DETERMINANTS OF COMPETITIVENESS LEVEL OF REFRIGERATED TRANSPORT SERVICES COMPANIES

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A b s t r a c t

Transportation services can be evaluated from the perspective of a number of criteria. One aspect of the evaluation is the competitiveness of companies who provide the services. The most important factors determining the level of competitiveness of enterprises are discussed in reference books, while there are no tests determining their hierarchy of importance and their assessment for companies associated with the realization of transport function in the controlled temperature conditions.

The purpose of this study is defining the importance and assessing the main factors determining the level of competitiveness of transport companies.

The quantitative study was conducted using survey methods based on a questionnaire. Entities participating in the study were customers using refrigerated transport services. Among them were producers and distributors of food products, supermarkets and specialist grocery stores.

The study allowed for distinguishing two groups of importance of the competitiveness determinants, and determined the relationship between the level of selected assessed factors and the parameters characterizing the companies acquiring services.

DETERMINANTY POZIOMU KONKURENCYJNOŚCI PRZEDSIĘBIORSTW ŚWIADCZĄCYCH USŁUGI W ZAKRESIE TRANSPORTU CHŁODNICZEGO

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Abstrakt

Usługi transportowe mogą być oceniane z punktu widzenia wielu kryteriów. Jednym z aspektów ich oceny jest konkurencyjność przedsiębiorstw je świadczących. W literaturze przedmiotu omawiane są najważniejsze czynniki decydujące o poziomie konkurencyjności przedsiębiorstw, natomiast brak jest badań określających hierarchię ich ważności oraz ich oceny w zakresie przedsiębiorstw związanych z realizacją funkcji transportowej w warunkach kontrolowanej temperatury.

Celem niniejszej pracy jest określenie ważności i ocena głównych czynników decydujących o poziomie konkurencyjności przedsiębiorstw świadczących usługi transportowe.

Prowadzone badania miały charakter ilościowy z wykorzystaniem metod badań ankietowych w oparciu o kwestionariusz ankiety. Podmiotami biorącymi udział w badaniach byli klienci korzystający z usług w zakresie transportu chłodniczego. Należeli do nich producenci i dystrybutorzy produktów żywnościowych oraz hipermarkety i branżowe sklepy spożywcze.

Przeprowadzone badania pozwoliły na wyróżnienie dwóch grup ważności determinant konkurencyjności oraz określenie zależności poziomu wybranych ocen czynników od parametrów charakteryzujących przedsiębiorstwa nabywające usługi.

Introduction

Transportation services can be evaluated from the perspective of a number of criteria e.g. the level of competitiveness. The competitiveness of an enterprise is defined as *"a set of characteristics determining the attractiveness of given goods, services or the economy as a whole, and is mostly affected by price, performance characteristics or quality"* (Encyklopedia 2010, p. 60).

The most important factors determining the level of company competitiveness, associated with realizing transport functions, according to P. Romanov include: the credibility of the company (recommendations from other customers, the time of presence in the market), reliability of deliveries (promptness, accuracy, completeness), used means of transport (transport, reloading), transport route (distance), frequency of carriage, size of freight, delivery cost (price) and the level of alternative costs, (GOŁEBIOWSKI 1994, ROMANOW 2003).

According to KOŹLAK (2008), basic factors allowing the TSL sector companies to obtain an advantage over competitors can be: the level of company costs, its technological level (modern fleet, availability and quality of used infrastructure, IT systems), qualifications of staff, organizational efficiency and marketing strategies. BRDULAK (2009) in the research conducted on "The perfect TSL company profile" perceived by the customer takes into account such factors as: quality of service, terminal, fleet, customer service, promotional activities, prices and reliability of the company.

The aim of this study was to determine the importance and assess the main factors determining the competitiveness level of transport services. The scope of research included the evaluation of: the importance of competitiveness determinants, development of the level of service prices, quality of services provided, and the impact of co-operation with the service provider on the company satisfaction.

Material and Methods

Entities participating in the study were customers using the refrigerated transport services within the country. Among them were producers and distributors of food products, supermarkets and specialist grocery stores. For research purposes, a total of 206 questionnaires were obtained, by e-mail and the environmental method, from customers using these services.

Among the surveyed companies, manufacturers and distributors of food products constituted the largest group of more than 76%, while hypermarkets made up over 11%, and grocery stores over 12%.The largest number of companies, almost 52%, indicated that they operated in international markets; the smallest group of respondents included local-range companies (over 11%).

Research concerning competitiveness determinants in a transport company was of quantitative nature. A survey method based on a questionnaire prepared in accordance with official guidelines was employed in the quantitative survey (OPPENHEIM 2004, SAGAN 2004, COHEN et al. 2000).

Results obtained in the survey were subject to a statistical analysis. In order to test the significance of differences between the two dependent measurements the Wilcoxon signed-rank test was used, while the significance χ^2 test was used for comparison of groups containing the quantitative variables (ACZEL 2006, SOBCZYK 2002).

Results and Discussion

In the carried out research concerning the importance of competitiveness determinants of competitiveness, the factors proposed by ROMANOW (2003) were taken into account.

Table 1 shows the average assessment of the importance of factors determining the competitiveness level of a company providing transport services of products requiring controlled temperature.

The most important factors determining the level of service provider competitiveness, according to percentage rates of both high and very high importance factors, were: the cost of delivery, the company credibility and reliability of supply (81.6–83%). However, for the used means of transport the indicated share was about 74%, and for the remaining four factors the very high and high importance indicators were in the range between 62–67%.

The resulting ranking of the importance of leading features resembled the characteristics presented in the "Profile of ideal company providing logistics services" as seen by the customer. The results obtained by BRDULAK (2009) indicate that the "ideal company profile" TSL as perceived by the client in

Table 1

Assessment of the importance of factors determining a company competitiveness level

Factors determining the level of competitiveness of a company	% of indications						
	average evaluation of an importance (pt.)	not important (0 pts.)	very small importance of factor (1 pts.)	small importance of factor (2 pts.)	average importance of factor (3 pts.)	high importance of factor (4 pts.)	very high importance of factor (5pts.)
Company credibility	4.12	0	0	1.94	15.53	50.97	31.55
Reliability of supply	4.18	0	1.94	2.91	13.59	38.35	43.20
Means of transport used	3.93	0	0.49	2.43	23.30	51.46	22.33
Transport route	3.80	0	2.91	1.46	28.64	46.60	20.39
Frequency of carriage	3.77	0	0.49	3.88	33.98	40.78	20.87
Size of freight	3.76	0	0.49	6.80	29.61	42.23	20.87
Cost of delivery	4.26	0	0	1.94	15.05	38.35	44.66
Level of alternative costs	3.85	0	0	0	33.98	46.60	19.42

Source: own research.

Table 2

Hierarchy of factors determining the competitiveness level of the company

Average evaluation of an importance (pts.)	Factors determining the level of competitiveness of the company	Cost of delivery	Reliability of supply	Company credibility	Means of transport used	Level of alternative costs	Transport route	Frequency of carriage	Size of freight
4.26	cost of delivery	1	0.27	0.05	0	0	0	0	0
4.18	reliability of supply	0.27	1	0.46	0	0	0	0	0
4.12	company credibility	0.05	0.46	1	0	0	0	0	0
3.93	means of transport used	0	0	0	1	0.22	0.17	0.03	0.01
3.85	level of alternative costs	0	0	0	0.22	1	0.72	0.26	0.16
3.80	transport route	0	0	0	0.17	0.72	1	0.99	0.65
3.77	frequency of carriage	0	0	0	0.03	0.26	0.99	1	0.72
3.76	size of freight	0	0	0	0.01	0.16	0.65	0.72	1

Source: own research.

2009, shows that the most important were: quality of services, prices, then customer service, and reliability of the company.

The importance hierarchy for factors determining the competitiveness level of the company, in the opinion of the designated recipients according to average grade point along with the values of the variable p is given in Table 2. The *p*-values are the result of the Wilcoxon test verifying the null hypothesis of equal importance of different sets of criteria, i.e. the lack of significant differences between the analyzed groups. Test value below 0.05 indicates that the importance of the stated factors differs significantly from each other.

Two importance levels were appointed, on the basis of statistical inference, determining the company competitiveness to the greatest extent among the eight analysed factors. Groups of similarly important factors are as follows:

– cost of delivery, reliability of supply, credibility of company,

– means of transport used, the level of alternative costs, transport route, the frequency of carriage, the size of freight.

An important element of the competitiveness level for enterprises providing services in the field of refrigeration transport is the cost of delivery, so the price level of logistics services offered was evaluated. Figure 1 presents the obtained results.
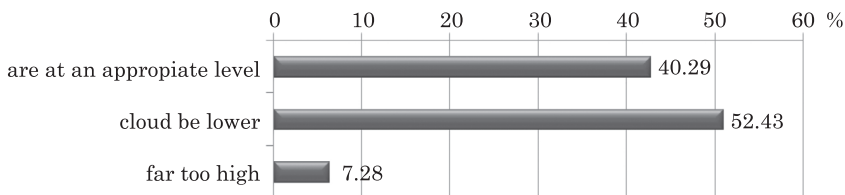

Fig. 1. Sheet of price evaluation for logistic services (% indications)
Source: own research.

More than half of the surveyed enterprises declared that the prices of the logistic services could be lower. However, for more than 40% of respondents prices of offered transport services are at an appropriate level, and for more than 7% the service prices are far too high.

The relationship between the assessment of the price level of the service and the area of the company activity were subject to the statistical analysis. The p coefficient value, resulting from the significance χ^2 test, lower than 0.05 indicates that there is a statistically significant relationship between the area of the company activity, and assessment of the level of service pricing. The results are given in Table 3.

Relationship between the level of pricing and area of activity

Prices	Assessment of the level of pricing in relation to the area of company activity (% indications)			P-value
	production and distribution of food products	shopping malls	grocery stores	
Are at an appropriate level	**36.08**	**47.83**	**60.00**	0.16511
Could be lower	**56.96**	43.48	32.00	
Far too high	**6.96**	8.70	8.00	

Explanation to table 3: underlined values in table mean numbers of assessments by respondents between research variables >10.
Source: own research.

The relationship between the spatial range of the company and the assessment of the logistic service pricing was also examined. The obtained results of analyses are shown in Table 4.

Relationship between the service price level and the spatial range of the company

Prices	Assessment of the transport service pricing in relation to the spatial range of the company (% indication)				P-value
	up to 9	10–49	50–249	more than 250	
Are at an appropriate level	34.78	33.33	**36.96**	**44.86**	**0.00073**
Could be lower	43.48	**66.67**	**54.35**	**49.53**	
Far too high	21.74	0	8.70	5.61	

Explanation to table 4: underlined values in the table mean numbers of assessments by respondents between research variables >10.
Source: own research.

On the basis of statistical analysis it was established that 60% of respondents functioning within specialist grocery stores found the prices of offered transport services to be on the appropriate level. On the other hand, 57% of food producers and distributors assessed that prices could be lower. Moreover, the statistic analysis indicated that the company activity area has no significant bearing on the assessment of pricing of the offered service ($p > 0.05$).

An important aspect of assessing the supply reliability, i.e. the quality factor of competitiveness of enterprises providing services for refrigerated transport, was also information about the opinion of recipient representatives (customers) concerning the level of service quality depending on the type of

cargo. Three main groups of products requiring controlled-temperature transport, such as: food products (fruits and vegetables), food products (meat, fish, eggs, milk and dairy products) and frozen or deep-frozen food products were analyzed. Table 5 shows the level of average ratings (in points) of transport services for the three food groups, where 0 is not satisfactory, 1 – very low, 2 – low, 3 – medium, 4 – high and 5 – very high level of quality of transport.

Table 5

Level of transport service quality depending on the type of cargo [pts.]

Groups of food products	Average evaluation
Food products (fruits and vegetables)	3.80
Food products (meat, fish, eggs, milk and milk products)	3.44
Food products frozen and deep-frozen	3.91

Source: own research.

Table 6

Dependence of the transport service quality level assessment for groups of food products on areas of the company activity

Level of quality for groups of food products		Assessment of quality level of transport service for groups of food transport on areas (% indications)			*P*-value
		production and distribution food products	shopping mall	grocery stores	
Food products (fruits, vegetables)	very low	0	17.39	8.00	**0.00007**
	low	2.53	0	8.00	
	medium	**17.09**	17.39	16.00	
	high	**39.87**	**56.52**	24.00	
	very high	**14.56**	8.70	20.00	
Food products (meat, fish, eggs, milk and milk products)	very low	6.41	0	0	**0.1330**
	low	3.85	19.05	0	
	medium	**14.74**	19.05	34.78	
	high	**18.59**	28.57	17.39	
	very high	**15.38**	19.05	17.39	
Food products frozen and deep-frozen	very low	1.27	0	0	0.32260
	low	2.53	8.70	16.00	
	medium	**17.09**	8.70	16.00	
	high	**39.87**	34.78	32.00	
	very high	**19.62**	26.09	16.00	

Explanation to table 6: underlined values in the table mean numbers of assessments by respondents between research variables >10.
Source: own research.

The research showed that recipient representatives (customers) similarly rated the quality level of logistic services for the three different groups of transported foods.

The dependence of assessment of the transport service quality level for three groups of food products on areas of activity of the company acquiring the services was also analysed. The coefficient p is the result of the significance test χ^2. The value of the coefficient p lower than 0.05 indicates that between the two variables there is a significant statistic correlation. The obtained results are presented in Table 6.

The carried out statistic analysis showed that there exists a relation between evaluating the quality level of transport services for two types of fresh food produce, and the areas of the company activity. However, no correlation was shown between the evaluation of transport service quality for frozen and deep-frozen food products and areas of the company activity.

The study was completed by assessing the impact of cooperation with the service provider on satisfaction of company. The subject of the statistical analysis was assessment of the relationship of positive impact of cooperation with the logistic services company for the refrigerated transport on the satisfaction of the company in relation to the spatial extent of its activity. The obtained results are presented in Table 7.

Table 7

Assessment of the relationship of positive impact of cooperation with the logistic services company for the refrigerated transport assessment on the satisfaction of the company in relation to the spatial extent of its activity

Impact of cooperation	Assessment of impact of cooperation with the transport company on the satisfaction of the company with the spatial extent of its actions (% indications)				P-value
	local	regional	domestic	international	
No significant impact	13.04	6.67	2.17	0.931	
Low impact	8.70	**40.00**	13.04	4.67	
Medium impact	17.39	0	19.57	**20.56**	**0.00001**
High impact	43.48	**40.00**	30.43	**42.06**	
Very high impact	17.39	13.33	**34.78**	**31.78**	

Explanation to table 7: underlined value in the table means numbers of assessments by respondents between researches variables >10.
Source: own research.

On the basis of the statistical analysis, a statistically significant relationship was noticed between the spatial range of the company activities, and the assessment of the positive impact of cooperation with the company providing logistic services for the refrigerated transport on its functioning (*p*-value <0.05). It has been shown, that the broader spatial extent of the company activities, the higher the assessment of the positive impact of cooperation with the company providing logistics services.

Conclusions

In accordance with the stated objective of the study, the order of priority for the factors determining the competitiveness level of the transport company was established, and then their assessment was made. The research showed that the most important factors determining the competitiveness level of the provider are: the cost of delivery, the reliability and credibility of the company. The means of transport used, the level of alternative costs, and frequency of transport, route and size of cargo belong to the second group of importance. It has also been shown that, in the opinion of more than half of recipients, the prices of offered transport services could be lower. Furthermore, the statistical analysis showed that the area of the company operations has no significant effect on the assessment of the transport service pricing. The research showed that recipient representatives (customers) similarly rated the quality level of services in three groups of transported foods. It was also found that there is a statistical relationship between the assessments of the quality of transport services for two groups of freight: food products (fruits, vegetables) and food products (meat, fish, eggs, milk and dairy products) and the areas of the company activity. There has also been shown a significant correlation between the positive impact of cooperation assessment on the company satisfaction, and the quality of the spatial extent of its activity. The broader the spatial range of activity (from local to international), the higher the assessment of the positive impact of cooperation with the service provider.

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