

EVALUATION OF CONDITIONS FOR QUALITY LOGISTIC SERVICES IN THE AREA OF REFRIGERATED TRANSPORT

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ABSTRACT Logistic services are evaluated primarily by measuring customer satisfaction. A satisfaction measurement provides information on the operations of an organization and how effective it is in meeting the customers' needs.

The aim of this paper is an evaluation of the organizational conditions of the customer satisfaction level regarding the quality of logistic services within three groups of transport of food products. In turn, the range of the conducted research involved aspects of organizational conditions, such as: effects of the cooperation with a provider of logistic services in the field of transport of food products and the usefulness of the compulsorily implemented management systems in an enterprise.

The studies were carried out based on a research survey questionnaire addressed to purchasers of logistic services. The study subjects were companies that use services for refrigerated transport. The χ^2 test was used to define the relationship between the effects of the cooperation with a service provider and the spatial range of their activities, the respondents' job seniority and education, as well as to estimate the dependence of the evaluation of usefulness of the compulsorily implemented management systems in a company on the spatial range of their activities.

Introduction

The cold chain is a term applied to food handling and distribution where the product is maintained at suitable conditions all the way from the cooling or freezing process to the point of sale. The transport of cooled produce was one of the first major uses of mechanical refrigeration. Logistics developments have enabled worldwide distribution

of food under temperature-controlled conditions. The temperature of the commodity must be maintained within specified limits (Hundy, 2008).

The food industry uses important quality management tools, mainly the Good Manufacturing Practices (GMP), Manual Good Hygiene Practices (GHP) and Hazard Analysis Critical Control Point (HACCP).

Transporters and/or containers used for transporting foodstuffs must be kept clean and in good condition, in order to protect food from contamination and should, where necessary, be designed and constructed in such a manner as to permit adequate cleaning and disinfection (Zymleraj, Resyli, Kolgeci, Berisha, 2013).

GMP is a system for ensuring that products are consistently produced and controlled according to quality standards. It is designed to minimize the risks involved in any food production that cannot be eliminated through testing the final product (Finke, 2003).

The Hazard Analysis Critical Control Point (HACCP) philosophy was introduced in European Community legislation in 1993 with Council Directive 93/43/EEC on the hygiene of foodstuffs. It specifies that all business operators shall identify any step in their activities which is critical to ensuring food safety and ensure that adequate procedures are identified, implemented, maintained and reviewed on the basis of the HACCP principles (Panisello, 1999).

Table 1 provides a description of management systems for contact with food, which served as the basis for analysis.

Table 1. Identification quality management tools

Quality management tools	Description
GMP (Good Manufacturing Practices)	That part of quality assurance aimed at ensuring that products are consistently manufactured to a quality appropriate to their intended use. It is thus concerned with both manufacturing and quality control procedures (Anon, 1977).
GHP (Good Hygiene Practices)	GHP regulations address issues related to record-keeping, staff training, public hygiene, verification (control) equipment and investigate (revue) the clamor (Zymleraj, Resyli, Kolgeci, Berisha, 2013).
HACCP (Hazard Analysis Critical Control Point)	HACCP is widely recognized in the food industry as a preventive system for managing food safety. The HACCP system identifies critical control points in the production process that are essential to monitor and control products safety. HACCPs preventive focus is seen as more effective than testing a product and then destroying or reworking it (Bata, 2005).

Source: own research.

Literature review

The design and maintenance of vehicles and transportation equipment must be such as to ensure that it does not cause the food that it transports to become unsafe. For example, they must be suitable and adequately cleanable for their intended use and capable of maintaining temperatures necessary for the sanitary transport of food (Guide Refrigerated Transport, 2016).

The aim of the research was to assess the organisational conditions for customer satisfaction with the quality of the logistic services in the transport of various groups of products that require controlled temperature in transport.

The writings on the subject offer a number of definitions interpreting logistic services which essentially differ in the degree of their detail (Golemska, 2010; Kilibarda, 2012). Essentially, a logistic service is an "activity which is intended to satisfy logistic needs of businesses and people" (Dembińska-Cyran, 2005, p. 205).

A logistic service is a response to the customer's needs and expectations and is about delivering the right product, at the right time, at the right price, and with due service quality (Jałowiec, 2010; Wejers, 2012).

What is being accentuated increasingly frequently in the development of logistics is its link with quality management (Gajewska, 2010). Logistic services are evaluated primarily through customers' satisfaction. A comprehensive definition of customer satisfaction in terms of pleasurable fulfilment is given by Oliver (1997): "...Satisfaction is the consumer's fulfilment response. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption – related fulfilment, including levels of under-or overfulfillment..." (Grigoriudis, Siskos, 2010, p. 4).

The level of the customer's satisfaction reflects the degree to which the total product offered by an organisation satisfies the set of the customer's requirements (Hill, 2003). Indeed, the customer's opinion is the key measure of the quality of logistic services (Mentzer, 2001; Xu, 2008). A satisfaction measurement provides information on the organisation's operation and effective satisfaction of the customers' needs. Satisfaction may be interpreted either from the viewpoint of a specific transaction or a collective point (Saura, 2008). What matters a lot is a subjective nature of the customer's perception of a product or a service which largely depends on the customer's individual characteristics and requirements concerning the product or the service (Sikora, 2010).

Material and research methods

The analysis of the research took account of the positive and negative impact of the cooperation with a provider of logistic services in the transport of foods. Also obligatory quality management systems in businesses were analysed, to include: Manual Good Hygiene Practices (GHP), Good Manufacturing Practice (GMP) and Hazard Analysis Critical Control Point (HACCP).

The research was done at the end of 2011 and beginning of 2012, and in 2017, and was quantitative in its nature. The research used a questionnaire which were sent out to 1321 purchasers of logistic services. The respondents were customers using logistic services in refrigerated transport, such as manufacturers and distributors of foods, hypermarkets and groceries. A total of 217 questionnaires were obtained electronically and directly from the respondents.

Results and discussion

The analysis of the organisational conditions started with a presentation of the customers' declarations on the impact of their cooperation with logistic service providers in road transport of foods on their satisfaction with the service quality (Table 2).

Table 2. Evaluation of the impact of cooperation with the company in the field of food products transport

Impact of cooperation with the logistic service provider in the field of food products transport on business satisfaction	Percentage of indications				
	no influence (0 pt.)	little impact (1 pt.)	average impact (2 pt.)	huge impact (3 pt.)	very big impact (4 pt.)
Positive influence	3.2	11.87	15.98	40.64	28.31
Negative influence	24.2	19.63	12.79	19.63	23.74

Source: own research.

According to the declarations of service purchasers, for approx. 69% of them the impact of cooperation with the service provider on their satisfaction was positive, and the impact was evaluated as big and very big. The research also showed a high percentage of customers who saw the impact of their cooperation with logistic service providers on their satisfaction as negative (more than 43%). This suggests that nearly half of the respondents are dissatisfied with the fulfilment by providers of logistic services in food product transport of the agreed terms and conditions of contract or the results of their mutual cooperation, and hence conflicts arise between the parties.

The statistical analysis covered the dependence between analysed variables (Table 3). The indicator p is the result of the significance test χ^2 . The p figure below 0.05 means that there is a statistically significant dependence between the variables under analysis.

Table 3. Dependence evaluation of the impact of cooperation with the company in the field of food products transport on the spatial range of their business activities

Impact of the cooperation		Evaluation of impact of cooperation				P-value
		local	regional	nationwide	internationalal	
Positive	no influence	42.86	28.57	14.29	14.29	0.00004
	little impact	11.54	<u>46.15</u>	23.08	19.23	
	average	11.43	0.00	25.71	<u>62.86</u>	
	huge	11.24	<u>15.73</u>	<u>17.98</u>	<u>55.06</u>	
	very big impact	6.45	9.68	<u>29.03</u>	54.84	
Negative	no influence	18.87	7.55	16.98	<u>56.60</u>	0.00893
	little impact	6.98	<u>27.91</u>	13.95	<u>51.16</u>	
	average	7.14	14.29	<u>39.29</u>	<u>39.29</u>	
	huge	0.00	13.95	23.26	<u>62.79</u>	
	very big impact	17.31	15.38	<u>26.92</u>	<u>40.38</u>	

Explanation: underlined value means numbers of evaluation >10.

Source: own research.

Both in the case of a positive and negative impact of the cooperation with the provider the value of the indicator was $p < 0.05$. It was demonstrated that the wider the spatial reach of the provider's operations, the greater the positive impact of the cooperation with the logistic provider. However, the dependence between the spatial reach of the provider's operations and a negative impact of the cooperation on the company's activities cannot be clearly defined which is evidenced by the varied ranks.

The statistical analysis also covered the dependence between the respondent's seniority and the evaluation of the relationship with the provider (Table 4).

A significant dependence was demonstrated between the respondents' seniority and the evaluation of a positive and negative impact of the cooperation with the logistic provider on the functioning of the company ($p < 0.05$). The higher the seniority the higher the evaluation of the impact of the relationship with the logistic service provider. It seems that more experienced employees are capable of more analytic evaluation of the mutual relationship with the service provider.

Table 4. Dependence of the evaluation of the impact of cooperation with a logistic service provider in the field of food products transport on job seniority

Impact of cooperation	Evaluation of impact (%)				P-value	
	from 0 to 3 years	over 3 to 6 years	over 6 to 9 years	more		
Positive	no influence	0.00	66.67	0.00	33.33	0.0252
	little impact	30.77	19.23	7.69	<u>42.31</u>	
	average	20.00	<u>34.29</u>	11.43	<u>34.29</u>	
	huge	<u>35.96</u>	<u>14.61</u>	<u>12.36</u>	<u>37.08</u>	
	very big impact	48.39	<u>19.35</u>	12.90	<u>19.35</u>	
Negative	no influence	<u>28.30</u>	18.87	9.43	<u>43.40</u>	0.0190
	little impact	<u>28.57</u>	<u>33.33</u>	9.52	<u>28.57</u>	
	average	<u>57.14</u>	14.29	7.14	21.43	
	huge	<u>34.88</u>	<u>27.91</u>	18.60	18.60	
	very big impact	<u>36.54</u>	11.54	11.54	<u>40.38</u>	

Explanation: underlined value means numbers of evaluation >10.

Source: own research.

The dependence was also studied between the respondents' education and the impact of the cooperation with the provider of logistic services in the transport of food products. The value of p is the result of the significance test χ^2 (Table 5).

Table 5. Dependence of the evaluation of the impact of cooperation with the company in the field of food products transport on the respondent's education

The impact of cooperation	Evaluation of impact (%)				P-value	
	vocational	secondary	Bachelor's degree	higher education		
Positive	no influence	0.00	14.29	0.00	85.71	0.0070
	little impact	0.00	7.69	7.69	<u>84.62</u>	
	average	11.43	17.14	17.14	<u>54.29</u>	
	huge	2.25	<u>24.72</u>	<u>15.73</u>	<u>57.30</u>	
	very big impact	3.23	16.13	<u>33.87</u>	<u>46.77</u>	
Negative	no influence	7.55	18.87	<u>20.75</u>	<u>52.83</u>	0.0040
	little impact	0.00	18.60	4.65	<u>76.74</u>	
	average	7.14	0.00	25.00	<u>67.86</u>	
	huge	0.00	18.60	18.60	<u>62.79</u>	
	very big impact	3.85	<u>28.85</u>	<u>28.85</u>	<u>38.46</u>	

Explanation: underlined value means numbers of evaluation >10.

Source: own research.

The statistical analysis demonstrated that there is a significant dependence between the analysed variables ($p < 0.05$). It was noted that the higher the employees' education the higher their evaluation of the impact of the cooperation with the service provider on their company's satisfaction. It was also demonstrated that the higher the employees' education the higher their evaluation of the negative impact of the relationship with the logistic provider

on the satisfaction. The above dependencies are correct because employees with higher education have the relevant knowledge and higher awareness and hence are more capable of evaluating the impact of the cooperation between the customer and the service provider.

The respondents' opinions were also used to evaluate the usefulness of the obligatory management systems implemented with the service providers (Table 6).

Table 6. Evaluation of the usefulness of the implemented management systems

Management systems	Percentage of indications				
	very little usefulness (1 pt.)	little usefulness (2 pt.)	average usefulness (3 pt.)	high usefulness (4 pt.)	very high usefulness (5 pt.)
GHP	5.09	11.11	22.69	37.96	23.15
HACCP	8.29	10.60	18.89	32.72	29.49
GMP	11.11	15.28	29.17	26.39	18.06

Explanation: Due to the fact that respondents did not provide an answer the attempt is: for GHP and GMP, N = 216, for HACCP N = 217.

Source: own research.

Nearly 62% of the respondents found the GHP and the HACCP useful and very useful. For more than 44% of the respondents, the implementation in a transport company of the GHP was considered useful and very useful. It is to be noted further that none of the respondents mentioned uselessness of the implementation of any of the systems under analysis for the purposes of service quality improvement.

The statistical analysis covered the dependence of the evaluation of the management systems that were implemented on the spatial reach of the service purchasers' activities. The value p is the result of the significance test χ^2 (Table 7).

Table 7. Dependence evaluation of the usefulness of GHP and HACCP on the spatial range of business activities (logistic purchasers)

Level of usefulness of systems	Evaluation of usefulness (in %)				P-value	
	local	regional	nationwide	international		
GHP	no influence	9.09	18.18	36.36	36.36	0.95191
	little impact	12.50	16.67	20.86	<u>50.00</u>	
	average	8.16	16.33	20.41	<u>55.10</u>	
	huge	<u>14.63</u>	<u>17.07</u>	<u>19.51</u>	<u>48.78</u>	
	very big impact	8.00	12.00	<u>28.00</u>	<u>52.00</u>	
HACCP	no influence	5.56	44.44	5.56	44.44	0.00355
	little impact	13.04	8.70	26.09	<u>52.17</u>	
	average	9.76	<u>29.27</u>	21.95	<u>39.02</u>	
	huge	<u>16.90</u>	11.27	<u>23.94</u>	<u>47.89</u>	
	very big impact	6.25	6.25	<u>26.56</u>	<u>60.94</u>	

Explanation: underlined value means numbers of evaluation >10.

Source: own research.

The statistical analysis demonstrated no impact of the spatial reach of the company's activities on the evaluation of the usefulness of the Good Hygienic Practices implemented with the company (service provider). The values of p were, in the analyses cases, above 0.05. What was demonstrated, however, was a dependence of the evaluations of the usefulness of the implementation of the HACCP system on the reach of the customer's activity. It was found that the greater the spatial reach of the company's operations the higher the evaluation of implementation of the GHP (Manual Good Hygiene Practices) and the HACCP system.

Conclusions

In conclusion to the analysis, it is to be noted that approx. 69% of the respondents consider the impact of the cooperation with the service provider on the functioning of the company and its satisfaction as positive. A significant dependence was demonstrated of the impact of the cooperation on the satisfaction with the service quality on the spatial reach of the service purchaser's operations. The wider the spatial scope of activities (from local to international), the higher the evaluation of the positive impact of the relationship with the service provider. Further, a correspondence was identified between the evaluations of a positive impact and the respondents' seniority and education. As regards the usefulness of the obligatory management systems to be introduced by service providers, concerning the Good Hygiene Practices and the HACCP system, the respondents mentioned their usefulness at the level of above 3.5 points (that is between average and high usefulness). Hence, none of the management systems introduced obligatorily in service providers which were analysed obtained an average of high usefulness. What was demonstrated, in the other hand, was a significant dependence of the evaluations of the usefulness of the implementation of the HACCP system with the provider on the spatial reach of the purchaser of logistic services in the area of food product transport.

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