ORIGINAL PAPER

HOW TO ACHIEVE CUSTOMER SATISFACTION? PERSPECTIVE OF LOGISTICS OUTSOURCING PERFORMANCE

Marcin Świtała[1], Marzenna Cichosz[2], Joanna Trzęsiok[1]

1) University of Economics in Katowice, Katowice, **Poland**, 2) SGH Warsaw School of Economics, Warsaw, **Poland**

ABSTRACT. **Background:** The inspiration to undertake research in the field of logistics customer service was formed by the strong relationship between service performance and customer satisfaction, observed within a study of the needs of logistics service providers' (LSPs) customers. The paper aims to understand which elements of service performance are important to customers purchasing logistics services in Poland and are worth investing in by LSPs.

Methods: The study was conducted among 112 production and trade enterprises – customers of LSPs selected in a targeted manner. A questionnaire method was used. Based on the respondents' answers, a model was built in the form of a classification tree with customer satisfaction as a response variable and features of service performance as predictors.

Results: The results show that two main characteristics affect customer satisfaction levels, namely logistics costs and shorter delivery times. According to the respondents, improving the level of customer service and increasing flexibility turned out to be less significant. However, the discriminant analysis has shown that high satisfaction with logistics outsourcing can also be achieved with the assumption of longer delivery.

Conclusions: In order to stand out in the logistics services market, LSPs should not only invest in reducing costs and improving service times, but also in factors that will cause above-average customer satisfaction, like improved operational flexibility and service levels, including pro-environmental activities.

Key words: performance, satisfaction, service quality, Kano's model, logistics service providers (LSPs), sustainability, classification tree.

INTRODUCTION

Observing modern supply chains (especially within e-commerce), it can be seen that a high level of customer service within logistics has become the standard [Saghiri et al. 2018]. Customers expect fast deliveries [DP DHL 2018], flexibility [Świtała et al. 2018, Hartmann et al. 2011, Zhang et al. 2005] and customized solutions [Hu et al. 2016]. Daugherty et al. [2018] define the phenomenon of fast-growing customer expectations as customer impatience. It mainly concerns the B2C market (Business-to-Consumer), but it also affects institutional customers on the B2B market (Business-to-Business). Among the reasons for this, there are social changes – on the demand side –hyper-competition of logistics service providers (LSPs) and a huge rate of technological progress – on the supply side – most often indicated [Langley 2018, Cichosz 2018a]. Considering the above, Daugherty et al. [2018] call for reawakening logistics customer service research, which will allow for providing suggestions to LSPs regarding the main directions of their operations' improvement.

This article responds to this need. It presents the results of the study aimed at identifying and assessing the impact of the complex category of logistics outsourcing performance on customer satisfaction. This objective was achieved thanks to the application of a discriminant analysis. A model

was built in the form of a classification tree with customer satisfaction as a response variable and features of service performance (i.e. reduction of logistics costs, shortened delivery times, improvement of the customer service level and increased flexibility of customer service) as predictors.

The article consists of three parts. The first part (theoretical) presents key matters for the undertaken subject referring to LSPs, service performance, customer satisfaction and the Kano model discussing dependencies between service performance and customer satisfaction; the second part discusses the primary study methodology and characterizes the study sample; while the third part (empirical) analyzes the results of the study and principles which lead to high and very high customer satisfaction. The summary covers the most important conclusions, study limitations and directions for further studies.

THEORETICAL BACKGROUND

Changes in the market of logistics services

Since the 1990s, the use and significance of logistics outsourcing has increased. Along with this, the number of entities providing logistics services and the range of services offered has also increased [Salakivi et al. 2018, Langley 2018]. Today, according to researchers investigating the logistics services market, it is still at the stage of shaping and change [Świtała 2012, Kawa 2017, Salakivi et al. 2018]. The main players are: transport and forwarding companies, LSPs, CEP (courier, express and postal) operators, railway operators, air operators, maritime shipowners, inland waterway companies and terminal operators. With the development of technology, new entities outside the logistics industry have started fighting for logistics customers. Among them there are: (i) technology companies from the retail industry, e.g. Amazon, (ii) electronic platform operators, including operators offering logistics services in the crowd logistics model, e.g. UberCARGO, Stowga, or (iii) car manufacturers who invest in a fleet of vehicles to offer transport services in the sharing economy model, e.g. Daimler, BMW. Thus,

the modern logistics service market is characterized by intense rivalry, often referred to as hyper-competition [Cichosz 2018a].

Studies prove that entities who are able to offer customers value (i.e. to provide a service that will meet or even exceed their expectations in a more cost-effective manner) will win the battle for logistics customers in the long-term perspective [Deepen 2007, Marchet et al. 2017]. As proved by Stank et al. [2003], Deepen et al. [2008] and Świtała et al. [2018] logistics service performance is a key category in building customer satisfaction with logistics outsourcing.

Logistics outsourcing performance

Logistics performance is a complex term. It can be perceived from two perspectives: performance of logistics operations carried out within an enterprise (in-house logistics performance) and performance of outsourced operations (logistics outsourcing performance). In this study, the outsourcing perspective was assumed as the basis for the investigation. This results from the fact that, as observed by Borgstrom et al. [2017], there is no clarity how customers with various needs assess logistics service performance elements, or how they decide on cooperating with a logistics service provider.

In this study logistics service performance is defined in accordance with Fugate et al. [2010] and Świtała et al. [2018] as: effectiveness and efficiency in performing logistics activities and building logistics differentiation. Operationalizing the term of logistics outsourcing performance, most often researchers refer to a three-dimensional scale proposed by Stank et al. [2003] including: operational performance, relational performance and cost performance, or the Knemeyer and Murphy multi-element scale [2004] divided into: operations performance, channel performance and asset reduction performance. For this research we adapted the Knemeyer and Murphy scale [2004] using four elements i.e. reduction of logistics costs, shortened delivery times, improvement in customer service, and increasing customers' flexibility.

Analyzing the relationship between service performance and customer satisfaction, the Deepen et al. [2008] study should be mentioned. They proved that customers of LSPs recognize the difference between the implementation of the objectives agreed under the contract and performance that exceeds the goals assumed. Their study demonstrated that while goal achievement leads to satisfaction, unexpected, above-average services exceeding the contract terms might result in customer loyalty and translate into additional profits for the company.
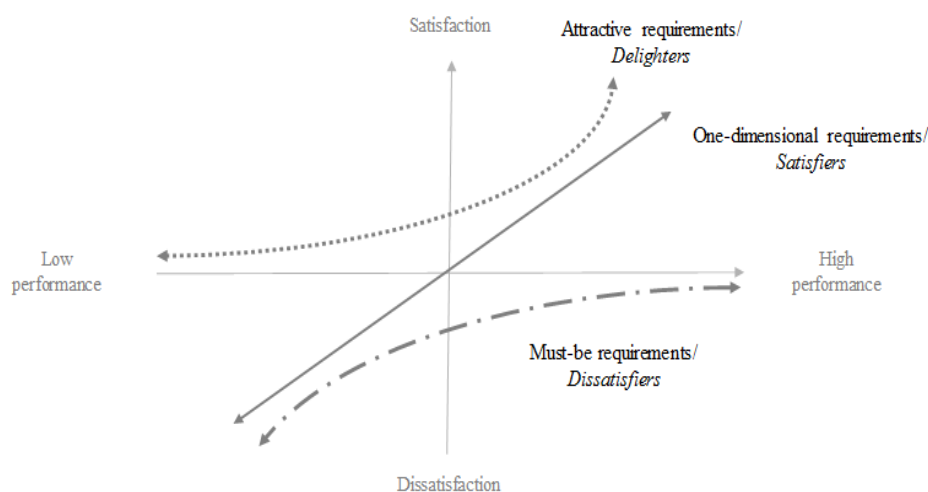
Customer satisfaction

Customer satisfaction is one of the outcomes of service performance offered by LSPs [Cichosz et al. 2017]. It appears as a result of the fulfillment of customers' expectations. It may concern a single transaction or result from an experience during the entire period of cooperation between the LSP and the customer [Stank et al.2003] and in this situation it can be referred as cumulative satisfaction [Zhang et al. 2005]. In the instance when logistics outsourcing fails to fulfill customers' expectations, dissatisfaction might appear and result in losing a customer. Understanding the fact that in a competitive market with freedom of choice in LSPs, satisfaction constitutes to be a mandatory (however insufficient) condition to continue cooperation, so LSPs carry out studies on levels of customer satisfaction.

In this study, customer satisfaction is interpreted, in accordance with Cichosz et al. [2017] and Świtała et al. [2018] as being related to a customer's experience against his/her expectations regarding the level of long-term logistics servicing, as well as other aspects of cooperation with an LSP. Cooperation takes place at subsequent stages, such as: (i) pre-transaction service, when companies conclude a contract and set rules for cooperation, (ii) transaction service, which is related to the provision of logistics services to customers and (iii) post-transaction service, which may, for example, relate to situations associated with the repair of possible service errors.

Kano Model – the relationship between service performance and customer satisfaction

Initially, the dependence between service performance and customer satisfaction was perceived to be linear, i.e. the increase/decrease in service quality causes a proportional increase/decrease in customer satisfaction. However, Kano [Shen et al. 2000] noticed that customers have different types of needs that constitute the quality of their service (logistics outsourcing performance).

Source: Shen et al. 2000

Fig. 1. Kano Model – diversity of the customer satisfaction level

A different level in fulfillment of these needs results in a different level of satisfaction. Kano distinguished three types of needs (Figure 1):

− Must-have requirements – satisfying these needs is necessary to achieve customer satisfaction; an example of such a need in terms of logistics service is the security of the cargo; if the LSP fails in the matter of cargo security, the customer will be extremely dissatisfied, but if the LSP ensures security, the customer will not be dissatisfied; it is therefore a necessary condition; however, it is insufficient to obtain complete customer satisfaction;

− One-dimensional requirements – in relation to these needs, satisfaction will be directly proportional to their implementation, i.e. a higher quality will result in a higher level of satisfaction; these are usually needs explicitly identified by the customer as part of negotiations, like deliveries within a certain time windows or a specified delivery cost;

− Attractive requirements – cause above-average customer satisfaction; as a rule, they have not been clearly named by the customer and their fulfillment is a pleasant surprise for the customer, which leads to delight; failure to meet these needs does not cause dissatisfaction; an example of such a need may be continuous improvement in the level of customer service.

RESEARCH MATERIAL AND METHODS

The studies on which this article is based were conducted among production and trade enterprises representing the main participants of the supply chain. In total, 112 entities selected purposefully constituted subjects of the study. Invitations to participate in the study were sent to respondents using logistics services operating on the national market and employing at least ten employees. Participants of the study completed an online survey.

The questionnaire consisted of two parts. The first part involved scales used to measure service performance and customer satisfaction. The first measurement was made on a multi-item scale by Knemeyer and Murphy [2004], from which four criteria referring to benefits obtained by customers entrusting logistics to specialized service providers (LSPs) were selected, so at the same time we speak about reduction of logistics costs (P_1), shortening of delivery times (P_2), improvement of the level of service for customers (P_3) and increased flexibility (P_4). In terms of the measurement of satisfaction, statements on the scale referred to both general satisfaction arising from cooperation with LSPs (S_1) and the level of satisfaction with the course of service at the pre-transaction (S_2), transaction (S_3) and post-transaction (S_4) stage. It is worth mentioning that when developing the scale, an important point of reference involved studies conducted by Large et al. [2011]. In the case of both variables, seven-degree ordinal scales were used. The second part of the questionnaire consisted of numerical questions containing quotient and nominal ratios that were used to characterize respondents.

In accordance with the suggestion of Henseler et al. [2016], the reliability analysis of both scales was carried out using Cronbach's α and Dillon-Goldstein's ρ. The obtained results are presented in Table 1 from which it can be concluded that in both cases, the variables are characterized by high measurement reliability.

Table 1. Evaluation of the performance and satisfaction measurement reliability

Variable	Cronbach α (α > 0.7)	Dillon-Goldstein ρ (ρ > 0.7)
Performance	0.847	0.897
Satisfaction	0.917	0.942

Source: own work

The study sample consisted of production enterprises in 40%, and trade enterprises in 60%. Due to the origin of their capital, the largest segment consisted of companies with domestic capital (76.6%). Foreign capital was indicated by 9.0% of the respondents, and mixed capital - 14.4%. Companies from the SME sector (81.4%) and running business activities on the national or regional (68.2%) market dominated in the study, while the participation of enterprises employing more than 250 employees and operating at an

international scale was 18.8% and 31.8% respectively. Responses were given mostly by medium and senior level employees, who at the time of the study were employed as managers of the logistics, production and sales departments. As mentioned before, all respondents outsourced logistics services, of which 51% of the respondents used contract logistics services. Most respondents (68%) also declared a long period of cooperation with LSPs, most often lasting several years.

The research material was subject to statistical analysis using the SPSS package and the R software. For the needs of the research objective, a discriminant analysis was performed. To build the model, the recursive partitioning method (so-called classification trees) was used. In the studied dataset, customer satisfaction was expressed through

four variables which correspond to the S1–S4 scales. Using values of these features (i.e. respondents' responses),

a SAT aggregated variable was built:

$$(1) \qquad SAT = \frac{1}{4} \sum_{j=1}^{4} S_j.$$

This variable was subjected to the standardization process using a ten-element stern scale. The distribution of the scale presenting satisfaction after discretization and conversion to a five-point scale is presented in Figure 2. Results from the range: 1-2 sten are considered very low, 3-4 – low, 5-6 sten are considered average, 7-8 – high, and 9-10 – very high.
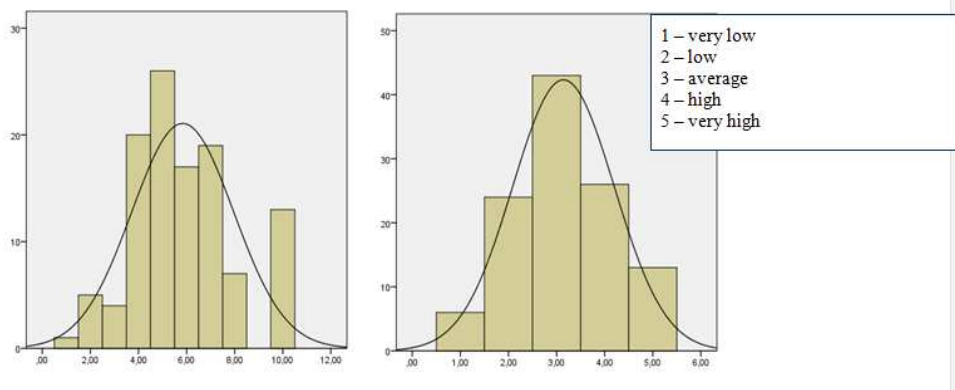
Source: own work

Fig. 2. Distribution of the satisfaction level after applying the standardization procedure

The only variable (SAT) reshaped and categorized in such a manner represents customer satisfaction and fulfills the role of a dependent variable in the created classification model. While, the P_1–P_4 scales are predictors, related to questions about service performance.

Due to the poor scale of the SAT variable measurement, a discriminant analysis was used for the study, and in this case - classification trees (or a recursive partitioning method). This method does not assume knowledge of the distribution of the studied predictors, and what

is more – they may be measured on weak and strong scales. Moreover, it can deal well with the problem of nonresponses and it is resistant to the outliers. All this causes that it has a significantly broader potential area of applications than e.g. Fischer's classical discriminant analysis [Breiman et al. 1984].

To assess the importance of variables P1–P4 within the final model, the values of dedicated measure were computed. These values are located in the interval [0,1] and allow to create a ranking of predictors with increasing explanatory power [Ishwaran 2007].

The classification error for the model is 26.8%, which means that the satisfaction level of the respondent obtained from the model differs from the real, observed satisfaction level in 26.8% of cases (the predictions of the model are accurate in 73.2%).

RESEARCH RESULTS

Logistics service satisfaction level

The average value of the satisfaction index for the whole group was 3.14 and was slightly above the center of the scale, which indicates the average level of satisfaction of the respondents with logistics services. The results presented in Table 2 indicate that almost 30% of the respondents gave low or very low ratings, 38% reported satisfaction at a average level, while high and very high results were observed in 34% of the respondents.

From the data analysis, it can be concluded that the group of customers with low and very low satisfaction (dissatisfied customers) consisted mainly of small trade companies with a rather limited reach of operations, as it concerned nearly exclusively the regional or national market. Logistics service in their case had a rather narrow nature. Cooperation was usually carried out without a permanent contract and it concerned a small number of services outsourced to one entity.

Table 2. Customer satisfaction level

Scale	$\overline{x}$	σ	Satisfaction level in %				
			Very low [1]	Low [2]	Average [3]	High [4]	Very high [5]
Customer satisfaction	3.14	1.06	5.45	21.82	38.18	23.64	10.91

Source: own work

Preferences of the respondents qualified to a group with high and very high satisfaction are different in this context. In this case, the most common form of cooperation was contract logistics. More than 70% of the respondents declared the use of such a logistics offer. What is more, in comparison to dissatisfied customers, this group is characterized by a much longer period of cooperation with LSPs, usually lasting four or more years (dissatisfied customers indicated several months to one year). The number of LSPs outsourced to handle cargo was also larger.

As expected, in the group of customers with a high or very high level of satisfaction, the participation of both production enterprises as well as enterprises conducting international operations was larger. An employment level above 100 people was declared by more than 54% of the respondents, including 23% that indicated employment in a large company, i.e. employing more than 250 people.

The impact of service performance on customer satisfaction

In this part of the article the results of the studies the objective of which was to identify and assess rules ensuring customer satisfaction were presented. The function of predictors was fulfilled by four features of service performance. The classification tree obtained in the analysis is presented in Figure 3. As we can see, the tree consists of 18 nodes (classification rules) of which six lead to high (4) or very high (5) satisfaction, 5 – to satisfaction at an average level (3), and in the case of seven rules low (2) or very low (1) satisfaction was observed.

Delivery time (P_2) is a variable based on which the first partitioning of the tree into two – as it turns out – equal branches in terms of numbers was made. The right part of the tree consists of respondents declaring benefits in the form of faster deliveries ($P_2 \geq 5.5$), while on the left side more diverse opinions on the

subject were noted ($P_2 < 5.5$). 46% were "rather yes", 29% - "hard to tell", and 25% of the respondents denied that deliveries were shortened as a result of operations carried out by LSPs. Analyzing the partitioning of the left part of the tree, we can see that negative opinions of the respondents about delivery times ($P_2 < 3.5$) constitute the main part of the principle leading to low or very low satisfaction with logistics services.
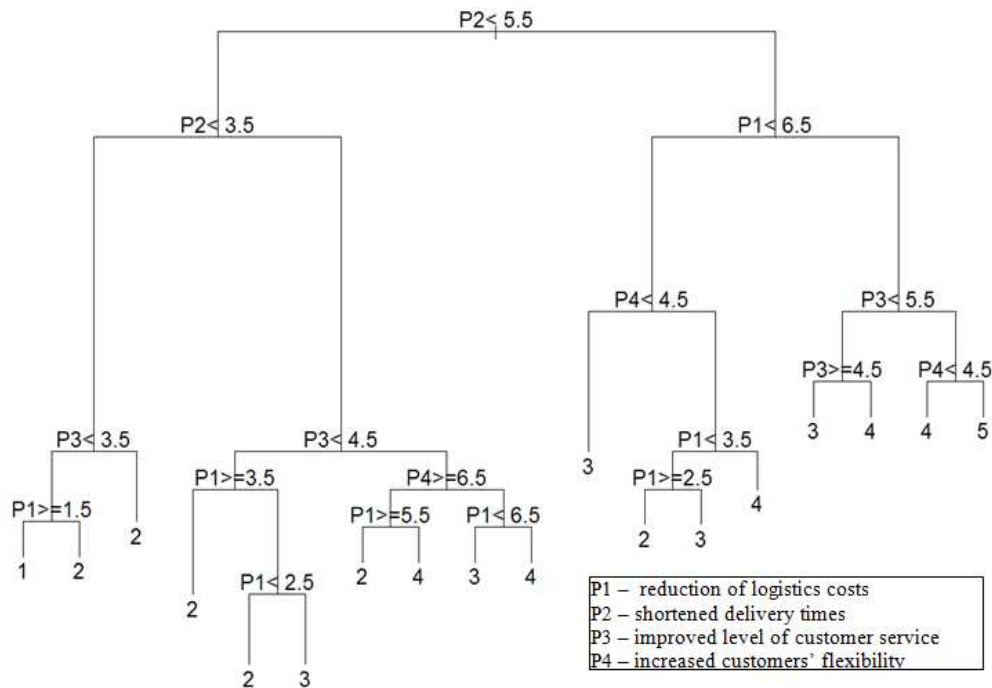
Source: own work

Fig. 3. Satisfaction/dissatisfaction model in the form of a classification tree

It is worth highlighting that only in one case (on the right side of the tree) a very high satisfaction level was achieved (5). It turns out that very satisfied customers are respondents who express a strong belief about benefits resulting from cooperation with LSPs. According to the respondents the service provided led to the shortening of delivery times ('yes" and "definitely yes" for P_2), contributed to the reduction of costs ("definitely yes" for P_1), improved service of subsequent links in the supply chain ("yes" and "definitely yes" for P_3) and led to improved flexibility ("rather yes", "yes", "definitely yes" for P_4). As shown in the results of the studies, a strong belief of the respondents concerning measurable benefits in the form of cost reduction constitutes the key condition of very high satisfaction.

Among customers characterized by high satisfaction (4), five classification rules were identified. In each case, the achievement of satisfaction required the fulfillment of numerous conditions of service performance improvement, although not always in relation to all features included in the study. Considering the right side of the tree, we can see two fundamental differences between customers with high and very high satisfaction levels. It concerns benefits in the form of improvement in the level of their own customer service (P_3), as well as increased flexibility of operations (P_4). Whereas in the group compared in both cases, only positive assessments were made, i.e. confirming the improvement of results in the studied service performance areas, in the second group greater polarization of related assessments was observed. Considering P_4, customers' responses indicate the lack of positive effects of service (neutral responses, such as "neither yes or no" and "rather not", "no", "definitely no" were recorded), while in the case of P_3,

there were positive responses; however, they were not strong judgments (responses such as "rather yes" were observed). Hence, it can be assumed that in the discussed matter opinions of the groups differ significantly. What is important, in both groups benefits in the form of the reduction of logistics costs and shortening of delivery times constitute the sine qua non condition for satisfaction to be ensured.

In comparison to this, the classification rules of the left side of the tree seem interesting, as in this case it can be noticed that shorter delivery times do not constitute a mandatory condition for a high level of satisfaction to be achieved (4). From the interpretation of the figure it can be concluded that it is possible with the combined fulfillment of the following conditions: first of all, improvement of delivery times will be assessed rather positively ("rather yes") or neutrally ("neither yes or no"); second of all, respondents will assess the improvement of service of the subsequent links of the supply chain positively ("yes" and "definitely yes") or neutrally ("neither yes or no"); third of all – which seems to be the most important – other benefits will be assessed definitely positively. In other words, the respondents will be convinced that thanks to the cooperation with LSPs logistics costs were reduced and the company's ability to respond to changes occurring on the market increased. What is more, it may be assumed that positive results of P_1 and P_4 service constitute sufficient compensation for the respondents for – as it seems – not fully met expectations in relation to P_2 and P_3.

Figure 4 presents the ranking of the significance of predictors. The results of the study demonstrate that mainly two features decide about the customer satisfaction levels, i.e. lower logistics costs (P_1) and shorter delivery times (P_2). P3 (improvement of the customer service level) turned out to be less significant, i.e. with a more limited impact, while P_4 (increased flexibility) was considered the least significant feature the force of impact on the form of the model of which – in comparison to P_1 and P_2 – was twice as low.
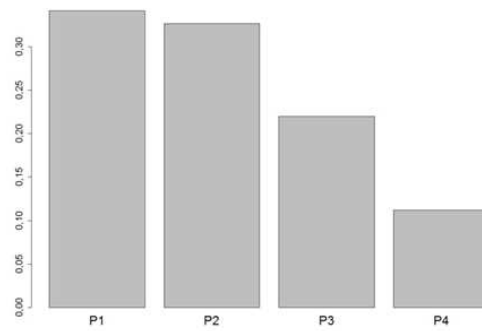
Source: own work

Fig. 4. Ranking of predictors with increasing explanatory power

DISCUSSION AND CONCLUSIONS

The studies confirmed a strong relationship between service performance and customer satisfaction in the logistics industry and allowed for the identification of key performance criteria, which decide the satisfaction level of customers purchasing logistics services in Poland.

Theoretical implications

Within the study, a discriminant analysis was performed in the field of data exploration. Based on the recursive partitioning method, a classification tree was built which shows various combinations of service performance elements (i.e. reduction of logistics costs, shortened delivery time, improved customer service levels and increased flexibility of customer service) ensuring various levels of customer satisfaction with logistics services (from 1 – very low, to 5 – very high). The tree presents various paths to achieve a high (4) and very high (5) level of customer satisfaction by managing particular elements of service performance. The use of the classification tree for the analysis of key factors of logistics service performance is an innovative approach in the area of logistics and supply chain management, which constitutes an input into studies conducted in this field.

Managerial implications

Among the benefits for business practice, it is worth listing several facets. Firstly, the study's results indicate that services provided by LSPs constitute an area that requires further improvement. The obtained results prove that for 18 analyzed classification rules only in one case the highest level of customer satisfaction, arising from the improvement of logistics performance, was observed. What is important, the declaration about very high service satisfaction was made only by 10.91% of the respondents. It can be assumed that in other cases the respondents' requirements were not completely fulfilled, which may suggest that in the Polish market of logistics services there is still a gap to be filled.

Additionally, the study showed that LSPs could achieve a higher level of customer satisfaction from logistics service performance within long-term cooperation (70% of satisfied and very satisfied customers cooperated with LSPs for more than four years within contract logistics). From signing a several-year-long contract, an LSP is able to become more familiar with their customers' expectations and adjust their system of providing services to meet the needs of each customer. Long-term cooperation is essential, in particular in the case of incurring high investment expenditures on additional potential (i.e. equipment, human resources), modern technologies dedicated to a given customer (i.e. IT system supporting warehouse operations, transport planning systems, autonomous vehicles, inclusion of robots, co-robots, drones in the service, artificial intelligence application at various stages of the service process, etc.) or a complex adjustment of processes to meet customers' individual requirements. Basically, long-term cooperation between LSPs and customers is associated with better communication between them, including more trust, as well as sharing risks and benefits [Deepen et al. 2008], thanks to which LSPs can reduce the cost of logistics service and improve the ability to respond and be flexible to changes in the environment, which subsequently allows both companies to achieve better results.

The third observation arising from the analysis of the study's results indicates the significant role of the reduction of costs and service times in the achievement of customer satisfaction with logistics outsourcing. These results are not surprising. It is rather obvious that customers of LSPs want to pay less and be serviced faster in such a competitive market. However, it is worth noticing that the criteria will not ensure companies above-average customer satisfaction. They belong to the category responding to one-dimensional needs, which means that satisfaction arising from their improvement is directly proportional to their change. If LSPs wish to achieve above-average satisfaction that will lead to long-term relationships and customer loyalty, and build logistics diversity and a competitive advantage of the operator at the same time, LPSs should pay attention to constant (preferably proactive) improvement of cooperation with customers [Wallenburg 2009] and building skills to respond to external problems that may occur in the changing environment.

More interesting takeaways for logistics managers arising from these studies are provided by the analysis of service performance criteria for a large group of customers on the left side of the classification tree, for which shorter delivery times do not constitute a mandatory condition to achieve high satisfaction (4). It is possible assuming: (i) rather positive or neutral improvement of delivery times, (ii) rather positive or neutral improvement of customer service, (iii) definitely positive assessment of cost reduction and (iv) improvement of flexibility. These results are confirmed among others by the increasing popularity of the sustainable logistics environment policy of LSPs in recent years [Evangelista et al. 2018]. Here, it is worth convincing LSPs to offer customers a sustainable transport environment, and in particular to encourage an increase in the use of multimodal transportation (carried out using at least two modes of transport), which is implemented using environmentally-friendly modes of transport over a substantial part of the route. Such transport is promoted by the European Union [COM 2011]. Although it takes longer, it is cheaper and more ecologically sustainable, which as indicated by the studies, could be accepted by customers.

A particular variety of multimodal transportation is synchromodal transport, which is currently gaining popularity [Pleszko 2012]. It constitutes a higher level of cooperation between the shipper and the LSP under the conditions of integrated transport, as well as the information and communication infrastructure. The service is contracted without specifying a particular mode, mean and route of transport. Therefore, the operators can freely select an optimal solution, and in the case of unexpected situations – have the flexibility dynamically respond to a given problem. The main attributes of synchromodal transport include its price, flexibility and high level of complex logistics service. However, customers must accept a longer transport time in comparison to road door-to-door transport [Cichosz 2018b].

Limitations and future studies

It should be emphasized that discriminant analysis has its limitations. In this study, the classification error is 26.7%. This means that nearly 27% of the respondents were classified into the wrong class in terms of the SAT variable. Hence, we need to be careful about interpreting the results. Although it is possible to build a classification tree with a smaller classification error, it would mean increasing the model complexity, and consequently, a certain loss of interpretability. A more complex tree will generate many more classification rules describing various levels of customer satisfaction.

An additional limitation of this study might be the size of the study sample. Within future studies, it would be worth analyzing the impact of service performance on customer satisfaction with logistics services by using a larger sample. It would be particularly interesting to study the cooperation of logistics operators, including CEP operators, with e-commerce customers. With the growing popularity of omnichanneling (i.e. integration of various delivery channels in order to create unified customer experience), it is worth verifying which aspects of logistics service performance become the deciding factors to achieve customer satisfaction with logistics services.

ACKNOWLEDGMENTS AND FUNDING SOURCE DECLARATION

REFERENCES

Borgström B., Gammelgaard B., Wieland A., 2017. Strategic themes in the haulier business: a systematic literature review of road freight transport. Proceedings of the 29th Annual Nordic Logistics Research Network Conference. Available from Internet: http://muep.mau.se/bitstream/handle/2043/24234/Borgstroem_Gammelgaard_Wieland_nofoma2017.pdf?sequence=2&isAllowed=y .

Breiman L., Friedman J.H., Olshen R.A., Stone C.J., 1984. Classification and Regression Trees, Chapman & Hall, Nowy Jork.

Cichosz M., 2018a. Otwarte innowacje: technologiczne partnerstwa w branży usług logistycznych [Open innovations: technological partnerships within logistics outsourcing industry], Gospodarka Materiałowa i Logistyka, 4, 12-22. http://www.gmil.pl/archiwum/gospodarka_materialowa_i,p1195912378

Cichosz M., 2018b. Synchromodality-as-a-service – innowacyjny model transportu towarów [Synchromodality-as-a-service – innovative freight transport business model], ZN Studia i Prace Kolegium Zarządzania i Finansów, Oficyna Wydawnicza SGH, 169.

Cichosz M., Goldsby T.J., Knemeyer A.M., Taylor D.F., 2017. Innovation in logistics outsourcing relationship – in the search of customer satisfaction. LogForum 13 (2), 209-219. http://doi.org/10.17270/J.LOG.2017.2.8

COM, 2011. 144 final. Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system, Brussels. Available from Internet: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0144:FIN:en:PDF

Daugherty P.J., Bolumole Y., Grawe S.J., 2018. The new age of customer impatience: an agenda for reawakening logistics customer service research, International Journal of Physical Distribution & Logistics Management, http://doi.org/10.1108/IJPDLM-03-2018-0143

Deepen J.M., 2007. Logistics outsourcing relationships: measurement, antecedents, and effects of logistics outsourcing performance, Springer Science & Business Media. https://www.springer.com/gp/book/978379 0819168

Deepen J.M., Goldsby T.J., Knemeyer A.M., Wallenburg C.M., 2008. Beyond expecta-tions: an examination of logistics outsour-cing goal achievement and goal exceedan-ce, Journal of Business Logistics, 29, 2, 75-105, http://doi.org/10.1002/j.2158-1592.2008.tb00088.x

DP DH, 2018. Logistics Trend Radar. Delivering insight today, creating value tomorrow, DHL Customer Solutions & Innovation, Germany. Available from Internet: https://www.logistics.dhl/content/dam/dhl/g lobal/core/documents/pdf/glo-core-trend-radar-widescreen.pdf

Evangelista P., Santoro L., Thomas A., 2018. Environmental sustainability in third-party logistics service providers: a systematic literature review from 2000–2016, Sustainability, 10, 5, 1627. Available from Internet: https://www.mdpi.com/2071-1050/10/5/1627/pdf

Fugate B.S., Mentzer J.T., Stank T.P., 2010. Logistics performance: efficiency, effectiveness, and differentiation, Journal of Business Logistics, 31, 1, 43-62, http://doi.org/10.1002/j.2158-1592.2010.tb00127.x

Hartmann E., De Grahl A., 2011. The flexibility of logistics service providers and its impact on customer loyalty; an empirical study, Journal of Supply Chain Management, 47, 3, 63-85, http://doi.org/10.1111/j.1745-493X.2011.03228.x

Henseler J., Hubona G., Ray P.A., 2016. Using PLS path modeling in new technology research: updated guidelines, Industrial Management and Data Systems, 116, 1, 2-20, http://doi.org/10.1108/IMDS-09-2015-0382

Hu M., Huang F., Hou H., Chen Y., Bulysheva L., 2016. Customized logistics service and online shoppers' satisfaction: an empirical study, Internet Research, 26, 2, 484-497, http://doi.org/10.1108/IntR-11-2014-0295

Ishwaran H., 2007. Variable importance in binary regression trees and forests, Electronic Journal of Statitics, 1, 519-537, http://doi.org/10.1214/07-EJS039

Kawa A., 2017. Orientacja sieciowa w branży usług logistycznych [Network orientation in logistics outsourcing industry], Wydawni-ctwo UEP, Poznań. Available from Internet: https://www.researchgate.net/profile/Arkadi usz_Kawa/publication/320041564_Orientac ja_sieciowa_przedsiebiorstw_branzy_uslug _logistycznych/links/59ca56c345851556e9 7dfdee/Orientacja-sieciowa-przedsiebiorstw-branzy-uslug-logistycznych.pdf

Knemeyer A.M., Murphy P.R., 2004. Eva-luating the performance of third-party logistics arrangements: a relationship marketing perspective, Journal of Supply Chain Management 40, 1, 35-51, https://doi.org/10.1111/j.1745-493X.2004.tb00254.x

Langley C.J., Jr., 2018. 2018 Third-party logistics study. The State of Logistics Outsourcing, Infosys Consulting, Penske, Korn Ferry, Penn State University. Available from Internet: http://www.3plstudy.com/

Large R.O., Kramer N., Hartmann R.K., 2011. Customer-specific adaptation by providers and their perception of 3PL-relationship success, International Journal of Physical Distribution & Logistics Management, 41, 9, 822-838, http://doi.org/10.1108/09600031111175807

Marchet G., Melacini M., Perotti S., Sassi C., Tappia E., 2017. Value creation models in the 3PL industry: what 3PL providers do to cope with shipper requirements, Inter-

national Journal of Physical Distribution & Logistics Management, 47, 6, 472-494, http://doi.org/10.1108/IJPDLM-04-2016-0120

Pleszko J., 2012, Multi-variant configurations of supply chains in the context of synchromodal transport, LogForum, 8, 4, 287-295. Available from Internet: http://www.logforum.net/vol8/issue4/no2

Saghiri S.S., Bernon M., Bourlakis M., Wilding R., 2018. Omni-channel logistics special issue, International Journal of Physical Distribution & Logistics Management, 48, 4, 362-364, http://doi.org/10.1108/IJPDLM-05-2018-361

Shen X.X., Tan K.C., Xie M., 2000. An integrated approach to innovative product development using Kano's model and QFD, European Journal of Innovation Management, 3 (2), 91-99, http://doi.org/10.1108/14601060010298435

Solakivi T., Ojala L., Lorentz H., Töyli J., Laari S., 2018. Estimating the size of the national logistics market: a method to include both market-based demand and in-house services, International Journal of Physical Distribution & Logistics Management, 48, 5, 488-503, http://doi.org/10.1108/IJPDLM-01-2018-0032

Stank T.P., Goldsby T.J., Vickery S.K., Savitskie K., 2003. Logistics service performance: estimating its influence on market share, Journal of business logistics, 24, 1, 27-55, http://doi.org/10.1002/j.2158-1592.2003.tb00031.x

Świtała M., 2012. TSL sector companies and their offer of logistics services, Handel Wewnętrzny, 4, 55-65. Available from Internet: http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.ekon-element-000171220337

Świtała M., Niestrój K., Hanus P., 2018. Examining how logistics service providers' adaptability impacts logistics outsourcing performance, customers' satisfaction and loyalty, LogForum, 14 (4), 449-465, http://doi.org/10.17270/J.LOG.2018.298

Wallenburg C.M., 2009. Innovation in logistics outsourcing relationships: proactive improvement by logistics service providers as a driver of customer loyalty, Journal of Supply Chain Management, 45, 2, 75-93, http://doi.org/10.1111/j.1745-493X.2009.03164.x

Zhang Q., Vonderembse M.A., Lim J.S., 2005. Logistics flexibility and its impact on customer satisfaction, The International Journal of Logistics Management, 16, 1, 71-95, http://doi.org/10.1108/09574090510617367

LOGISTICS OUTSOURCING PERFORMANCE JAKO CZYNNIK SPRZYJAJĄCY SATYSFAKCJI KLIENTÓW Z USŁUG LOGISTYCZNYCH

STRESZCZENIE. **Wstęp:** Inspiracją do podjęcia badań z zakresu logistycznej obsługi klienta była silna relacja między performance'm obsługi a satysfakcją klienta, którą zaobserwowano w badaniu klientów operatorów logistycznych. Autorzy chcieli bliżej poznać, które elementy performance'u obsługi są istotne dla klientów nabywających usługi logistyczne w Polsce i jak te elementy wpływają na poziom satysfakcji klientów z usług logistycznych. Badanie miało na celu wskazanie operatorom logistycznym, w które elementy performance'u obsługi warto inwestować.
Metody: Badanie zostało przeprowadzone wśród 112 przedsiębiorstw produkcyjnych i handlowych – klientów LSPs dobranych w sposób celowy. Wykorzystano metodę kwestionariusza ankietowego. W oparciu o odpowiedzi respondentów zbudowano model w postaci drzewa klasyfikacyjnego z satysfakcją klienta w charakterze zmiennej objaśnianej oraz cechami performance'u obsługi w roli zmiennych objaśniających.

Wyniki: Wyniki pokazują, iż o poziomie satysfakcji klienta decydują głównie dwie cechy, tj. niższe koszty logistyczne oraz krótsze czasy dostaw. Mniej istotne, wg respondentów, okazały się poprawa poziomu obsługi klienta oraz wzrost elastyczności. Jednak analiza dyskryminacyjna pozwoliła zauważyć, że wysoką satysfakcję z logistycznej obsługi klienta można również osiągnąć przy założeniu dłuższych czasów dostaw.
Wnioski: Chcąc wyróżnić się na rynku usług logistycznych, LSP powinien inwestować nie tylko w obniżkę kosztów i poprawę czasu obsługi, ale również w czynniki, które spowodują ponadprzeciętną satysfakcję klienta, tj. poprawę elastyczności działania i poziomu obsługi, w tym działania proekologiczne.

Słowa kluczowe: performance, satysfakcja, jakość usług, model Kano, usługodawcy logistyczni, zrównoważony rozwój, drzewo decyzyjne.

Marcin Świtała
University of Economics in Katowice
Department of Business Logistics
ul. 1 Maja 50, 40-287 Katowice, **Poland**
e-mail: marcin.switala@ue.katowice.pl

Marzenna Cichosz
Warsaw School of Economics,
Department of Transport
ul. Niepodległości 128, 02-554 Warszawa, **Poland**
e-mail: Marzenna.Cichosz@sgh.waw.pl

Joanna Trzęsiok
University of Economics in Katowice
Department of Economic and Financial Analysis
ul. 1 Maja 50, 40-287 Katowice, **Poland**
e-mail: joanna.trzesiok@ue.katowice.pl