



EXAMINING HOW LOGISTICS SERVICE PROVIDERS' ADAPTABILITY IMPACTS LOGISTICS OUTSOURCING PERFORMANCE, CUSTOMERS' SATISFACTION AND LOYALTY

Marcin Światała, Krzysztof Niestrój, Piotr Hanus

University of Economics in Katowice, Katowice, Poland

ABSTRACT. Background: This article examines the adaptability of logistics services providers (LSPs), which has been relatively rarely tackled in the literature on supply chain management. We examined the impacts of LSPs' adaptability on logistics outsourcing performance, as well as on satisfaction and loyalty of their customers.

Methods: We formulated specific research hypotheses and assessed them using structural equation. The data was obtained via IT survey of 110 companies using LSPs. Our analyses were conducted in the SPSS and R software packages.

Results: Based on the estimated path coefficients from the structural equation model, we found evidence of a dependency between the adaptability of LSPs and their logistic services performance, as well as customer satisfaction and loyalty.

Conclusions: Our results confirm the importance of adaptability for the development of logistics outsourcing relationships, primarily due to the strong direct impact of LSP adaptability on logistics services performance, as well as the impact of this factor on customer satisfaction and loyalty. Therefore, when struggling to improve relations with customers, LSPs should take adaptive actions that can enhance performance outcomes.

Key words: logistics service providers, adaptability, performance, customer satisfaction and loyalty.

INTRODUCTION

While the topic of the presence of LSPs in supply chains has been quite widely described in the literature [Zacharia et al. 2011, Forslund 2012, Oláh et al. 2018], the subject of their adaptability to the conditions of specific supply chains has been relatively rarely tackled. Even less attention has been paid to the impact of LSP adaptability on customer relationships based on performance, satisfaction and loyalty, even though this cognitive perspective would seem pertinent and valuable. Research focused on supply chain relationships has demonstrated that their success is largely dependent on improved performance [Olsen 2002], ensuring customer satisfaction and securing

a customer's intention to continue the relationship with a given service provider [Stank et al. 2003]. Available studies also show that adaptability oriented towards meeting a customer's needs may be considered as a key (and desirable) characteristic of LSPs [Hertz, Alfredsson 2003].

The purpose of our study is to explain the importance of adaptability in logistics outsourcing relationships by linking LSPs' adaptability to logistics service performance, as well as customer satisfaction and loyalty. We tested a theoretical model consisting of these four concepts using structural equation modelling. Our research was based on primary data obtained from a survey of customers of

LSPs in Poland, which resulted in 110 usable responses.

Our article consists of five sections. The first section contains definitions of the key terms: adaptability, performance, customer satisfaction and customer loyalty. The second section presents our research hypotheses, together with their theoretical frameworks and the conceptual model derived from those hypotheses. The third section describes the methodology and results, including details on sampling, the variables used in the model, and the various stages of data analysis using structural equations for hypothesis testing. In the last two sections we discuss our results and the limitations of our study and also make suggestions for further research.

DEFINITIONS OF KEY TERMS

Adaptability

The concept of "adaptability" has been termed a significant [Holma 2013], though still poorly identified issue [Schmidt et al. 2007, Ueltschy Murfield and Esper 2016] in the literature. Adaptability is widely understood as the capacity to adapt, but definitions can have greatly different scope, depending on the meaning of "adaptation" that is adopted. For example, Brennan et al. [2003] narrowly defined adaptation as the changes that one company takes for the benefit of another company in order to satisfy its specific needs. Under this definition, the scope of adaptation is limited to the changes that are the company's response to customer preferences, without reference to other external factors. Under this approach, adaptation is clearly associated with the concept of "customisation", which is aimed at strengthening the relationship with a single customer and often entails high investment costs to meet the specific needs of a host of customers [Large et al. 2011]. These investments are called relationship-specific investments and defined by Bensaou [1999] as "investments that are difficult or expensive to transfer to another relationship". It is also worth noting that such one-sided adaptation may lead to a high degree of asymmetrical dependence between two parties.

Another broader approach defines "adaptability" as "the ability to modify own activities in connection with the events occurring on the outside of the company" [Caralco, Guravis 2006]. Under this approach, adaptation is understood to be activities undertaken by the company in response to changes in its environment. Ivanov et al. [2010] presented a similar definition, though presented from the perspective of multilateral relationships, treating adaptability as the ability to change existing activities in such a way as to ensure that desired objectives are achieved. In turn, Giannoccaro [2015] understood adaptability as the process of self-organisation occurring within the mutual learning process and that takes place between supply chain participants. Depending on the scale of changes undertaken, adaptation may occur at the level of a single unit (e.g. employee), or at a team or corporate level. It may also necessitate organisational or behavioural changes [Zhu, Zolkiewski 2016].

In this study, we interpret adaptability as the ability of LSPs to alter or modify their activities according to external influences. However, we have adopted the "narrow" meaning of adaptation, i.e. we limit it to changes that LSPs take to meet the specific requirements of each customer.

Performance

There is an even greater diversity of meanings for the concept of performance in the literature on logistics. Mentzer and Konrad [1991] suggested use of the concept of logistics performance, which consists of a combination of the effectiveness and efficiency of logistics activities. This dual concept was later extended by Langley and Holcomb [1992] to include a third component, logistics differentiation, which indicates the value that the final customers gain as a result of logistics activities [Fugate et al. 2010]. According to Green et al. [2008], logistics performance reflects the ability of an LSP to deliver the goods and services expected by the recipients according to very specific quantities and timeframes. Forslund [2011] extended these delivery abilities to include logistics costs and stock capital, highlighting four levels

of assessing logistics performance: within the business, dyadic, triadic, and throughout the entire supply chain. LSPs are included in the third and fourth levels.

Deepen [2007] reflected on performance in contract logistics, distinguishing performance of processes outsourced to LSPs (logistics outsourcing performance) from dependent performance of processes that remain on the customer side (logistics performance). This perspective is of great importance to relevant research models, as it indicates the need to partition variables into those relating to logistics processes performed in-house by the customer and those linked to the responsibilities delegated to LSPs based on contracts [Križman 2011]. According to Deepen [2007], logistics outsourcing performance should be considered both from the point of view of achieving objectives and exceeding customer expectations as well as creating added value (goals exceedance).

In our study, we adopted the definition of Knemayer and Murphy [2004] enriched with the distinction put forward by Deepen [2007], thereby focussing on operations performance within the responsibilities delegated to the LSPs.

Customer satisfaction

Although it might appear intuitively easy to define, customer satisfaction has been examined in the literature according to two main conceptual paths [Zhang et al. 2005]. In the first one, it represents a state felt by the customer, arising from the extent to which goods or services meet his/her expectations [Grigoroudis and Siskos 2010]. Usually, customers make such assessments after execution of the logistics service, though they may be made even while it is being conducted. This conceptual path is consistent with the definition by Kotler and Armstrong [2010], who reported that customer satisfaction depends on whether a product's perceived performance matches the buyer's expectations. This kind of customer satisfaction is often termed transaction-specific satisfaction. According to the other conceptual path, more commonly used in a B2B relationship,

customer satisfaction is derived from various experiences accumulated throughout the entire period of cooperation between the LSP and customer, i.e. both positive and negative ones [Daugherty et al. 1998]. Negative experiences not only reduce the level of customer satisfaction, but also may have unpredictable effects that may not be discovered in time to correct them and, additionally, may lead to various negative consequences for a larger group of customers [Van Doorn and Verhoef 2008]. In this case, customer satisfaction can be termed cumulative satisfaction [Zhang et al. 2005].

Here, we interpret customer satisfaction 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.

Customer loyalty

In both B2B and B2C markets customer satisfaction is usually associated with customer loyalty, which can be understood as a customer's attachment to the goods or services of a particular company. It can also be examined from two perspectives: behavioural and attitudinal [Lao et al. 2011]. According to the first perspective ("purchase loyalty"), loyalty is manifested by the intentional (or unenforced) repurchasing (retention) or extension of purchasing (expansion) from the same company. The second perspective ("preference loyalty") perceives loyalty as a consistent readiness to purchase goods and services from a given company despite various stimuli coming from competitors, including encouragements to change provider [Oliver 1999], as well as recommending that company's goods and services to others (referral). Singh [2015] proposed a third (composite) perspective that integrates these latter two perspectives. According to Cichosz [2010], a comprehensive approach to customer loyalty requires that, in addition to the aforementioned aspects, other elements must be included, i.e. competition in the industry, availability of alternatives, and customer willingness to overcome possible difficulties.

In our study, we adopted the definition of Walsh et al. [2008], who understood customer loyalty as a "deeply held commitment to re-buy or re-patronise a preferred product or service consistently in the future, which causes repetitive same-brand or same-brand set purchasing, despite any situational influences and marketing efforts that might cause switching behaviour".

DEVELOPMENT OF HYPOTHESES

Logistics services are frequently outsourced, so the LSP should be sufficiently adaptable to provide more efficient and more effective services (with better results for the customer) than the customers can provide through their own logistics processes, given the changing needs and conditions of supply chains. This means that thanks to their adaptive actions, LSPs are better able to meet customer expectations, endowing them with superior performance [Chu et al. 2016]. The very high competition among LSPs also prompts them to improve the performance of the services they provide, which should also elicit enhanced adaptability.

However, LSP adaptability does not have to focus solely on improved performance, but can encompass other aspects of the service relationship that contribute to customer satisfaction, such as communication, and advising or handling complaints. The relationship between adaptability and customer satisfaction seems rather intuitive, especially since both are relevant to best meeting customer requirements. Zhu and Zolkiewski [2016] highlighted the key role of adaptability in the provision of logistics services, emphasizing that the adaptability of service providers helps them to meet the needs of their customers, to ensure their customers' satisfaction and loyalty, and to strengthen ties between service provider and client. Ueltschy Murfield and Esper [2016] drew similar conclusions, adding that although adjusting to specific customer requirements undoubtedly has a positive impact on the quality of the LSP-client relationship and, as a consequence, also on customer satisfaction, adaptation assessed solely from the perspective of

operational performance may not bring the expected benefits or as quickly as anticipated.

Loyal customers are not necessarily happy customers. Curasi and Kennedy [2002] referred to such customers as "prisoners" and "detached loyalists". The latter represents customers who, despite their lack of satisfaction, continue to cooperate, mostly due to the difficulties and costs associated with changing LSP. Research by Brennan and Canning [2002] revealed the impact of adaptability on the durability of inter-firm relationships. These authors emphasised that adaptation decreases the risk of opportunistic behaviour in dyadic relationships. Similar conclusions were drawn by Leszczyński [2014], who stated that change induced by adaptation strengthens the quality of inter-firm relationship, not only hindering sequestration of the relationship by a competitor but also ensuring customer retention. Therefore, it is worth noting the direct relationship between the adaptability of LSPs and customer loyalty even when the customer is not completely satisfied with the service provided. In such scenarios, the reason for a customer's loyalty, apart from the aforementioned, may pertain more to the value systems of both parties. For instance, customers who particularly value an adaptive approach, i.e. an LSP's ability and willingness to respond to change, will be loyal regardless of whether or not they are currently satisfied with the services they receive or with the LSP-client relationship. Such customers may perceive great potential in the service provided by the LSP into the future and accept imperfections in the current service.

Based on these considerations, we adopted the following three hypotheses:

- H1. Adaptability of LSPs positively influences their performance;
- H2. Adaptability of LSPs positively influences customer satisfaction;
- H3. Adaptability of LSPs positively influences customer loyalty.

There is a strong direct connection between performance and customer satisfaction in the area of logistics services, although there has been little research on this relationship due to the aforementioned problems of defining

performance in a business-to-business (B2B) relationship [Juga et al. 2010]. Performance should not be perceived solely according to internal LSP processes, but also from the perspective of the customer (based on his/her degree of satisfaction, i.e. performance outcomes). LSPs should conduct their services efficiently and effectively on behalf of their customers to ensure satisfaction [Weber 2003]. Customer satisfaction is one means of measuring the performance of a service provider [Bowersox et al. 2000]. However, solely assessing performance without ensuring concomitant customer satisfaction would not be meaningful.

Since we also appreciate that performance should be considered from the point of view of the specific benefits accrued by the customer, leading to customer satisfaction, we formulated the hypothesis (H4) that:

H4. Performance of LSPs positively influences satisfaction of its customers.

The positive impact of customer satisfaction on his/her loyalty towards an LSP is widely appreciated [Singh 2015]. Satisfied customers tend to repurchase logistics services [Ranjan and Puri 2012]. Zhang et al. [2005] found this relationship to be very strong and proposed customer loyalty as a measure of customer satisfaction. However the relationship between satisfaction and loyalty is not linear and its characteristics depend on the specific industry [Kumar et al. 2013].

Customer satisfaction can be decomposed into components, the influence of which on loyalty can be quite diverse. Cahill et al. [2010] presented loyalty as arising from satisfaction with the provided service (activities), pricing for these services, and tailored LSP-client relationships (cooperation

terms). These authors underlined that though these components can be treated as equivalent, the basis of customer loyalty is always satisfaction with operational activities since it can have a positive impact on price perception and the LSP-client relationship. A study by Singh [2015] confirmed the importance of operational activities, showing that customer loyalty to LSPs is primarily driven by satisfaction with the provided logistics service (its scope, quality and, above all, performance), with the impact of the LSP-client relationship on loyalty being weaker and that of price satisfaction being statistically insignificant. However, satisfied clients will not necessarily remain loyal [Lao et al. 2011].

There are two principle perspectives for examining the relationship between customer satisfaction and loyalty. The first, which is conventionally considered dynamic, allows for fluctuating loyalty. This is intuitive, since if loyalty is shaped overtime by the cumulative perception of various states of satisfaction with the logistics services provided or with the service provider relationship, it can be increased, consolidated, but also decreased, potentially to the point of dissolution. The second (static) treats loyalty as a fixed binary attribute that either exists or does not, meaning that regardless of subsequent changes to the level of satisfaction, the customer may remain loyal to the service provider at all times. In practice, this scenario means, for example, maintaining long-term intensive partnerships even if the service provider does not meet all of the client's service expectations or requirements [Çerri 2012]. In our study, we have adopted the dynamic stance and assume that:

H5. Customer satisfaction positively influences their loyalty.

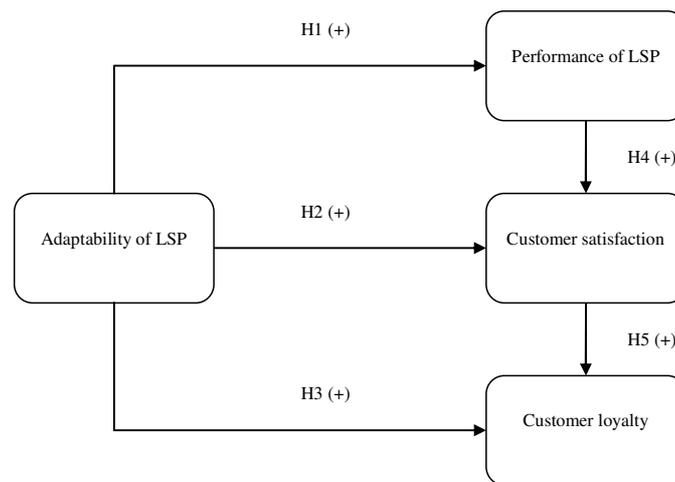


Fig. 1. Proposed conceptual model. Source: own work based on the model in Large et al. [2011]

Figure 1 shows the conceptual model of our study and the relationships between our five hypotheses.

RESEARCH METHODOLOGY & RESULTS

Sampling and data collection

We conducted our study on a sample of entities representing customers of LSPs. Sample selection was purposive and dependent on factors such as company size (firms with more than 10 employees), location (firms operating in Poland) and companies relying on external support from LSPs. Invitations to participate in the study were sent by email to 1,127 companies and completed responses were received from 110 firms, representing an overall response rate of 9.76%. We followed the four-step mail survey procedure recommended by Dillman [2000], which involves: pre-notifications, main survey invitation, reminders sent to non-respondents, and another survey mailing to non-respondents. Overall, 41.8% of respondents answered the first survey mailing (early respondents) and 58.2% responded after the reminder and second survey mailing (late respondents). A one-way analysis of variance (ANOVA) did not reveal any significant differences between early and late respondents.

In case of pls-pm models it is sometimes advised that the sample size should not be fewer than 100 [Seker 2013]. Other guidelines provided by Large et al. [2011], specify that it should be at least ten times higher than the largest number of independent variables. Those requirements are satisfied.

All respondents completed the survey online. We adopted the suggestions of Jafarkarimi et al. [2016], who specified that the number of items used to measure hidden features should not be less than three. In our case, the survey consisted of 17 manifest variables relating to the four latent variable constructs (performance, adaptability, satisfaction and loyalty) of our research model. We used SPSS and the R software platform [plspm package, Sanchez and Trinchera 2010] to analyse and interpret the data. In order to establish the dependencies between variables, we used structural equations analysis based on the least squares method. We also followed a two-stage analysis process in order to include both the outer model (measurement model) and the inner model (structural model), as suggested by Iqbal et al. [2017].

Our sample consisted of both manufacturing and trade companies, and was dominated by companies holding domestic capital. Foreign capital was declared by 9% of the respondents and 14.4% held mixed capital. More than 80% of the respondents were

employed in the small-medium enterprise (SME) sector. Surveys were mostly completed by middle/senior managers or departmental specialists, predominantly from production or logistics and sales departments. Most of the companies operated in domestic or regional

markets. Almost 30% of survey participants reported having international activities and only 3% of the respondents operate globally. Table 1 summarizes the characteristics of our sample.

Table 1. Sample characteristics

Specification	Distribution of responses based on the examined characteristics	
Type of activity	Manufacturing	40.0%
	Trade	60.0%
Geographical coverage	Regional	26.4%
	Domestic	41.8%
	International	29.1%
	Global	2.7%
Employment	10-49 people	33.9%
	50-100 people	23.2%
	101-249 people	24.1%
	More than 250 people	18.8%
Origin of capital	Domestic	77.6%
	Foreign	9.0%
	Mixed	14.4%
Respondent's position	Manager	42.9%
	Specialist	31.3%
	President/director	25.9%

Source: own work

Measurement (outer) model and manifest variables

We assumed that each of our latent variables is represented by a set of manifest variables, as presented in Table 2. Each construct was measured using multiple-item measures and each manifest variable was measured using a discrete 1-7 scale.

Performance was assessed using the multi-item scale of Knemayer and Murphy [2004]. Of the ten characteristics describing a given category (logistics service performance), four characteristics were chosen that reflected the benefits to the customer accruing from their cooperation with an LSP. This same approach was adopted by Weber [2003], who asserted that performance should be perceived from the customer's perspective, and by Green et al. [2008], who listed specific benefits of performance, such as reliability, flexibility and speed of delivery. Other studies have shown that variables used for performance measurement correspond well with customers' expectations of LSPs [Świtła and Kłosa 2015].

Customer satisfaction is commonly treated as a complex construct in the literature. In this study, we applied a multi-item scale of customer satisfaction developed by Large et al. [2011], though we changed the scope and form of some of its variables. We included a rather broad set of factors related to logistics services activities and tasks. Customer satisfaction was measured, considering both general satisfaction and partial satisfaction, according to the three key service stages, i.e. pre-transaction, transaction and post-transaction.

There is no consensus in the literature on the measurement criteria to be used for evaluating customer loyalty [Stan et al. 2013]. Here, we applied a scale of four levels (see Table 2), reflecting the three main components of customer loyalty, i.e. readiness to further the relationship, positive attitude to the service provider, and customer confidence that it is worth cooperating with a particular LSP. The previous research of Large et al. [2011] and Qayyum et al. [2013] greatly assisted us in establishing the framework for our manifest variables.

It is difficult to evaluate adaptability, mainly because it is a complex topic, and the methodological basis for studying it is poor due to insufficient research [Holma 2008]. We assessed adaptability according to five levels (see Table 2). We primarily focused on activities and processes performed within the

framework of logistics services and customer requirements, using the scale constructed by Large et al. [2011] as a basis and slightly modified according to research by Schmidt et al. [2007].

Table 2. Characteristics of the manifest variables used in our measurement model

Latent variables	Description of manifest variables
Performance [PERF]	P1. Our logistics costs are reduced thanks to the relationship with the LSP, P2. Our delivery times have decreased thanks to the relationship with the LSP, P3. Our customer service has improved thanks to the relationship with the LSP, P4. We can better respond to market changes thanks to the relationship with the LSP.
Satisfaction [SAT]	S1. In general, we are very pleased with our LSP, S2. We are very pleased with the service provided by our LSP, including bilateral communications, S3. We are very satisfied with how our LSP handles our cargo or performs intangible activities (e.g. advises us), S4. We are very pleased with how our LSP handles complaints.
Loyalty [LOY]	L1. Our company is very committed to maintaining our current relationship with the LSP, L2. We would like to maintain our relationship with the LSP for a very long period (even indefinitely), L3. We would like to enhance our reliance on the LSP, further strengthening our relationship, L4. We would gladly recommend our LSP to others.
Adaptability [ADAP]	A1. Our relationship with the LSP is already at a stage where we can combine our processes, A2. Our LSP tailors its activities and procedures to meet the specific needs of our company, A3. In case of termination of the relationship, the LSP would have problems recovering the capital it invested in our relationship (dedicated resources), A4. The LSP has made significant infrastructural investments to initiate and maintain the relationship with our company, A5. To continue the relationship with our company, the LSP should purchase specialized hardware and/or software or make other kinds of adaptations to its operations.

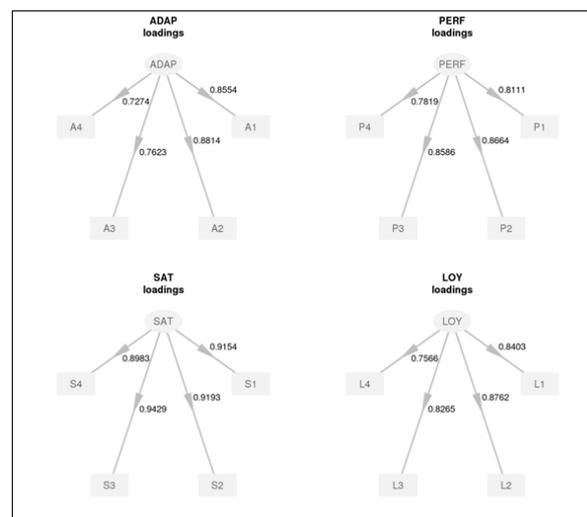
Source: own work

Model refinement

At the first stage, a reliability analysis of an outer model was conducted. Based on Henseler et al. [2016], we stipulated that both the Cronbach α and Dillon-Goldstein composite reliability indicator ρ were not lower than 0.700 for any latent variable. Following the similar study by Large et al. [2011], we also set the threshold that all factor loadings associated with manifest variables were not lower than 0.700. Only manifest variable A5 (see Table 2) violated these two criteria (factor loading equal to 0.550). Hence, we excluded manifest variable A5 from our model, and further analysis was performed on the remaining 16 manifest variables.

Scale evaluation after model refinement

The results of our scale evaluation are given in Figure 2.



Source: own work

Fig. 2. Scale evaluation: factor loadings corresponding to manifest variables after excluding A5

All factor loadings of the 16 retained manifest variables are greater than 0.720. Measures of latent variable unidimensionality are presented in Table 3. Values of α and ρ for all latent variables are within acceptable limits (exceeding 0.770 and 0.850, respectively). Hence, our proposed model exhibits

a sufficient level of reliability. Furthermore, the average variance extracted (AVE) for each latent variable is greater than 0.650, indicating convergent validity.

Table 3. Reliability and validity of the measurement model for latent variables

Latent variable	Cronbach α ($\alpha > 0.7$)	Dillon-Goldstein ρ ($\rho > 0.7$)	Average variance extracted (> 0.6)
ADAP	0.782	0.860	0.655
PERF	0.847	0.897	0.689
SAT	0.917	0.942	0.845
LOY	0.776	0.857	0.682

Source: own work

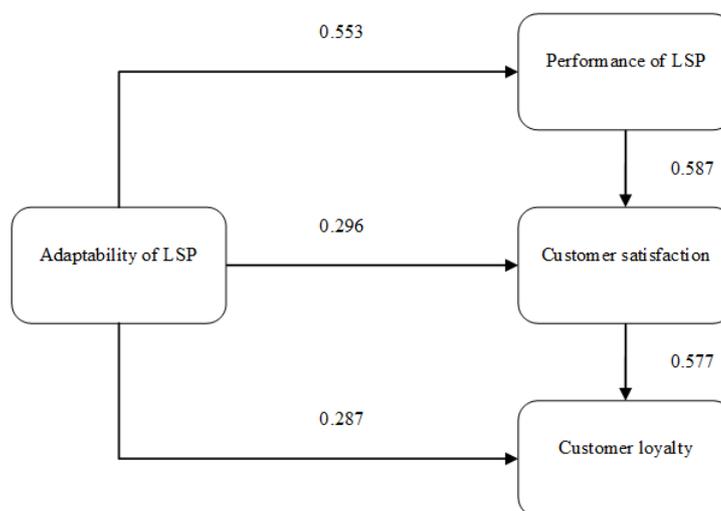
The structural model

The path coefficients of the structural (inner) model were estimated using the R *plspm* package developed by Sanchez and Trinchera [2010] (see Figure 3). All path coefficients are strictly positive, but their magnitudes vary. A summary of the structural model parameter estimates is provided in Table 4.

Determination coefficients for endogenous latent variables are shown in Table 5. According to the guidelines of Henseler et al. [2009], the determination coefficients for

customer satisfaction (SAT) and customer loyalty (LOY) indicate that these latent variables could be considered moderately well-fitting in our structural model, whereas the goodness-of-fit for LSP performance (PERF) is somewhat weaker.

We applied a bootstrap procedure (10000 sample replications) to estimate the empirical distribution of path coefficients and to construct nonparametric 95% confidence intervals for direct path effects (see Table 6 for bootstrapping results).



Source: own work

Fig. 3. Structural model with estimated path coefficients (for direct effects) between latent variables.

Table 4. Values of path coefficients for direct, indirect and total effects between latent variables in our structural model

Path	Effects		
	Direct	Indirect	Total
ADAP → PERF	0.553	-	0.553
ADAP → SAT	0.296	0.316	0.612
ADAP → LOY	0.287	0.353	0.640
PERF → SAT	0.571	-	0.571
PERF → LOY	-	0.329	0.329
SAT → LOY	0.577	-	0.577

Source: own work

Table 5. Determination coefficients (R²) for each endogenous latent variable

Endogenous latent variable	Determination coefficient R ²
PERF	0.305
SAT	0.601
LOY	0.617

Source: own work

Table 6. Results of a bootstrap simulation to estimate nonparametric confidence intervals

Path	Bootstrap estimates		
	Standard deviation	Lower CI bound	Upper CI bound
ADAP → PERF	0.132	0.426	0.740
ADAP → SAT	0.086	0.177	0.468
ADAP → LOY	0.117	0.103	0.550
PERF → SAT	0.076	0.423	0.720
SAT → LOY	0.100	0.411	0.769

Source: own work

Intervals for all direct paths (i.e. ADAP → PERF, ADAP → SAT, ADAP → LOY, PERF → SAT, and SAT → LOY) do not span zero, supporting that the true values of these direct path effects are indeed positive and significantly greater than zero.

Hypotheses testing

Our results support each of our five research hypotheses. Hypotheses H1, H2 and H3 pertained to dependencies between LSP adaptability and the other examined variables, i.e. performance, customer satisfaction and customer loyalty. As illustrated in Figure 3, adaptability has a positive and highly significant impact on each of these latent variables, albeit with varying magnitude. Our analyses indicate that LSP adaptability has twice as much direct impact on improved LSP performance than it does on customer satisfaction or loyalty. However, it is worth noting that adaptability has a more pronounced indirect than direct impact on both customer satisfaction and loyalty. The two remaining

hypotheses focused on links between LSP performance and customer satisfaction (H4), as well as the relationship between satisfaction and loyalty (H5). In both cases, we assumed the existence of positive relationships, which was confirmed by our results. As for H1, there is a strong direct impact of performance on customer satisfaction and, even more, with regard to the impact of satisfaction on loyalty.

CONCLUSIONS AND MANAGERIAL IMPLICATIONS

Our study extends the existing research on logistics outsourcing relationships by examining the impact of LSP adaptability on those relationships. The findings demonstrate that adaptability is a key condition for development of the LSP-client relationship. We focused on the relationships between adaptability and three other factors considered essential to the LSP-client relationship, namely LSP performance, customer satisfaction and customer loyalty. It is noteworthy that our

study takes into account the perspective of LSP customers, thereby extending the research of Large et al. [2011].

There are several important points to be made with regard to our study. First, our results show that adaptive actions by LSPs have a direct positive impact on perceptions of their service provision among customers. In other words, adaptability leads to improved performance that, in turn, gives companies a competitive advantage. Second, this adaptive activity is very important for strengthening customer relationships, since the consequently improved logistics services enhance client satisfaction and build customer loyalty. This relationship between customer satisfaction and consequent loyalty was the strongest in our model. Third, we also found evidence of positive direct impacts of adaptability on customer satisfaction and loyalty, but they are weaker than the indirect impacts via performance enhancement. This model outcome confirms that it is only through increased performance can LSP adaptability become a significant predictor of customer satisfaction. Consequently, projection of an LSP's image as being adaptive, without indicating specific effects for the provision of customers' logistics services, is of secondary importance for the quality of the LSP-client relationship.

Our results have significant practical implications for the adaptive actions undertaken by LSPs. They may prove helpful at the stage of choosing appropriate adaptive measures and the subsequent design of detailed solutions, emphasizing the need for LSP decision-makers to focus on effects that impact customers and on long-term benefits that contribute to their satisfaction and loyalty. Thus, an in-depth diagnosis of the needs and processes of the customers must precede the choice of adaptive actions. In many cases, active participation by customers in the selection and design of adaptive measures may be beneficial.

In terms of a wider understanding of adaptation (i.e. modification of the business in response to external changes), it seems that service providers should design adaptive

measures in such a way that improvements in performance can be perceived by customers, irrespective of their business, organisational, or IT specificities.

LIMITATIONS AND FURTHER RESEARCH

Our study is not free of limitations. Firstly, our structural equation modelling methodology relies on several assumptions, the most fundamental of which is that our variables are independent and identically distributed. In the case of non-random purposive sample selection with a high non-response rate, as is the case with our study, this assumption may not be strictly met, especially with respect to invariance of distributions. For our methodology to be valid, missing data must be "missing at random" [MAR – see e.g. Little and Rubin 2002] and variables should have the same distributions within all surveyed subpopulations of enterprises. These assumptions need to be verified in the future, otherwise our findings may be questioned due to the increased likelihood of having detected spurious correlations. Another important assumption of structural equation modelling is multivariate normality of variables, which underlies the use of parametric correlation tests based on the Student's t-distribution. If variables are measured on a discrete scale (especially the Likert scale), then the data may not have the prescribed characteristics for conducting multivariate normality tests. To circumvent this problem, we decided not to use t-tests and instead based our analysis on bootstrap confidence intervals that may be more robust to such model assumptions. The manner in which we measured the variables may also be regarded as a limitation. Our empirical material was obtained through indirect measurements, which can be biased by subjectivity among the respondents. Thus, caution should be exercised when interpreting our results.

Secondly, the scope of our research was limited to analyses of the dependencies between only four variables, i.e. adaptability, performance, satisfaction and loyalty. In particular, it will be important to examine in more detail the indirect relationships between

adaptability and satisfaction or loyalty, necessitating a more complex model incorporating additional variables. For example, it would be worth investigating whether the dependency between LSP adaptability and customer satisfaction is mediated through factors other than performance, such as the influences of trust and commitment on a given relationship. Also, greater attention must be paid to the mediating role of performance between adaptability and customer satisfaction.

Thirdly, due to the small number of companies in research sample, the data were analyzed without referring to different levels of outsourcing relationship and the scope of logistics service provision (i.e. 2PL, 3PL, 4PL and 5PL). However, examining adaptability from the 3PL and 4PL perspective seems to be cognitively valuable and thus desirable in further research. Adaptability of collaborating logistics service providers in double outsourcing relation might be interesting likewise.

Fourthly, it is necessary to identify the reasons for an LSP to become more adaptable; internal ones, such as those arising from the LSP's own desire to achieve particular goals, and external, such as adaptation forced by other links in the supply chain. It would be worth evaluating LSPs' adaptive abilities so that their competence in this regard could be differentiated, thereby helping to identify factors that play a crucial role in their success.

ACKNOWLEDGMENTS AND FUNDING SOURCE DECLARATION

University of Economics in Katowice statutory fund.

REFERENCES

- Bensaou M., 1999. Portfolios of buyer-supplier relationships, *Sloan Management Review*, 40, 4, 35-44.
- Bowersox D.J., Closs D.J., Stank T.P., Keller S.B., 2000. How supply chain competency leads to business success, *Supply Chain Management Review*, 4, 4, 70-78.
- Brennan D.R., Canning L., 2002. Adaptation processes in supplier-customer relationships, *Journal of Customer Behaviour*, 1, 2, 117-144,
<http://dx.doi.org/10.1362/14753920260595183>
- Brennan D.R., Turnbull P.W., Wilson D.T., 2003. Dyadic adaptation in business-to-business markets, *European Journal of Marketing*, 37, 11/12, 1636-1665,
<http://dx.doi.org/10.1108/03090560310495393>
- Cahill D.L., Goldsby T.J., Knemeyer A.M., Wallenburg C.M., 2010. Customer loyalty in logistics outsourcing relationships: an examination of the moderating effects of conflict frequency, *Journal of Business Logistics*, 31, 2, 253-277,
<http://dx.doi.org/10.1002/j.2158-1592.2010.tb00151.x>
- Calarco A., Guravis J., 2006. Adaptability: responding effectively to change, CCL, Greensboro.
- Çerri S., 2012. The impact of the quality of logistics activities on customer commitment, loyalty and firm's performance, *Journal of Advanced Research in Management*, 3, 2, 79-88.
- Chu, Z., Wang Q., Lado A.A., 2016. Customer orientation, relationship quality, and performance: the third-party logistics provider's perspective, *The International Journal of Logistics Management*, 27, 3, 738-754, <http://dx.doi.org/10.1108/IJLM-08-2013-0093>
- Cichosz M., 2010. Lojalność klienta a logistyka firm usługowych [Customer loyalty and logistics in service companies], SGH, Warszawa.
- Curasi C.F., Kennedy K.N., 2002. From prisoners to apostles: a typology of repeat buyers and loyal customers in service businesses, *Journal of Services Marketing*, 16, 4, 322-341,
<http://dx.doi.org/10.1108/08876040210433220>
- Daugherty P.J., Stank T.P., Ellinger A.E., 1998. Leveraging logistics/distribution capabilities: the impact of logistics service

- on market share, *Journal of Business Logistics*, 19, 2, 35-51.
- Deepen J.M., 2007. Logistics outsourcing relationships. Measurement, antecedents and effects of logistics outsourcing performance, Physica Verlag, Heidelberg, <http://dx.doi.org/10.1007/978-3-7908-1938-0>
- Dillman D.A., 2000. Mail and internet surveys: the tailored design method, Wiley, New Jersey, <http://dx.doi.org/10.1177/003435520104400309>
- Forslund H., 2011. The size of a logistics performance measurement system, *Facilities*, 29, 3/4, 133-148, <http://dx.doi.org/10.1108/026327711111109261>
- Forslund H., 2012. Performance management in supply chains: logistics service providers' perspective, *International Journal of Physical Distribution & Logistics Management*, 42, 3, 296-311, <http://dx.doi.org/10.1108/09600031211225972>
- 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://dx.doi.org/10.1002/j.2158-1592.2010.tb00127.x>
- Giannoccaro I., 2015. Adaptive supply chains in industrial districts: a complexity science approach focused on learning, *International Journal of Production Economics*, 170, B, 576-589, <http://dx.doi.org/10.1016/j.ijpe.2015.01.004>
- Grigoroudis E., Siskos Y., 2010. Customer satisfaction evaluation methods for measuring and implementing service quality, Springer, New York, <http://dx.doi.org/10.1007/978-1-4419-1640-2>
- Green Jr. K.W., Whitten D., Inman R.A., 2008. The impact of logistics performance on organizational performance in a supply chain context, *Supply Chain Management: An International Journal*, 13, 4, 317-327, <http://dx.doi.org/10.1108/13598540810882206>
- 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://dx.doi.org/10.1108/IMDS-09-2015-0382>
- Henseler J., Ringle C.M., Sinkovics R.R., 2009. The use of partial least squares path modeling in international marketing, *New Challenges to International Marketing – Advances in International Marketing*, 8, 20, 277-319, [http://dx.doi.org/10.1108/S1474-7979\(2009\)0000020014](http://dx.doi.org/10.1108/S1474-7979(2009)0000020014)
- Hertz S., Alfredsson M., 2003. Strategic development of third party logistics providers, *Industrial Marketing Management*, 32, 2, 139-149, [http://dx.doi.org/10.1016/S0019-8501\(02\)00228-6](http://dx.doi.org/10.1016/S0019-8501(02)00228-6)
- Holma A., 2008. Interfirm adaptation in a triadic business relationship setting – a case study in business travel industry, *Proceedings of the 24th IMP Conference*. Available from Internet: https://www.impgroup.org/paper_view.php?viewPaper=6828
- Holma A., 2013. Adaptation in business contexts: working triadic relationships, in Woodside, A.G., Baxter, R. (Eds.), *Deep knowledge of B2B relationships within and across borders: advances in business marketing & purchasing*, Emerald Group Publishing Limited, Bingley, 119-291, <http://dx.doi.org/10.1108/S1069-0964%282013%290000020009>
- Iqbal M., Nisha N., Raza S.A., 2017. Customers' perceptions of green banking: examining service quality dimensions in Bangladesh, in Ordóñez de Pablos, P. (Ed.), *Managerial strategies and solutions for business success in Asia*, IGI Global, Hershey, Pennsylvania, 1-20, <http://dx.doi.org/10.4018/978-1-5225-1886-0.ch001>
- Ivanov D., Sokolov B., Kaeschel J., 2010. A multi-structural framework for adaptive

- supply chain planning and operations control with structure dynamics considerations, *European Journal of Operational Research*, 200, 2, 409-420, <http://dx.doi.org/10.1016/j.ejor.2009.01.002>
- Jafarkarimi H., Sim A.T.H., Saadatdoost R., Hee J.M., 2016. Designing a scenario-based questionnaire to assess behavioral intention in social networking sites' ethical dilemmas, in D'Ascenzo, F., Magni, M., Lazazzara, A., Za, S. (Eds.), *Blurring the boundaries through digital innovation: individual, organizational, and societal challenges*, Springer International Publishing, Bazel, 145-160.
http://dx.doi.org/10.1007/978-3-319-38974-5_12
- Juga J., Juntunen J., Grant D.B., 2010. Service quality and its relation to satisfaction and loyalty in logistics outsourcing relationships, *Managing Service Quality: An International Journal*, 20, 6, 496-510, <http://dx.doi.org/10.1108/09604521011092857>
- Kotler P., Armstrong G., 2010. *Principles of marketing*, Pearson Prentice Hall, New Jersey.
- Knemeyer A.M., Murphy P.R., 2004. Evaluating the performance of third-party logistics arrangements: a relationship marketing perspective, *Journal of Supply Chain Management*, 40,1, 35-51, <http://dx.doi.org/10.1111/j.1745-493X.2004.tb00254.x>
- Križman A., 2011. Involvement, knowledge sharing and proactive improvement as antecedents of logistics outsourcing performance, *Economic and Business Review*, 11, 3, 233-256.
- Kumar V., Pozza I.D., Ganesh J., 2013. Revisiting the satisfaction-loyalty relationship: empirical generalizations and directions for future research, *Journal of Retailing*, 89, 3, 246-262, <http://dx.doi.org/10.1016/j.jretai.2013.02.001>
- Langley C.J., Holcomb M.C., 1992. Creating logistics customer value, *Journal of Business Logistics*, 13, 2, 1-27.
- Lao S.I., Choy K.L., Ho G.T.S., Tsim Y.C., Chung N.S.H., 2011. Determination of the success factors in supply chain networks: a Hong Kong-based manufacturer's perspective, *Measuring Business Excellence*, 15, 1, 34-48, <http://dx.doi.org/10.1108/13683041111113231>
- 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://dx.doi.org/10.1108/09600031111175807>
- Leszczyński G., 2014. *Adaptacja w relacjach business-to-business: uwarunkowania i efekty [Adaptation in business-to-business relations: determinants and effects]*, UE Poznań, Poznań.
- Little R.J.A., Rubin D.B., 2002. *Statistical analysis with missing data*, Wiley, New York, <http://dx.doi.org/10.1002/9781119013563>
- Mentzer J.T., Konrad B.P., 1991. An efficiency/effectiveness approach to logistics performance analysis, *Journal of Business Logistics*, 12, 1, 33-62.
- Oláh J., Karmazin G., Petó K., Popp J., 2018. Information technology developments of logistics service providers in Hungary, *International Journal of Logistics Research and Applications*, 21, 3, 332-334, <http://dx.doi.org/10.1080/13675567.2017.1393506>
- Olivier R.L., 1999. Whence consumer loyalty?, *Journal of Marketing*, 63, 4, 33-44, <http://dx.doi.org/10.2307/1252099>
- Olsen S.O., 2002. Comparative evaluation and the relationship between quality, satisfaction and repurchase loyalty, *Journal of the Academy of Marketing Science*, 30, 3, 240-249, <http://dx.doi.org/10.1177/0092070302303005>
- Qayyum A., Khang D.B., Krairit D., 2013. An analysis of the antecedents of loyalty and the moderating role of customer

- demographics in an emerging mobile phone industry, *International Journal of Emerging Markets*, 8, 4, 373-391,
<http://dx.doi.org/10.1108/IJoEM-02-2011-0019>
- Ranjan J., Puri S., 2012. Out of stock conditions affecting customer satisfaction and customer loyalty, *Journal of Business and Retail Management Research*, 6, 2, 38-52.
- Rauyruen P., Miller K.E., 2007. Relationship quality as a predictor of B2B customer loyalty, *Journal of Business Research*, 60, 1, 21-31,
<http://dx.doi.org/10.1016/j.jbusres.2005.11.006>
- Sanchez G., Trinchera L., 2010. Package plspm [software]. Available from Internet:<https://cran.r-project.org/web/packages/plspm>.
- Schmidt S.O., Tyler K., Brennan R., 2007. Adaptation in inter-firm relationships: classification, motivation, calculation, *Journal of Services Marketing*, 21, 7, 530-537,
<http://dx.doi.org/10.1108/08876040710824889>
- Seker H., 2013. In/out-of-school learning environment and SEM analyses on attitude towards school, in Khine, M.S. (Ed.), *Application of structural equation modeling in educational research and practice*, Sense Publishers, Rotterdam, 135-167,
http://dx.doi.org/10.1007/978-94-6209-332-4_7
- Singh S.H., 2015. The impact of service satisfaction, relational satisfaction and commitment on customer loyalty in logistics outsourcing relationship, *Journal of Supply Chain Management Systems*, 4, 1&2, 58-71.
- Stan V., Caemmerer B., Cattan-Jallet R., 2013. Customer loyalty development: the role of switching costs, *The Journal of Applied Business Research*, 29, 5, 1541-1554,
<http://dx.doi.org/10.19030/jabr.v29i5.8069>
- Stank T.P., Goldsby T.J., Vicitery S.K., Savitskie K., 2003. Logistics service performance: estimating its influence on market share, *Journal of Business Logistics*, 24, 1, 27-55,
<http://dx.doi.org/10.1002/j.2158-1592.2003.tb00031.x>
- Świtła M., Klosa E., 2015. The determinants of logistics cooperation in the supply chain – selected results of the opinion poll within logistics service providers and their customers, *LogForum*, 11, 4, 329-340,
<http://dx.doi.org/10.17270/J.LOG.2015.4.2>
- Ueltschy Murfield M.L., Esper T.L., 2016. Supplier adaptation: a qualitative investigation of customer and supplier perspectives, *Industrial Marketing Management*, 59, 96-106.
<http://dx.doi.org/10.1016/j.indmarman.2016.02.004>
- Van Doorn J., Verhoef P.C., 2008. Critical incidents and the impact of satisfaction on customer share, *Journal of Marketing*, 72, 4, 123-142,
<http://dx.doi.org/10.1509/jmkg.72.4.123>
- Walsh H., Evanschitzky H., Wunderlich M., 2008. Identification and analysis of moderator variables: investigating the customer satisfaction-loyalty link, *European Journal of Marketing*, 42, 9/10, 977-1004,
<http://dx.doi.org/10.1108/03090560810891109>
- Weber J., 2003. Macht logistik erfolgreich? – konzeptionelle uberlegungen und empirische ergebnisse [Does logistics make successfull? – conceptual considerations and empirical results], *Logistik Management*, 5, 3, 11-22.
- Zacharia G.Z., Sanders N.R., Nix N.W., 2011. The emerging role of third-party logistics provider (3PL) as an orchestrator, *Journal of Business Logistics*, 30, 1, 40-54,
<http://dx.doi.org/10.1111/j.2158-1592.2011.01004.x>
- Zhang Q., Vonderembse M., Lim J.S., 2005. Logistics flexibility and its impact on customer satisfaction, *International Journal of Logistics Management*, 16, 1, 71-95,
<http://dx.doi.org/10.1108/09574090510617367>

Zhu X., Żółkiewski J., 2016, Exploring service adaptation in a business-to-business context, *Journal of Service Theory and Practice*, 26, 3, 315-337,
<http://dx.doi.org/10.1108/JSTP-02-2014-0039>

WPŁYW ADAPTACYJNOŚCI USŁUGODAWCÓW LOGISTYCZNYCH NA PERFORMANCE OBSŁUGI ORAZ SATYSFAKCJĘ I LOJALNOŚĆ KLIENTÓW

STRESZCZENIE. Wstęp: Niniejszy artykuł poświęcono stosunkowo rzadko podejmowanej w literaturze przedmiotu problematyce adaptacyjności usługodawców logistycznych. Celem zrealizowanych badań była ocena wpływu adaptacyjności usługodawców logistycznych na performance obsługi oraz satysfakcję i lojalność klientów.

Metody: Sformułowano hipotezy badawcze, które zweryfikowano wykorzystując modelowanie równań strukturalnych. Badania przeprowadzono z zastosowaniem metody ankiety elektronicznej wśród 110 przedsiębiorstw zlecających obsługę logistyczną. Analizę oraz interpretację pozyskanych w ten sposób danych przeprowadzono z wykorzystaniem pakietu SPSS oraz programu R.

Wyniki: Na podstawie oszacowanych współczynników ścieżek w modelu równań strukturalnych odnotowano zależności pomiędzy adaptacyjnością usługodawcy logistycznego a performance obsługi oraz satysfakcją i lojalnością klientów.

Wnioski: Uzyskane w toku analizy statystycznej wyniki pozwoliły na pozytywną weryfikację postawionych hipotez badawczych. Potwierdzono, że działania adaptacyjne usługodawców mają bezpośredni pozytywny wpływ na performance obsługi, i co ważne – zależność ta jest bardzo istotna dla umacniania współpracy, ponieważ dzięki poprawie obsługi wyraźnie wzrasta satysfakcja klientów, kreuując ich lojalność wobec usługodawcy.

Słowa kluczowe: usługodawcy logistyczni, adaptacyjność, performance obsługi, satysfakcja, lojalność

DER EINFLUSS DES ANPASSUNGSVERMÖGENS VON LOGISTIKDIENSTLEISTERN AUF DIE BEDIENUNGS-PERFORMANZ UND DIE GENUGTUUNG UND LOYALITÄT VON KUNDEN

ZUSAMMENFASSUNG. Einleitung: Der vorliegende Artikel ist der relativ selten in der Gegenstandsliteratur aufgegriffenen Problematik des Anpassungsvermögens von Logistikdienstleistern gewidmet. Das Ziel der durchgeführten Forschungen war es, eine Beurteilung des Einflusses des Anpassungsvermögens von Logistikdienstleistern auf die Bedienungs-Performanz sowie auf die Genugtuung und die Loyalität von Kunden vorzunehmen.

Methoden: Es wurden Forschungshypothesen formuliert. Sie wurden anschließend verifiziert, indem man die Modellierung von strukturellen Gleichungen in Anspruch nahm. Die Forschungen wurden unter Anwendung der Methode des elektronischen Fragebogens unter 110 Unternehmen, die den Logistik-Service in Auftrag geben, durchgeführt. Die Analyse und Interpretation der auf diese Art und Weise gewonnenen Daten nahm man anhand des SPSS-Paketes und des R-Programms vor.

Ergebnisse: Aufgrund der ermittelten Koeffizienten der Pfade im Modell der strukturellen Gleichungen stellte man die Abhängigkeit zwischen dem Anpassungsvermögen eines Logistikdienstleisters und der Bedienungs-Performanz sowie der Genugtuung und der Loyalität bei den Kunden fest.

Fazit: Die im Laufe der statistischen Analyse gewonnenen Resultate ließen die angenommenen Forschungshypothesen positiv verifizieren. Es wurde nämlich bestätigt, dass die Anpassungsaktivitäten bei den Logistikdienstleistern einen direkt positiven Einfluss auf die Bedienungs-Performanz ausüben. Und was dabei wichtig zu sein scheint – diese Abhängigkeit ist sehr relevant für die Festigung der Zusammenarbeit, denn dank der Verbesserung des Kundenservice wächst auch sehr eindeutig die Genugtuung der Kunden, indem sie ihre Loyalität dem Dienstleister gegenüber generiert und ausgestaltet.

Codewörter: Logistikdienstleister, Anpassungsvermögen, Bedienungs-Performanz, Genugtuung, Loyalität

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

Krzysztof Niestrój
University of Economics in Katowice
Faculty of Management
Department of Business Logistics
ul. 1 Maja 50, 40-287 Katowice, **Poland**
e-mail: krzysztof.niestroj@ue.katowice.pl

Piotr Hanus
University of Economics in Katowice
Faculty of Management
Department of Business Logistics
ul. 1 Maja 50, 40-287 Katowice, **Poland**
e-mail: piotr.hanus@ue.katowice.pl