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Management and Economics of Transport

IMPACT OF ELECTRONIC COMMERCE ON FORMING COMPETITIVE ADVANTAGES

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Abstract

The article analyses the impact of electronic commerce on forming competitive advantages in terms of the added value chain. The researches done by the following authors were reviewed and conclusions were made. The matrix of four alternative possibilities suggested by Rockart and Scott Morton was reviewed, as well as three main ways in which electronic commerce may be used to form competitive advantages by distinguishing direct benefit to the customers and to the company. Five overlapping Internet development stages in business distinguished by M.Porter were analysed. The matrix was provided on the importance of the organisation development and electronic commerce for the company activity. The following issues were analysed: Is it possible to use electronic commerce in seeking to make significant changes in the company's business processes so that the company could have a competitive advantage? Could the company focus on electronic commerce in order to improve its position on the market? Is it better to aim efforts at internal improvements in the same way as the company's activity is performed at the moment?

Key words: Electronic commerce, Competition, Competitive advantages, Internet, Market

1. Contribution of Different Authors in Analysing the Impact of Electronic Commerce on Forming Competitive Advantages of the Economic Entities

The analysis of the added value chain, with the aim of forming competitive advantages, received more attention from various scientists than the Porter model of competitive analysis. In the opinion of M.Porter (2001), Rockart (1984), Scott Morton (1984), Ives (1984), Learmonth (1984), in order to establish the fields where a company could apply electronic commerce to gain competitive advantages, we must analyse the company's added value chain and search for the possibilities to apply the EC in each stage of the cost value chain.

Seeking to describe the potential opportunities and competitive advantages arising due to the use of electronic commerce, Rockart and Scott Morton (1984, 1990) analysed the added value chain.

2. Impact of Electronic Commerce on Forming Competitive Advantages in Terms of the Added Value Chain

According to Rockart and Scott Morton (1990), the research of the stages of the added value chain is one of the methods to use the possibilities of electronic commerce more efficiently and to successfully develop the company's business. However, in practice the result of such research is appearing of new efficient technologies and their successful application in the company's business. When evaluating this approach of the authors, it must be remarked that the information services/technologies unit of the company must review its activity limits and actively participate in the business process, and maintain contacts with the customers and suppliers.

Electronic commerce may be applied in establishing relations with the customers and starting new kinds of business, e.g. managing information on the insurance indemnity which must be paid to the consumer by the insurance companies.

A thorough analysis of the added value chain allows to identify the areas where using of electronic commerce can give the highest benefit. When making such analysis, the manager

seeking to establish the critical points where electronic commerce can be best applied must make a thorough analysis of all steps in the business process.

According to Rockart and Scott Morton (1984), in analysing possible use of electronic commerce in respect of the added value chain it is most important to answer the following questions:

- Is it possible to use electronic commerce in seeking to make significant changes in the business process of the company so that the company can have a competitive advantage?
- Could the company focus on electronic commerce in order to improve its position on the market? Would it be better to direct the efforts to internal improvements in the same way as the company's activity is being carried out at the moment?

The first question is very important since in certain industry sectors quite a number of possibilities exist for using electronic commerce in order to provide revolutionary new products able to change the industry sector substantially or to change the present attitude to production, purchasing, etc. This huge competitive "jump" can become very important in the company's activity. If such jump is not acceptable to one company, it can be used by others. Another alternative is that if it comes out that such an opportunity cannot be implemented, then the company should be focused on improving of the present business by using electronic commerce.

The second question makes a special emphasis on two methods: by improving the company's position on the market to improve the main internal operations of the company by reducing the expenses or improving the services (minimisation of the costs or differentiation of the products). At the moment most of the attention is drawn on using of the technology in order to improve the company's position on the market. Nevertheless, most companies have an opportunity to improve their main internal operations by using information technologies. To summarise the use of electronic commerce in order to get competitive advantages it can be stated that the answers to these questions offer a matrix of four alternative possibilities.

	Position on the market	Internal operations
Structural changes	1	2
Traditional products and services	3	4

Figure 1. Matrix of using electronic commerce to gain strategic advantages (Rockart and Scott Morton, 1984)

As the matrix shows, possibilities 2 and 4 are related with the use of electronic commerce to form competitive advantages in separate stages of the added value creation, while possibilities 1 and 3 are related with using of electronic commerce to increase competitiveness in respect of the industry sector.

Generalising the Rockart and Scott Morton's approach (1984), we can state that the authors distinguished the major methods how electronic commerce can be used to form competitive advantages:

- To improve each value adding function
- To increase the costs of selecting customers and suppliers
- To create new fields of activity.

Rockart and Scott Morton (1984) were the first to try to define the possibilities of using electronic commerce to form competitive advantages. B.Ives and G.P.Learmonth (1984) further developed the research started by Rockart and Scott Morton (1984). In their works B.Ives and G.P.Learmonth (1984) analysed the model of thirteen stage life cycle of resources seeking to establish how the company can gain competitive advantages. Although the authors did not use the term "added value chain" in their works, however the model of the resources life cycle used by them is very closely related with the added value chain.

3. Using of Electronic Commerce as an Instrument for Gaining Competitive Advantages

The analysis of the added value chain or life cycle of the resources aimed at achieving the operational efficiency and functional efficiency, is closely related with the performance strategy of the companies. In the opinion of B.Ives and G.P.Learmonth (1984), the ways of using EC for gaining competitive advantages are shown in the table.

		Use	Examples
Using electronic commerce in seeking competitive advantage	Direct benefit to the customers	Offering services	Purchasing at home by electronic means
		Offering new products	“Mobile” sales of insurance policies
		Creating of the distribution channel	Regional bank automates able to pay amounts
		Offering other elements	Electronic medicine
	Direct benefit to the company	Providing information (knowledge)	Integrating of external and internal marketing information
		Reducing costs of the product	Integrated production and distribution systems with feedback and control
		Reducing costs of the services	Capital for changing the work force
		Organisational change	Automation of the office functions

Figure 2. Using of electronic commerce as an instrument for gaining competitive advantages (Ives and Learmonth, 1984, Notowidigdo 1984)

4. Importance of Electronic Commerce in the Company

In order to see how information technologies, including electronic commerce and Internet, influence the added value chain, we must evaluate the historic perspective of their use. Development of the Internet in business may be evaluated by expressing it in five overlapping stages each of which originated from the previous generation due to the progress in technology (M.Porter, 2001).

The earliest use of the Internet and electronic commerce in transport companies allowed to automate separate operations such as accepting of orders and accounting. Another stage is characterised by the automation of separate higher activities and fulfilment of additional functions such as human resources management, trading operations and product development of transportation services. The third stage accelerated by the Internet covers integration of various actions, e.g. joining of trading actions with order processing. Many actions were related due to such measures, like customer relations management and company’s resources planning systems. The fourth stage, which is just starting, provides an opportunity to integrate the added value chain and the whole system of value, i.e. the complex of the value chains and the whole industry sector, including suppliers, distribution channels, and customers.

In the future fifth stage the commerce based on information technologies and Internet will be used not only to maintain relations in the value system of various actions and participants but also to optimise its operation in real time. The decisions will be made basing on the information from the joint actions and common organisations. The production tasks will be shared in accordance with the companies’ capacities and reserves which can be received from suppliers. Since the first implementation phases of the fifth stage will cover a relatively simple optimisation of the resources supply, production, logistics and service operations, a more complete optimisation will in its turn cover product development, too.

The summary of the stages of applying electronic commerce in the company provided by M. Porter (2001) is shown in the figure.

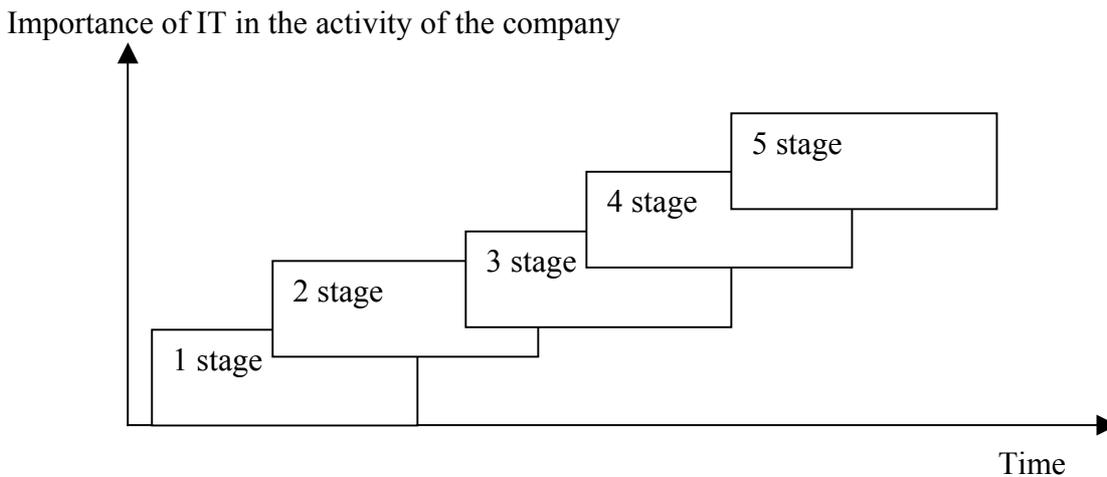


Figure 3. The growth of importance of electronic commerce in the company's activity time-wise (M.Porter, 2001)

Generalising of the importance of electronic commerce to the company time-wise allows to form a matrix, which evaluates the development of the organisation and the importance of electronic commerce for the company's activity. According to the reasoning provided by M.Porter, the company starting to apply electronic commerce in its activity is included in field 1 of the matrix and only after passing five stages it gets to field 4. However, the companies the managers of which think that electronic commerce has a strategic importance to the company's activity, get into field 3 by attempting to implement both the first and the second stage in their activity at the same time.

		Organisation	
		Young	Mature
EC importance In company's activity	Little	1	2
	Great	3	4

Figure 4. Matrix of the importance of organisation development and electronic commerce in the company's activity

5. Conclusions

The question whether electronic commerce is a competitive instrument in business remains important to many company managers. For many years technical experts have been trying to find out whether the computer systems of the company correspond to its needs. Unfortunately, these experts did not realise the business needs in terms of competition, as they did not realise that electronic commerce based on information technologies is part of the competitive business field. Despite of this main lack of the strategic direction, many companies, including transport sector, use electronic commerce to achieve their competitive advantage.

References

1. Porter, M. Competitive Strategy, The Free Press, 1982
2. Porter, M., Miller, V., "How Information Gives You Competitive Advantage", Harvard Business Review, July-August 1985
3. Scott Morton, M.S., "Strategy Formulation Methodologies and IT", in Kling, R.(Ed.), Computerization and Controversy, Academic Press, 1997.

DISTRIBUTION OF MARKET SHARES AMONG COMPETITORS IN LITHUANIAN TRANSPORT SECTOR

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Abstract

The article analyses the intensity of competition among Lithuanian companies in the transport sector and its evaluating. Intensity of competition is defined by using Herfindal's –Heshman's index. Distribution of market shares is defined among carriers of passengers by taxi cars, air transport companies, cargo carrying companies, and forwarding companies. The nature of the market share distribution is evaluated which shows the concentration degree of production and services in the Lithuanian transport sector. The market monopolisation level in the Lithuanian transport sector is defined.

Key words: Competition. Transport company. Services. Competition intensity. Market share

1. Introduction

During the recent decade increase of competition has been practically observed in the whole world. Not so long ago it was absent in many countries and sectors of economy. The market was secured and its dominating positions were clearly defined. Even in those areas where there was competition, it was not very strong. The increase of competition was suppressed by direct interference of the state.

Severe competition pushes away weak non-efficient companies and concentrates production or service providing in large companies. The tension of competition is conditioned by the increasing number of participants in international trading and service providing operations, increasing variety of products and services, constant improvement of technologies, etc. Very much influence on rapid and hardly predictable changes in this field has the progress of science and technology. It is not by chance that innovation of a product or a service today is becoming one of the basic factors of competitiveness. The increase of competition in its turn speeds up the characteristic processes: rapid renewing of its forms and methods, active creating of new competitive products, services and technologies, search for new outlets.

Competitiveness of a product or service is mostly conditioned by the ability to satisfy the consumer's needs: price, quality acceptable to the consumer, accessibility of a product or service, awareness to the consumer. Each of these factors is conditioned by many other factors. E.g.: the price is influenced by the production costs (which in their turn are conditioned by the working efficiency, etc.), distribution, advertising costs and other promotion costs. The price depends on the management and the pricing strategy of the company – it may be based on costs or value. The quality depends on the production technologies, the materials used, and on work organization.

The need for large financial resources when implementing a new production or providing new services is a critical factor restricting appearance of new companies on the market. On the one hand, it is financially difficult to establish a company, and on the other, circulating assets must be increased, obligations to the bank must be fulfilled, etc. This makes entering to the market harder.

With competitive products or services many companies still cannot efficiently use this advantage as they do not have experience in using the marketing complex: flexible policy on the product range and prices, effective sales stimulation methods, etc. The conjunctive situation is more and more burdened every year by extending of the market margins and entering of foreign companies with large experience in the conditions of strong competition into the market.

The factors having influence on the company's competitiveness are management, financial resources, staff qualification, modern technologies, convenient location of the company, experience on the market, flexibility in reacting to changes on the market, etc. Many Lithuanian businessmen very well realize the importance of management, finance, and implementation of modern technologies, however improving of staff qualification and training is a new process in Lithuania and far from many managers of the companies realize its importance.

Infrastructure of business services is a source of a competitive advantage and its absence or low level may be an important drawback of competitiveness. This is especially important to the transport, logistics, and telecommunications system. In Lithuania this general economic infrastructure is relatively well developed and is improving. Development of the transport service sector will depend on many circumstances. Good geographical location is only one important precondition for development, however the regulations for border crossing and transit control are also of no less importance as well as the investments of the state in this infrastructure. The state must privatize the services which, as the world's experience shows, are operating more efficiently when being private. The best quality and most rational services may be more rapidly ensured only by strong international companies. Certainly, this does not apply to the services which may be provided by small and medium companies. In this case it would be most perspective to use common services of foreign and local companies since the biggest effect is achieved this way.

Many small companies see competition as copying large competitors. This gives them self-confidence. However, following others means losing any advantage. Absence of the competitive advantage is the straightest way to bankruptcy. Some companies that have an advantage do not take any measures to maintain it. Possession of a competitive advantage is to be seen as an accomplished fact or achieved goal and then another one must be searched for. The essence of the competitive struggle is not in the actions against the company but in taking over the competitors using the services of that company.

2. Distribution of Market Shares Among Competitors and Intensity of Competition

One of the most important characteristics of the competitive struggle is the degree of competitors' resistance in fighting for consumers and new gaps in the market. Due to the difficulties in direct evaluating of interaction of the competitive environment factors, the indirect measurement of competitive intensity is possible. It is based on evaluation of the after-effects of the actually controlled relationships. The results of the analysis allowed us to distinguish three aggregated actions showing the intensity of competition. The nature of the market share distribution among the competitor, market expansion rate, and market profitability must also be ascribed to such factors.

To evaluate the nature of the market share distribution the ratio is used showing the concentration degree of production and services in the sector. It allows defining the monopolization level on the market and is the opposite value to the competition intensity. The ratio used consists of four parts

(CR_4 – Concentration Ratio):

$$CR_4 = \frac{QR_1 + QR_2 + QR_3 + QR_4}{QR}$$

where QR_i is the sales amounts of the i^{th} company;

QR – total sales amounts of the planned product range, LTL thou.; $QR_1 = \max\{QR_i\}, i = 1 \div n$;

$QR_2 = \max\{QR_i \setminus QR_1\}, i = 1 \div (n-1)$;

$QR_3 = \max\{QR_i \setminus QR_1, QR_2\}, i = 1 \div (n-2)$;

$QR_4 = \max\{QR_i \setminus QR_1, QR_2, QR_3\}, i = 1 \div (n-3)$.

Where n is the total number of companies selling certain products or services.

In other words, CR_4 shows the total market share of the first four companies. Those companies sell most products or services on the whole analyzed market. This ratio is used by the Department of Justice, USA to define the competition level on the trading market. If CR_4 is higher than 0,7 (75 per cent), then restrictions on company mergers are introduced, since such market is becoming a monopoly.

At the moment concentration ratios in the USA and France are calculated to 4,8,20,50,100 leading companies on the market, while in Germany, England, and Canada this is done to 3,6,10 companies. In the middle of the eighties, the eastern European countries started to use CR, as well as partially Hungary and Poland.

An important drawback of the concentration ratio is that it does not reflect the distribution of various market shares among the competitors. E.g., CR is the same and equals to 0,8 in two totally different market situations: 1) one company controls 77 per cent of the market, while other 23 companies have 1 per cent each; 2) 5 equivalent companies control 20 percent of the market each.

This drawback in a way is eliminated by the quadrate sum of the competitors' market shares – Herfindal's index:

$$Y_h = \sum D_i^2 \text{ or } Y_h = 10000 \sum D_i^2,$$

where Y_h is Herfindal's index ($0 < Y_h \leq 1$)

$$D_i = QR_i \setminus QR, i = 1, \dots, n$$

D_i is the share of the i^{th} company in all sales amount of the planned product range.

Herfindal's index increases when increasing concentration in the market and is equal to 1 in case of pure monopoly. When 100 equivalent companies are operating on the market, then $Y_h = 0,01$.

Since 1984 this index has been used in practice with certain Hershman's specifications in the USA government anti-monopoly activity. The specifications are related with the number of companies and parts used in formula 1. In defining Herfindal-Hershman's index the quadrate sums of the shares are defined only for the first 50 larger companies operating on the analyzed market. In case the value is higher than 0,18 then the competition intensity is low and the market concentration is high. Therefore, the government must interfere and monopolize the situation on the market. In case in this situation the companies merger leads to $Y_h = 0,005$ (50 points), then it is prohibited by the laws.

In order to define the market monopolization level among the road cargo carriers of the Republic of Lithuania, a research was made which showed that the market concentration level ratio CR_4 in 2001 stood at 0,385 and in 2002 it was 0,428, which shows low monopolization

level among the Lithuanian cargo carriers. Having used Herfindal-Hershman's index during the research the quadrature sums of the shares are defined only for the first 50 larger companies operating in the analyzed market. If the value is higher than 0,18 then the competition intensity is low and the market concentration is high. The research showed that among 50 largest road cargo carriers of the Republic of Lithuania the values of Herfindal-Hershman's index in 2001 stood at 0,0658, and in 2002 – 0,0715. This shows that the competition intensity is high and the market concentration in low. When analyzing the cargo carrying companies of Lithuania it was defined that the cargo carrying related activity share of the analyzed companies amounts to 50-100 per cent.

Having made an equivalent research of the cargo forwarding companies of the Republic of Lithuania, it was established that the market concentration level ratio CR_4 in 2001 amounted to 0,426 and in 2002 it was 0,489, which shows low monopolization level among the Lithuanian cargo forwarding companies.

The research showed that among 50 largest cargo forwarding companies of the Republic of Lithuania the values of Herfindal-Hershman's index in 2001 stood at 0,1151, and in 2002 – 0,1088. This shows that the competition intensity is high and the market concentration in low. When analyzing the cargo forwarding companies of Lithuania it was defined that the cargo forwarding related activity share of the analyzed companies amounts to 60-100 per cent.

Having made an equivalent research of the taxi companies of the Republic of Lithuania, it was established that the market concentration level ratio CR_4 in 2001 amounted to 0,686 and in 2002 it was 0,729, which shows high monopolization level among the Lithuanian taxi companies. The research showed that among 50 largest taxi companies of the Republic of Lithuania the values of Herfindal-Hershman's index in 2001 stood at 0,1513, and in 2002 – 0,1555. This shows that the competition intensity is close to the limit when the market concentration is considered to be high.

A totally different situation is among air transport companies. 2 Lithuanian companies and 6 representatives of foreign companies in Lithuania are dominating on the market. Having calculated the market concentration level ratio, which in 2001 amounted to 0,871 and in 2002 – 0,849, we can state that there is a high monopolization level among air transport companies in Lithuania, and the market concentration is high. This is also illustrated by the values of Herfindal-Hershman's index, which in 2001 stood at 0,3788 and in 2002 – 0,3806.

As the formula shows, Y_h does not evaluate the companies' rank. This drawback is eliminated by Rozenblut's index (Y_r), which is calculated by considering the running number of the companies received having divided by rank from the maximum to the minimum (i):

$$Y_r = \frac{1}{2 \sum (i * D_i) - 1}; i = 1, \dots, n.$$

Sometimes the entropy ratio (E) is used in evaluating the distribution of the shares. In this case the measurement of the share is done not by ranks but by making the share logarithms:

$$E = \sum D_i * \ln D_i; i = 1, \dots, n.$$

In principle, a totally different method giving equivalent results is the evaluating of the qualitative integration of Lorence's diagram – Ginny's ratio (G):

$$U_D = 1 - \frac{\sigma(D)}{D_{vid}} \text{ or } U_D = 1 - \frac{\sqrt{(1/n) \sum (D_i - D_{vid})^2}}{D_{vid}}; i = 1, \dots, n.$$

Where U_d – competition intensity measured by evaluation of the similarity of the competitors' shares;

$\frac{\sigma(D)}{D_{vid}}$ – variation ratio of the competitors' market share (D_i);

$\sigma(D)$ – average quadrature deviation D_i ;

D_{av} – arithmetic D_i average;

N – number of companies on the market.

It can be seen that the arithmetical average of the shares depends on the number of companies (n):

$$D_{vid} = \frac{1}{n} .$$

Therefore, $U_D = 1 - n \sqrt{(1/n) \sum_i (D_i - (1/n))^2}$, $i = 1, \dots, n$.

3. Market Development and Competition Intensity Rates

U_D ratio is necessary but not enough since it does not evaluate the nature of the market development. We are talking about the characteristics of dynamic demand and supply, which are disclosed by the growth rates of the sales and services amounts. The speeded-up development of the market even in the situation of equal competition may eliminate many contradictions among the companies on their satisfaction in the increase rates. High growth rates, increasing demand and supply eliminate many problems, including competition. This happens because the market share for the company increases not on account of the competitors but due to the increased number of consumers or increased purchasing power. In such case the competition intensity falls.

On the other hand, such increase cannot go on forever. Due to many objective and subjective reasons, any market undergoes stagnation, depression or a small positional growth when the sales amounts increase due to the decreasing position of the competitors. In such case the competition intensity increases significantly. Such fact must be included into the complex evaluation of the competition intensity. The main difficulty is several meanings of the marginal values of the growth rates. The competition intensity in minimal (growth rates higher than 100 per cent) or maximal (growth rates lower than 100 per cent). Most situations describing the dynamics of certain product or service markets may be limited by two marginal values of growth rates in the sales amounts: 70 per cent and 140 per cent. In this range the following values can exist of the competition intensity evaluating the growth rates of the sales amounts in the analyzed market:

$$U_{TA} = 1 - \frac{T_A - 70}{140 - 70} = \frac{140 - T_A}{70} ,$$

where T_A is the annual growth rate of the sales amounts in the analyzed market without considering the inflation, %.

General scheme for defining U_{TA} :

$$\text{If } \left\{ \begin{array}{l} T_A \geq 140\% \\ 70\% < T_A < 140\% \\ T_A = 70\% \end{array} \right\}, \text{ then } \left\{ \begin{array}{l} \Rightarrow 0 \\ U_{TA} = (140 - T_A) / 70 \\ \Rightarrow 1 \end{array} \right\} .$$

It is also important that when T_a is lower than 70 per cent (market change), then the competition intensity becomes lower. The given situation cannot be transferred to the operating market. It means that the products are not sold or services are not provided, or the market has experienced a strong economic shock. These cases must be analyzed separately.

Another important economic factor showing the competition intensity is the market profitability ratio (R_R), which is defined by the relation of general profit to sales amounts:

$$R_R = \frac{P}{Q}.$$

High market profitability is when the demand exceeds the supply. The situation allows the company to fulfill the goals without suppressing the competitors' interests. When the profitability gets lower, the situation becomes more inverted.

This tendency has an objective basis and is mentioned in the researches of many economists. A number of microeconomics theories use Lerner's ratio (L) to evaluate dominating of the company on the market.

$$L = \frac{K - MC}{K} \text{ or } L = -\frac{1}{E_K},$$

K – product price;

MC – marginal costs;

E_k – demand elasticity by price.

The ratio provided shows the possibility of the seller or service provider to make influence on the price of the product. The higher is Lerner's ratio, the less is the company dependent on the competitors, suppliers, consumers, etc. Having integrated this expression by all companies on the market, we would come to the aforementioned market profitability ratio. This way, regardless of the market profitability, R_R shows the company's competitive activity and the company's "freedom" degree in gaining profit. The higher is R_R , the lower is the pressure of the competitive environment, lower competition intensity. This conclusion can be expressed by the formula:

$$U_R = 1 - \frac{P}{Q} = 1 - R_R,$$

U_R – competition intensity ratio evaluating the market profitability level.

When profitability is higher than 100 per cent, the value of U_R is closer to 0, and when the business is loss making, the U_R value is closer to 1.

General scheme for defining U_R :

$$\text{If } \left\{ \begin{array}{l} R_R \geq 1 \\ 0 \leq R_R < 1 \\ R_R \leq 0 \end{array} \right\}, \text{ then } \left\{ \begin{array}{l} \Rightarrow 0 \\ U_R = 1 - R_R \\ \Rightarrow 1 \end{array} \right\}.$$

It is important to mention that the factors provided cannot fully evaluate the impact of the competitive environment to the competition intensity. Speaking about U_D , U_{TA} , U_R , the attention was not focused on technologic innovations, product modification, change in market strategy, and other moments able to make significant changes in the nature of the competitive struggle. This was not done accidentally. After detailed analysis, changes in the competitive environment are reflected from the dynamics of the competitors, market shares, market profitability, and growth rates. This is confirmed by the competition practice and special competition researches.

Analysis by the competition intensity characteristics is convenient when analyzing the competition intensity in separate markets (its segments) and evaluating the attraction of the market. Beside the comparison base, such analysis allows to specify the analysis results of separate elements of the competitive environment.

The ratios U_D , U_{TA} , U_R can be generalized in the following way:

$$U_k = \sqrt[3]{U_D * U_{TA} * U_R} ,$$

U_k – generalized competition intensity ratio, $0 \leq U_k \leq 1$.

This way the aggregated, general evaluation of the company's competitive environment is received. Its main purpose is to measure the competition intensity. It would, however, be wrong to think that the whole situation of the analyzed activity can be described by the given characteristics. Like any other complicated process, the competitive struggle also requires a system of ratios. By U_k it is impossible to establish the conditions for receiving certain advantages over the competitors, since there is only indirect relation with the results of the concrete measures. This fact requires detailed evaluation in analyzing the competitors' activity.

4. Conclusions

1. There are over 3000 companies in the road cargo carriers market of the Republic of Lithuania, the competition intensity is high, and the market concentration is low.
2. The monopolization level among the cargo forwarding companies of the Republic of Lithuania is a low, i.e. the competition intensity is high, and the market concentration is low.
3. The research has shown that the competition intensity among the Lithuanian taxi companies is approaching the limit when competition is considered to be high.
4. The monopolization level among air transport companies in Lithuania is high and the market concentration is high too. Two Lithuanian air transport companies are dominating on the market.

References

1. Porter, M. On Competition. Harvard Business Press, 1998, 495p.
2. Yakovlev, A. Statistical estimation of production monopolization level. Moscow. Statistics manual, 1990. 46p. (in russian)
3. Azoev, G. Competition: analysis, strategy, and practice. Moscow: Economic and marketing center, 1996. 208p. (in russian)
4. Azoev, G. Competitors activity analysis. Moscow. GAU. 1995. 80p. (in russian)

SOCIAL AND ECONOMIC PRINCIPLES OF DEVELOPING AN INTEGRATED PUBLIC TRANSPORT NETWORK IN VILNIUS

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Abstract

In the present paper, the problems of offer and demand for public transport services as well as satisfaction of the needs of potential passengers and their attitudes towards the available routes and transport services and their expansion have been considered. Transport services, their quality and amount, network of routes, schedules, tariffs and fares have been analysed from social and economic perspectives. The most urgent transport problems are encountered in newly built residential districts which emerged in the last decade. Therefore, a survey based on questionnaires distribution among the residents of these districts with the aim to learn their opinion as the potential public transport users about the above issues was made. The data obtained was then analysed from social and economic perspectives.

Key words: public transport; routes; demand; supply; suburban; service quality

1. Introduction

With the aim to investigate the present situation of the changing public transport market in 2001–2002 there were carried out the social-economic investigations. In this research work, the problems of offer and demand for public transport services as well as satisfaction of the needs of potential passengers and their attitudes towards the available routes and transport services and their expansion have been considered. Transport services, their quality and amount, network of routes, schedules, tariffs and fares have been analysed from social and economic perspectives. The most urgent transport problems are encountered in newly built residential districts which emerged in the last decade. Therefore, a survey based on questionnaires distribution among the residents of these districts with the aim to learn their opinion as the potential public transport users about the above issues was made. The data obtained was then analysed from social and economic perspectives.

2. Supply and Demand

The key market economy principle is the correspondence of the public transport service market supply to the demand of passengers. The transport service supply analysis confirms the insufficient capacity of the public transport system.

1. In Vilnius, 57.8 % passengers using public transport are carried by trolley-buses. Buses are mainly used on suburban routes to carry passengers to the downtown. They service 39.3 % passengers, with 15 % passengers using taxi buses and 14 % – fixed route taxis (Fig. 1).

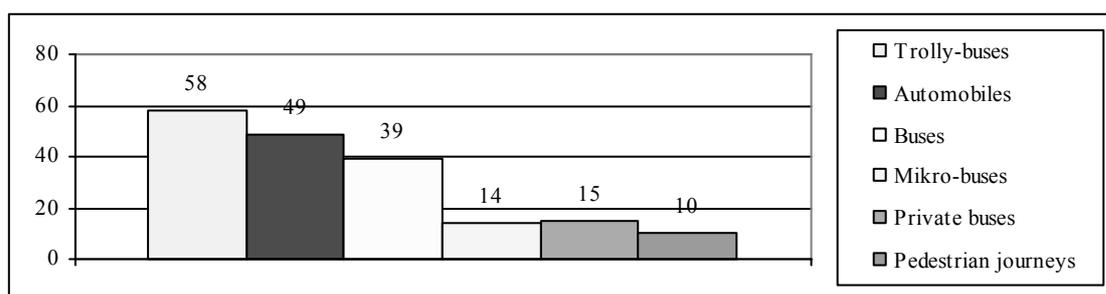


Figure 1. The choice of transport facilities in the outskirts and in the suburbs of Vilnius in 2001–2002 (%)

2. Because of the high rate of motorization, public transport has lost a part of passengers. In 2001, the degree of motorization of the population reached 304.0 auto/1000 inhabitants, with 0.8 automobile per household. The motorization boom in Lithuania was caused by the flood of old relatively cheap Western – made cars on the market (Fig. 2).

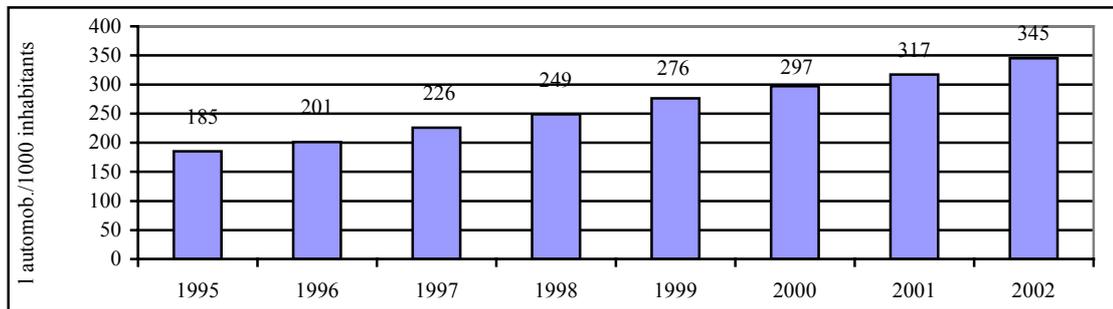


Figure 2. The number of automobiles in Vilnius, automob./1000 inhabitants

The mobility of the inhabitants increased not only on account of commuters but because people began to travel more at the weekends and in their leisure time. Even seasonal travel fluctuations became not so sharp. Now these fluctuations correspond to the variations of expenditures for cultural and recreational purposes.

3. Firms providing public transport services tend to maintain currently achieved level. However, the trolley-buses and buses exploited can now satisfy only the existing demand for transportation. For renovation and upgrading of public transport facilities the subsidies from Vilnius municipality are needed. New buses and trolley-buses are needed to serve the suburbanites and integrate the suburban routes into a unified urban transport network.

4. The municipality is responsible for providing quality transport services for urban inhabitants. It announces bids for providing transport services on the existing routes and gives licenses for using minibuses on the routes serviced by other transport facilities. In announcing bids, the municipality should set the criteria to evaluate quality and quantity of the services offered.

5. The problems of suburban transport have not been paid due attention yet. New routes for public transport are not being laid, passengers should still make changes, the network of streets has not been completed, and not all suburban roads have been turned into the city streets. These unsolved integration problems prevent rational allocation of funds of Vilnius region and the city into transport network development. The currently used tariffs and fares do not meet the requirements raised to passengers' transportation. Vehicle operators supported by the municipality tend to increase the tariffs. A survey has shown that the users of transport services are interested in maintaining low tariffs as long as possible because they believe that public transport should be partially state-supported. A discount system seems most acceptable for them. It may be accounted for the economic situation and the purchasing power of the inhabitants as well as social spectrum of potential passengers embracing groups of state-supported people, unemployed family members and students for whom any price rise is painful. As a result, they simply stop using public transport.

6. The priorities of passengers include better transport services and an integrated transport network of urban and suburban routes. In the questionnaires, customers emphasized the importance of maintaining schedules with short intervals for fixed-route transport, as well as fast and comfortable journey. The survey conducted in Vilnius revealed the main factors influencing the selection of a particular transport facility.

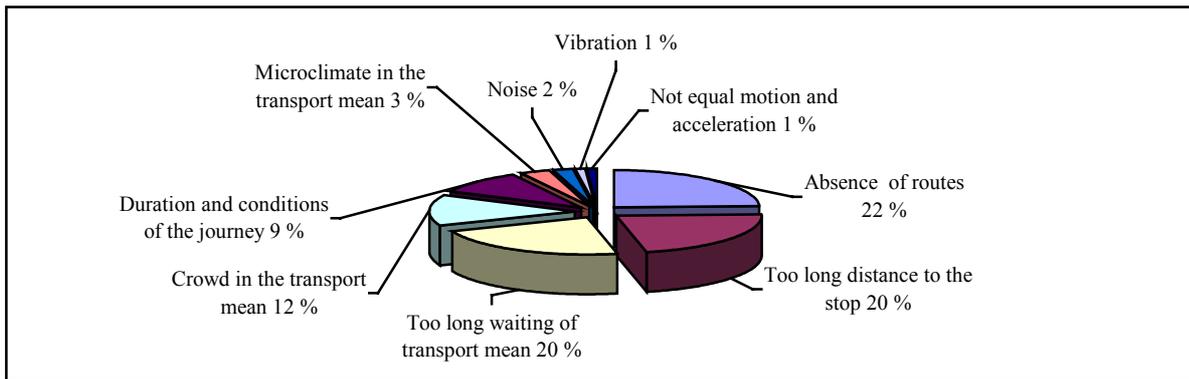


Figure 3. Conditions when preference is given to automobile

The preference of an automobile is conditioned by the lack of the route (22 %), long way to a bus (trolley-bus) stop (20 %), large intervals in the schedule (20 %), non-regular public transport service (3 %), time and conditions of journey (9 %), need for making changes and incompatibility of traffic schedules (9 %), etc. A unified network of urban and suburban transport providing services of the same quality to all inhabitants is needed.

3. Integration of Public Transport

The research made has shown that public transport system of Vilnius should be developed along three main lines [1, 2]:

1. Improving the quality of the available fixed-route public transport services;

The passengers give the priority to higher quality transport services and the extension of the existing routes. They emphasize such aspects as density, speed and comfort of fixed-route traffic. The users have to adapt to changes, therefore they prefer long-term stable schemes of transport routes and tariffs.

2. Integrating the suburban transport into the urban transport network

To make public transport more easily available for the inhabitants, an integrated urban transport system including suburban transport should be created. The inhabitants of the near suburbs would like to have stable routes and transport for getting to the workplace and for other purposes which should be the same as in the city in terms of time, space and tariffs.

To achieve this end, the fleet of transport facilities providing the above services should be extended.

Routes lying outside the city limits and the municipality's responsibility should be financed by the Vilnius region authorities. The tariffs on these routes should be revised in the context of the integration into the urban transport system.

3. Developing more advanced tariffs and ticket systems

Passengers are concerned about stable and low tariffs believing that public transport should be partially supported by the state. They support the allowances embracing a large number of people belonging to various social layers. The economic situation of the country and the impact of the priorities of the former planned economy account for this.

Tickets for journeys by public transport facilities are simple to print, to use and to change, if necessary. Mechanical ticket stamping machines are simple, cheap and easily maintained or repaired. However, a system of ticketing is not flexible, being difficult for keeping account and control.

The development of a harmonized public transport and its integration should be performed along three main lines:

- integration of public transport services includes coordinated exploitation and market of services, interaction of various transport facilities and services, coordinated selling of tickets and easily available information about the services;
- integrated development of all transport facilities implying their more effective use and coordination as well as the use of inter-modal transport and easy transfer from private to public transport;
- integration of transport development into other branches of economy.

These measures comply with major strategic goals of harmonized public transport development in Lithuanian cities [3, 4]:

- 1) to promote the use of public transport by urban inhabitants;
- 2) to raise the standards of public transport services provided in Lithuanian towns in compliance with the quantitative and qualitative standards of the developed EU states;
- 3) to extend the urban public transport network so that it could satisfy the needs of the particular territory;
- 4) to develop a mechanism of passenger transport system financing on the fixed routes which could be competitive in the market;
- 5) to authorize municipalities to be responsible for public transport services, their provision, planning, financing, expansion, quality and control;
- 6) to legitimize the responsibility of transport operators to satisfy the needs of passengers;
- 7) to support a competition between companies providing public transport services;
- 8) to take into account social principles in developing public transport and fixing the tariffs;
- 9) to start the integration process of urban and suburban public transport;
- 10) to introduce a well-thought (balanced) tariffs of public transport services;
- 11) to update the system of ticketing;
- 12) to introduce more flexible and varied system of tickets.

An urban public transport system is not sufficiently flexible. The response of the passengers to the novelties introduced is also often delayed, requiring some time for analysis and adaptation. Therefore, timely information is very important.

In the market, the spirit of uncertainty prevails in the expectation of the consequences of the integration processes in the area of public services. The users are expecting the improvements in public transportation and higher quality services. However, they are afraid of possible rise of prices which would affect the price of transport tickets.

4. Conclusions

1. A system of public transport is closely connected with the territorial planning of the city. If the urban territory is being expanded, transport system should also be extended not to become an obstacle for urban territory expansion.
2. Public transport system of Vilnius should be developed along three major lines:
 - Raising quality standards of the available fixed-route transport;
 - Promoting the integration of suburban transport into the urban transport system and providing services of higher quality;
 - Upgrading ticketing and tariffs;

3. A major purpose of the urban transport system is the integration of various transport facilities to provide a free choice of the particular means of transport for passengers.

4. To achieve more frequent use of public transport by urban inhabitants, a financing mechanism of passenger transportation should be developed which could be competitive in the market.

References

- [1] P. Juskevicius. *Planning of the urban transport systems*. (Vilnius: Technika, 1995).
- [2] P. Juskevicius. *Harmonizing the expansion of cities and their transport systems*. (VGTU, Vilnius: 2003).
- [3] M. Burinskiene, G. Paliulis. The analysis and perspectives of public transport // *Development of cities and roads*. (Vilnius: Technika, 2000).
- [4] J. Butkevicius. *Passenger transportation*. (Vilnius: Technika, 2002).