plans its promotions in the region.
<b>Yellow file</b>	<p>In 2012, LDZ haven't received about 100 million lats from the EU funds to purchase locomotives under the contract with the Spanish company <i>Construcciones y Auxiliar de Ferrocarriles</i> (CAF). A presumption can be done that this decision possibly was caused by Russia.</p> <p>In 2014, LDZ leased 25 passenger trains for a period of 15 years for 150 million euros from the Swiss company <i>Stadler Bussnang</i>. Given that this direction of the company's activity is not the main source of income, this step can be seen as unsuccessful.</p> <p>Insufficient capacity of oil transhipment of Latvian ports that may determine lower volumes of oil export through Latvian railway can be identified as another problem. Only 28 wagons can be loaded at a time at Riga seaport, and it takes 24-36 hours to reload the entire tanker.</p>
<b><i>Management of knowledge components</i></b>	
<b>Practitioners of competitive intelligence</b>	LDZ does not identify, assess and apply a potential of employees experience in collection and analysis of information.
<b>Comparison with competitors</b>	<ul style="list-style-type: none"> <li>LDZ actively cooperates with Kazakhstan, and annually transports about 40 million tons of cargo.</li> <li>LDZ began to show interest in oil and oil products transport from Venezuela to Belarus (through Riga seaport).</li> <li>In striving to gain a competitive advantage, LDZ focuses towards the markets of Russia, Belarus and Estonia and foresees a faster passenger transport in following directions: 17 hours to Moscow, 13 hours to Saint Petersburg, 12 hours to Minsk, 4 hours to Valga.</li> </ul>
<b>Environment</b>	Analysing private discussions of employees on the problems the employees are facing during performance of the tasks, it was determined that LDZ indirectly shows interest in <i>Sweco Central Eastern Europe AB</i> and collects information through its company SIA <i>Būvuzraudzība Latvija</i> .
<b>Researches</b>	LDZ does not apply this module, does not collect and analyse information on potential clients and market participants working with potential clients.
<b>Events and occasions</b>	LDZ constantly monitors, analyses and assesses information on the conferences and other events that might interest potential clients.
<b>Requests</b>	LDZ does not assesses implemented projects and the reasons why the projects were not implemented in full or their implementation is unsuccessful.
<b>Information transmission</b>	LDZ does not carry out a constant assessment of information on the companies collecting and analysing information in the market. However, it was determined that LDZ cooperates with the international consulting company <i>ICF GHK</i> , which is both the consultant and customer of LDZ. The above-mentioned company possibly collects a commercial information that is required for analysis from Latvian companies: <i>TradeUnion Urban Transport LAKRS</i> , <i>TradeUnionRail LDSZA</i> and others.
<b>Fight for contracts / contract tactics</b>	LDZ has chosen the tactics of signing personal contact contract (for example, by analysing tertiary sources a relationship was determined between the company <i>Transmashholding</i> of the <i>UGMK</i> (rus. Уральская горно-металлургическая компания - eng. Ural mining and metallurgical company) group.

## CONCLUSIONS

The Knowledge House method can be used to assess the competitive environment using databases such as Data Warehouse, Data Marts, Temporal Databases, and Virtual Data. The use of reliable databases ensures the quality of information

The application of "Standard components" enables the identification of key revenue areas of competitors. "Application Component Groups" allows foolhardy and continuous access to and updates of market events and expected actions by competitors. Consistent application of the Knowledge Component Management module enables companies to purposefully apply the information collected and make the right decisions to maximize impact.

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