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INVOLVEMENT, KNOWLEDGE SHARING AND PROACTIVE IMPROVEMENT AS ANTECEDENTS OF LOGISTICS OUTSOURCING PERFORMANCE

ANDREJA KRIŽMAN*

ABSTRACT: *The purpose of this article is to present the research results of a study on the impact of the drivers of logistics outsourcing performance: involvement, knowledge sharing, and innovation. The sample was derived from companies in the Slovenian market who choose to outsource their logistics services to logistics service providers. The article also attempts to contribute to the theoretical and methodological findings and managerial implications in logistics outsourcing discussions. On the basis of the existing literature and some new arguments derived from in-depth interviews with logistics experts, the measurement and structural models were empirically analysed on a sample of manufacturing and retail companies involved in an ongoing relationship with a logistics service provider. Measurement scales for the constructs, their development, refinement and measurement for validity and reliability were performed. Multivariate statistical methods (EFA, CFA and SEM – Partial Least Squares) were utilised. Five hypotheses were tested and confirmed. The logistics outsourcing performance (the goal achievement and the goal exceedance) is well explained by involvement, knowledge sharing, and innovation.*

Keywords: *Logistics outsourcing; Involvement; Knowledge sharing; Innovation; PLS; Path modelling*

UDC: 656.07

JEL classification: L91

1. INTRODUCTION

Logistics is an important business function that is influenced by globalisation and development. Its role and importance have changed rapidly. Logistics services have become specialised and involve a great amount of financial capital and other resources for achieving a competitive advantage in the world market. In order to increase their competitiveness, firms outsource services that are not part of their core business. Long-term relationships, often called partnerships, are established to increase benefits and decrease

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risks in logistics outsourcing, improve efficiency, profitability, and to offer a better customer service performance.

Research in relationship marketing has grown in recent years, involving relationship marketing variables which explain the relationship dimensions in logistics outsourcing (e.g. Moore, 1998; Knemeyer and Murphy, 2004; Deepen, 2007; Panayides 2007; Cahill, 2007; Križman, 2009). Over the past few years, a lot of researchers have contributed to the study of which variables should be included in relationship research (e.g. Anderson and Narus, 1984; 1990; Anderson and Weitz 1989; 1992; Dwyer *et al.*, 1987; Knemeyer *et al.*, 2003; Knemeyer and Murphy, 2004; Morgan and Hunt, 1994; Wilson, 1995 etc.). Aside from trust and commitment, other variables must be chosen depending on their suitability for any given context. Some researchers have discovered that in a logistics outsourcing relationship many of the most utilised variables in relational research are also very fitting for research into logistics and supply chain management. In addition, certain authors have highlighted literature gaps in the empirical examination of inter-organisational relationships in channels and logistics (Frazier, 1999; Sigauw *et al.*, 2003).

The purpose of this article is to present the results of logistics outsourcing research conducted in the Slovenian market and to contribute to the theoretical and methodological findings in logistics outsourcing discussions. The variables that have so far received very little attention in logistics outsourcing are involvement, knowledge sharing, and innovation. By analysing the relationship variables that impact logistics outsourcing performance through innovation, another goal of this research was to develop recommendations for practice. The key findings have several managerial implications for Slovenian firms which outsource their logistics services to logistics service providers ('LSPs'). With certain limitations, the key findings also hold practical implications for other logistics experts. To achieve this goal, the rest of the article is structured as follows. First, we review the literature on the constructs of involvement, knowledge sharing, and innovation as antecedents of logistics outsourcing performance, measured in two dimensions – goal achievement and goal exceedance. Building on prior research (e.g. Engelbrecht, 2004; Deepen, 2007; Cahill, 2007 etc.), we suggest that these constructs can be conceptualised as reflective, multi-item constructs. Then we formulate some hypotheses on the causal linkages between variables. A direct causal linkage with outsourcing performance will only be theorised for the construct of innovation.

Next, we test our conceptualisation using data from a survey conducted in the Slovenian market among the two largest Slovenian LSPs and their main customers. We present the scale development and refinement process. Finally, we discuss measurement assessments for validity and reliability, test and confirm the hypotheses, and suggest several managerial implications for Slovenian firms which outsource their logistics services to LSPs.

An empirical study was conducted which serves to answer the research question, as presented above, the relationship between the customer and its LSP, and identifying the factors that supposedly influence a firm's logistics performance. The research question is derived from current research deficits in logistics outsourcing in Slovenia and around the world.

2. LITERATURE REVIEW CONCERNING THE ANTECEDENTS OF LOGISTICS OUTSOURCING PERFORMANCE IN THE LOGISTICS FIELD

The strategic edge of LSPs in markets is influenced by how they develop and manage their customer relationships (Hertz and Alfredsson, 2003). Logistics outsourcing arrangements hold strategic implications for customers since they directly affect the boundaries of the firm and influence their core competencies and resources (Engelbrecht, 2004). The complexity of logistics outsourcing, and its impact on different business processes of the customer, highlight the need for inter-organisational collaboration between LSPs and their customers. Slovenia, a relatively small economy, was chosen since logistics outsourcing is growing in importance as logistics organisations widen their efforts towards new markets in the south-eastern region of Europe. The analysis of the Slovenian market in the field of logistics outsourcing shows that the level of logistics outsourcing relationships is still lower than that seen in more developed economies (Krizman, 2009).

To drive change and improvement in the overall business relationship, LSPs and customers must work toward a common set of goals and objectives, and establish a meaningful exchange of knowledge relating to planning, management, and performance measurement. In an environment of rising logistics costs, managing logistics activities will remain a daunting task, although managers believe that collaboration is now vital for improving efficiency. Working together is preferable, not only for LSPs and their customers, but also other key stakeholders. Due to financial restrictions in the region and a lack of investment in logistics technology, organisational innovation could be the key to improved efficiency in logistics activities.

2.1 Involvement

Engelbrecht (2004, 204) argues that, in order to build a successful relationship, it is crucial that employees from both sides collaborate efficiently and effectively to ensure an optimal implementational performance. This can be achieved with early LSP involvement in the outsourcing process. The LSP and their customer must be able to communicate and co-operate in the beginning stages of the process. According to Langfield and Greenwood (1998), the early involvement of an LSP provides direct assistance to customers. The constant involvement of LSP provides good tuning as regards day-to-day operations (Qureshi et al., 2007).

Since the construct of involvement has so far received very little attention in logistics outsourcing research, the importance of the construct was stressed by the participants of the in-depth interviews we conducted during our research. To find out to what extent an LSP was involved in the implementation process and how well the collaboration between employees from both partners has been functioning, a measurement scale for the construct of involvement was developed. However, involvement itself is not sufficient as partners should exchange their knowledge about outsourcing performance improvement through organisational learning (Hult *et al.*, 2000a; 2000b).

2.2 Knowledge sharing

Logistics practitioners recognise that knowledge sharing is so significant for success that it should begin well before the logistics contract is signed (Kerr, 2005). Knowledge sharing is a sub-construct of *organisational learning* in the Baker and Sinkula (1999), Hult *et al.* (2000, 2000b), and Panayides (2007) research which refers to the organisation-wide activity of creating and using knowledge to enhance a competitive advantage. These include obtaining and sharing information about customer needs, market changes and competitor activity (Hurley and Hult, 1998). Organisational learning theory suggests that the development of new knowledge occurs best in conditions where there are few or no existing organisational routines to unlearn (Autio *et al.*, 2000; Cohen and Levinthal, 1990). As Sinkula (1994) argues, organisational learning is characterised by the presence of an intra-organisational culture that values learning manifested by top management commitment towards learning, a shared vision, open-mindedness concerning change, and the intra-organisational sharing of knowledge. Organisational learning is 'an intangible resource' and, in order to be manifested in practice, there must be 'an understanding from management of its importance and consequent commitment towards it' as Panayides stresses (2007, 136). Some authors recognise literature gaps in the field of logistics and supply chain management with regard to the relationship of organisational learning to inter-organisational marketing (Panayides, 2007; Stank *et al.*, 1999; Wisner, 2003; Lambert *et al.*, 2004; Lambert *et al.*, 2005) so they include the construct of organisational learning in their research.

2.3 Innovation

The global marketplace has driven businesses to look for new ways to innovate (Flint *et al.*, 2005, 113). However, when considering innovation, people focus on technological as opposed to service innovation. In order to purposely manage the innovation in logistics, it is crucial to have an understanding of how innovation occurs. In the Flint *et al.* (2005) study, there is strong evidence that customers expect service providers to continuously drive towards innovation so as to increase their value to customers, and for their own sustained competitive position. Customers have expressed growing demand for more effective logistics solutions. From the individual point of view, innovativeness is conceived as the degree to which an individual, compared to others in the social system, is relatively early in adopting something new (Hurt *et al.*, 1977). Firm innovativeness, as defined by Hurley and Hult (1998), means openness to new ideas as an aspect of a firm's culture. Innovation implies the generation, acceptance and implementation of new ideas, processes, products or services (Calantone *et al.*, 2002, 517). This definition is close to that of Rogers (1995, 11) as 'an idea, practice or object that is perceived as new by an individual or other unit of adoption'. Knowledge sharing, as mentioned above, is closely related to organisational innovation. Many scholars stress the importance of such an orientation to enhancing innovation capability (e.g. Damanpour, 1991; Verona, 1999; Cahill, 1996).

Some researchers define logistics service providers' orientation towards innovation as proactive improvement (Engelbrecht, 2004; Deepen, 2007). Except for studies by Engel-

brecht (2004), Flint et al. (2005) and Deepen (2007), innovation has received very little attention in current logistics outsourcing research. Their conclusions are that logistics innovation still requires substantial further research since it is a major driver of logistics outsourcing performance, as shown in empirically tested findings.

2.4 Logistics outsourcing performance

A logistics outsourcing performance is usually defined as the mutual logistics activities of both partners involved in long-term relationships. It is influenced by the performance of logistics processes performed in-house and those affected by the performance of outsourcing arrangements provided by LSPs. By joining forces, both partners will improve efficiency, profitability and customer service. The performance of logistics outsourcing projects cannot be explained by the extent of outsourced services since other performance drivers are relevant, such as the implementation process, the design of the outsourcing relationship, logistics costs, market characteristics etc. A large number of logistics researchers have defined and measured logistics service performance in many different ways (e.g. Mentzer and Konrad, 1991; Daugherty et al., 1998; Stank et al., 1999; Chow et al, 1995; Stank et al., 2001; Stank et al., 2003; Dehler, 2001; Knemeyer and Murphy, 2004; Engelbrecht, 2004; Cahill, 2007; Deepen, 2007; Panayides, 2007). Logistics outsourcing performance has to be measured in a multi-dimensional way, reflecting multiple stakeholders and interests. Stank et al. (2003) propose a construct of three dimensions: operational, cost, and relational performance as antecedents of customer satisfaction with outsourcing arrangements. Knemeyer and Murphy (2004, 40) suggest a construct consisting of operations, channel, and asset reduction performance. Engelbrecht (2004, 212) and Deepen (2007, 85–88) agree that achieving the goals of outsourcing contracts is relevant for measuring performance. It is not the achievement of previously set goals alone that matters, but also the quality of the services provided. An LSP can deliver better services and added value by exceeding the expectations of the customer. Deepen (2007, 87) argues that ‘this cannot be measured through the construct of goal achievement’ but must be considered as ‘whether the LSP has created added value by being customer oriented, innovative and proactive’. The second dimension, goal exceedance, is included to address those LSPs exceeding the expectations of customers. The goals are usually agreed upon in contracts between partners, although exceeding the goals requires much different efforts. In order to reach higher levels of outsourcing, goal exceedance in terms of service improvements and cost reductions, the simultaneous improvement of goal achievement must be realised as Deepen (2007, 88) believes.

3. DEVELOPMENT OF THE HYPOTHESES

Based on our literature review, the variables proposed as directly or indirectly affecting logistics performance in two dimensions were conceptualised and hypotheses on the causal linkages for the conceptual model were generated. The importance and usage of the constructs were previously checked with participants (logistics managers) of LSPs and their customers via in-depth interviews.

Gifford and Stalebrink (2002, 645) state that a key issue for logistics organisations is 'how to create organisations that pay attention to customers and focus on results and performance'. Running the logistics processes as specified in a contract between two parties is a prerequisite for successful relationships. Outstanding performance in changing environments and markets can only be achieved through constant improvements to the logistics processes, with the latter being supported by involvement and knowledge sharing between partners.

Our first two constructs, mentioned in the literature as an antecedent of logistics performance, are 'involvement' and 'knowledge sharing'. For the first time, involvement found its place in Engelbrecht's (2004) study of logistics outsourcing. Due to the complexity of logistics outsourcing and its impact on different business processes, the implementation should be overseen by interdisciplinary teams of experts from both partners. Together, the teams prepare the strategy of the logistics process in the customer's organisation and its implementation (Engelbrecht, 2004). The analysis of interviews with logistics managers of LSPs confirmed that such teams support successful implementation performance and benefit both partners. This is in accordance with Engelbrecht's (2004) empirical test findings.

Knowledge sharing, as part of organisational learning, is characterised by the presence of an intra-organisational culture that values learning manifested by top management's commitment to learning, and the intra-organisational sharing of knowledge (Sinkula, 1994). This includes obtaining and sharing information about customer needs, market changes and competitor actions (Hurley and Hult, 1998), and can easily be treated as the antecedent of innovation. Knowledge sharing as part of organisational learning played an important role in Panayides (2007) study of logistics outsourcing performance as well as in the research of Anderson and Weitz (1992), Stank et al. (1999), Wisner (2003), Lambert et al. (2004), Lambert et al. (2005).

Through empirical findings, Panayides (2007) proved the positive influence of organisational learning on the quality of logistics outsourcing performance. He argued (2007, 145) 'organizational learning not only improves learning about the relationship counterpart, but also cultivates the ability to learn and the fostering of closer relational ties'. In our research, the Sinkula (1994) definition and the adopted Panayides (2007) definition of knowledge sharing as a sub-construct of organisational learning is utilised for statements about the constructs' impact on building the marketing relationship in logistics outsourcing. Since both constructs (involvement and knowledge sharing) show closer ties and mutually affect business performance through innovation, the following hypotheses were formulated for the relationships between involvement, knowledge sharing, and innovation:

H1: Involvement positively influences innovation.

H2: Knowledge sharing positively influences innovation.

As stated before, innovation increases the value creation for customers and for the LSPs' own sustained competitive position. The logistics service providers' orientation towards

innovation is defined as a proactive improvement (Engelbrecht, 2004; Deepen, 2007). Since the study of the construct has received very little attention in current logistics research, in the conclusions of those involved in such research the suggestions are as follows: logistics innovation requires substantial further research since, in empirically tested findings, proactive improvement is a major driver of logistics outsourcing performance (Engelbrecht, 2004; Flint et al., 2005 and Deepen, 2007). The hypothesis of the positive effect of innovation on logistics outsourcing performance (goal achievement and goal exceedance) is supported by transaction cost theory. The optimisation process performed by an LSP results in lower costs for customers. In accordance with social exchange theory, an LSP can expect to be rewarded for improved services and will strive for higher goal achievement. Some measurable effects can be obtained if LSPs are constantly improving their efforts, supported by innovation. Stank et al. (2003) and Engelbrecht (2004) show that the proactive improvements of an LSP have a strong, positive causal effect on the goals of outsourcing arrangements; on both operational and cost performance. The linkage between innovation and goal achievement in their technical aspects was investigated by Sauvage (2003) and showed that innovation is crucial for competitiveness. Therefore, the following hypothesis is proposed for the relationships between innovation and goal achievement:

H3: *Innovation positively influences goal achievement.*

Not only will innovation in logistics services influence the goal settings of partners, but it will also exceed the expectations of customers regarding either better services or lower costs, or both. Therefore, the following hypothesis reads:

H4: *Innovation positively influences goal exceedance.*

Both goal achievement and goal exceedance are connected. If an LSP is creative by being customer-oriented, innovative and proactive, thereby increasing value in the dimensions of service quality and costs, the expectations will not only be fulfilled but can also be exceeded. Therefore, the next hypothesis is proposed:

H5: *Goal achievement positively influences goal exceedance.*

The conceptualisation is schematically depicted in Figure 1.

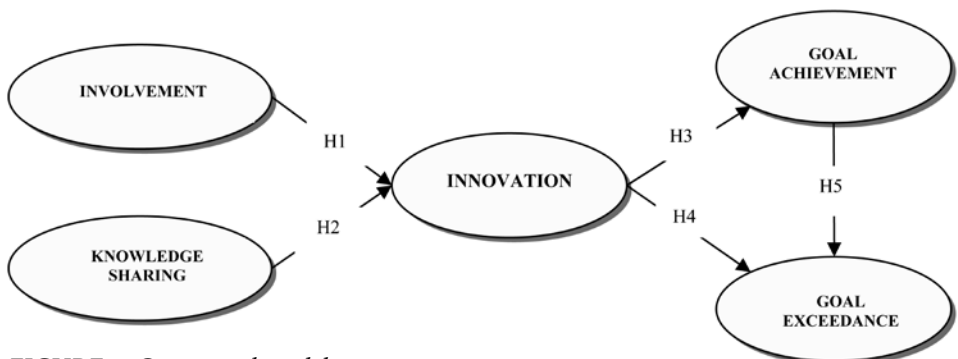


FIGURE 1: *Conceptual model*

4. RESEARCH DESIGN

4.1 Operationalisation of the variables

The constructs of involvement and of knowledge sharing, relevant for the model of logistics outsourcing performance, were operationalised as follows. Although it has been partially studied in relationship marketing research, few established scales exist for logistics outsourcing relationships. In order to assure relevant indicators for the constructs, in-depth interviews were conducted in the March–April 2008 period. Fifteen managers from two companies from a list of the largest Slovenian LSPs and their main customers participated. The participants represented two different levels of managers (operational and top management) and have several years of experience with logistics outsourcing relationships. Each individual was questioned about the relationship with their partner (provider or customer) in logistics outsourcing. The interviews were audio taped and then transcribed.

The operationalisation of involvement was developed in accordance with Engelbrecht's (2004) operationalisation of construct involvement (INV 1 and 2). It refers to LSP involvement in the preparation of outsourcing activities in the early stages. Both partners decide to work together in order to benefit the outsourcing arrangement.

The operationalisation of knowledge sharing is based on Sinkula *et al.* (1997), Hult and Ferrell's (1997a; 1997b) operationalisation of the construct organisational learning (KSH 1 and 2) because knowledge sharing is a sub-construct of it, and suggestions made in the in-depth interviews (KSH 3 and 4). Indicators for measuring the constructs are shown in Table 1.

TABLE 1: *Indicators for measuring the constructs of involvement and knowledge sharing*

Please indicate your level of agreement with the following statements in your outsourcing project with a particular LSP.	
INV 1	The LSP was involved in the outsourcing relationship in the early stages.
INV 2	The employees responsible for the outsourcing arrangement on both sides work together very well.
KSH 1	The success of working together is influenced by knowledge sharing.
KSH 2	The basic values of this organisation include learning as a key to improvement in our relationship.
KSH 3	There is a lack of joint programmes (meetings, seminars...) in knowledge sharing between us and our LSP.
KSH 4	Top management of our organisation supports knowledge sharing and mutual learning for logistics outsourcing needs.

Innovation is included in the logistics outsourcing research of Engelbrecht (2004), Flint *et al.* (2005) and Deepen (2007). They call the construct 'proactive improvement,' with a very similar definition as other researchers (e.g. Flint *et al.*, 2005) use

for innovation orientation. To operationalise the construct, the scale developed by Engelbrecht (2004) and adopted by Deepen (2007) was selected with slight modifications, as suggested by logistics experts in the Slovenian companies, as Table 2 shows.

TABLE 2: *Indicators for measuring the construct of innovation*

Please indicate your level of agreement with the following statements about innovation.	
INN 1	The LSP continuously makes suggestions for improvements of activities, even those outside its direct contractual responsibility.
INN 2	In changing business situations the LSP by itself modifies logistics processes if this is necessary and beneficial for us.
INN 3	The LSP continuously makes suggestions for improvements in logistics performance.
INN 4	The LSP services follow improvements and progress in logistics.
INN 5	The LSP shows a high level of innovation.

To measure operational research outsourcing performance, the scale developed by Engelbrecht (2004) and adopted by Deepen (2007) was selected. The reason for this selection was that the scale has been successfully used in logistics outsourcing studies of German and American companies. The operationalisation was aggregated to a more basic level of the construct of goal achievement, where it covers two aspects: achievement of the actual goals agreed on in the contract, and the quality of the relationship. Table 3 presents the selected indicators.

TABLE 3: *Indicators for measuring the construct of goal achievement*

Please indicate your level of agreement with the following statements on how satisfied you are with the relationship between this LSP and your company.	
GAC 1	The goals between partners in logistics outsourcing relationships are completely fulfilled.
GAC 2	Our LSP always delivers its services within the range of agreed costs.
GAC 3	Our LSP always delivers its services within the range of agreed quality.
GAC 4	Through this co-operation, our logistics outsourcing costs have been reduced to the level we expected.
GAC 5	We are very satisfied with the relationship with our LSP.

Goal achievement is the minimum condition that must be obtained in order to satisfy the customer. LSPs have to be engaged in activities that significantly exceed the set goals such as customer orientation, innovation and pro-activeness (Deepen, 2007). The in-depth interviews conducted in our research showed strong evidence supporting the importance of exceeding goals in order to maintain satisfaction in relationships. The measurement scale is quite new, developed by Deepen (2007), therefore only slight modifications were made to it. Four indicators were selected which are shown in Table 4.

TABLE 4: *Indicators for measuring the construct of goal exceedance*

Please indicate your level of agreement with the following statements on how satisfied you are with the relationship between this LSP and your company.	
GEX 1	The goals and expectations we jointly set in the agreement have mainly been exceeded.
GEX 2	Our expectations concerning quality performance have mainly been exceeded.
GEX 3	Our expectations concerning a reduction of costs in service performance have mainly been exceeded.
GEX 4	In comparison with the cost of providing services, the overall service quality performance is better than expected.

4.2 Questionnaire design and pretest

The development of the questionnaire was based on the conceptualisation of the variable theorised to effect the outsourcing relationship and performance. To measure the constructs, a seven-point Likert-type scale was utilised, which was anchored with 1 = strongly disagree to 7 = strongly agree with statements. Since multi-item Likert scales are a common and recommended means of collecting data on latent constructs (Peterson, 1994) and some disagreement exists on the question of how many points the scale should have, we chose the wider scale which better differentiates between answers. In addition, structural equation modelling will be utilised which requires that the scale of the observed variables must be continuous (Byrne, 2001). Since the seven-category Likert scale is assumed to be suitable for fulfilling the requirement of continuously scaled data (Bollen and Barb, 1981), we chose the latter.

In the second part of the questionnaire, the participants were invited to respond to a set of questions describing themselves, their company, and the activities that are outsourced to LSPs. Because the empirical study relied completely on the perceptions of key informants, it was important that the respondents were competent. Hence, the questionnaire contained a final set of questions that refer to the respondent's position and tenure with their company.

The questionnaire and the cover letter for this study were first (as a pretest) sent out by e-mail to the sample respondents consisting of 18 marketing relationship experts and logistics managers. Both documents were discussed in-depth with the respondents. Their comments and suggestions for improvements were used to revise the questionnaire. The results of the pretest indicated that the respondents had no difficulty comprehending the directions or questionnaire items. This procedure is recommended in the literature to avoid logical errors, misunderstandings and misinterpretations (Churchill, 1991; Malhotra and Birks, 2000).

4.3 Data collection

Empirical data were gathered in the survey among logistics managers of manufacturing and retail companies who had built long-term relationships in logistics outsourcing

with two of the largest LSPs in Slovenia, and the LSPs had to be able to offer a complete logistics service to their customers. The study was conducted in co-operation with the chosen LSPs. Based on the LSPs' customer lists, we contacted 67 companies by e-mail; two-thirds of them were small companies (up to 50 employees). Two follow-up reminders with enclosed questionnaires were sent via e-mail within 3 weeks, resulting in 58 useable responses, representing a response rate of 86.5%.

4.4 Measurement assessment

For the assessment of reliability and validity, an exploratory factor analysis and the coefficient (Cronbach) alpha are used in this study. Due to the small sample size, the threshold values for factor loadings and communalities were raised. The small sample size is the reason that partial least squares regression (PLS) was employed to assess the measurement model. PLS was developed (Wold, 1982) as a general method for estimating path models involving latent constructs indirectly measured by multiple indicators. It was designed to deal with multiple regressions when the data sample is small, there are missing values, or multicollinearity is present (Rigdon, 1996). PLS models are defined by two sets of linear equations: the inner model which specifies the relationships between unobserved or latent variables, and the outer model that specifies the relationships between latent variables and their associated observed or manifest variables. The approach is well suited and widely used because of its analysis procedures and its modelling flexibility.

5. DATA ANALYSIS AND RESULTS

The unit of analysis for the present research was the specific logistics service provider-customer relationship. The present sample consisted of retailers (70.4%), manufacturers (22.2%) and others (7.4%). More than one-third of the selected customer-LSP relationships (39.6%) had existed for more than 10 years, 28.3% for 6 – 10 years, 13.2% for 4 – 5 years, and only 18.9% for less than 4 years.

To present the results of customer statements on the variables included in the study, univariate statistical analyses of the variables (calculating arithmetic means and standard deviations) were performed and correlations between latent variables were calculated. The results are shown in Tables A-1 and A-2 in the Appendix.

5.1 Check for unidimensionality

The set of indicators for the construct was initially examined using exploratory factor analysis (PCA – Principal Components Analysis) to identify items not belonging to the specified domain. Only if solely one factor is extracted can convergent validity be assumed, and the factor must explain at least 50% of the variance of its indicators. Hair et al. (1998, 112) suggest a minimum factor loading of 0.70 for small samples of 60 units.

Our sample has 58 units so items with a loading of less than 0.70 and communality less than 0.40 were discarded. To examine the appropriateness of factor analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was employed. Values between 0.5 and 1.0 indicate that factor analysis is appropriate (Aaker and Day, 1990; Malhotra and Birks, 2000). Both items for the construct of *involvement* remain. For the construct of *knowledge sharing* three out of four remain. For the construct of *innovation*, as well as for the construct of *goal exceedance*, all five items remain after the refinement. One item was discarded from the construct of *goal achievement* and four of them remain. All results are shown in Table 5.

TABLE 5: EFA for indicators of the constructs

Constructs	Factor loading	Communality
Involvement		
The LSP was involved in the outsourcing relationship in the early stages. (INV 1)	0.914	0.836
The employees responsible for the outsourcing arrangement on both sides work together very well. (INV 2)	0.914	0.836
KMO_{INV} = 0.500		
Total variance explained (cumulative): 83.57%		
Knowledge sharing		
Top management of our organisation supports knowledge sharing and mutual learning for logistics outsourcing needs (KSH 4).	0.792	0.627
The basic values of this organisation include learning as a key to an improvement in our relationship (KSH 2).	0.790	0.625
The success of working together is influenced by knowledge sharing (KSH 1).	0.706	0.535
KMO_{KSH} = 0.652		
Total variance explained (cumulative): 59.6%		
Innovation		
The LSP continuously makes suggestions for improvements in logistics performance (INN 3).	0.925	0.773
The LSP shows a high level of innovation (INN 5).	0.918	0.705
The LSP services follow the improvements and progress in logistics (INN 4).	0.895	0.856
The LSP continuously makes suggestions for improvements of activities, even those outside its direct contractual responsibility (INN 1).	0.879	0.802
In changing business situations the LSP by itself modifies logistics processes if this is necessary and beneficial for us (INN 2).	0.839	0.843
KMO_{INN} = 0.846		
Total variance explained (cumulative): 79.6%		
Goal Achievement		
Our LSP always delivers its services in the range of the agreed quality. (GAC 3)	0.898	0.753
We are very satisfied with the relationship with our LSP. (GAC 5)	0.873	0.558
The goals between the partners in logistics outsourcing relationships are completely fulfilled. (GAC 1)	0.868	0.806
Our LSP always delivers its services in the range of the agreed costs. (GAC 2)	0.747	0.762
KMO_{GAC} = 0.846		
Total variance explained (cumulative): 79.6%		

Goal exceedance

Our expectations concerning the quality performance have mainly been exceeded. (GEX 2)	0.864	0.710
The goals and expectations we jointly set out in the agreement have mainly been exceeded. (GEX 1)	0.843	0.746
In comparison with the cost of providing services the overall service quality performance is better than expected. (GEX 4)	0.834	0.634
Our expectations concerning a reduction of costs in service performance have mainly been exceeded. (GEX 3)	0.796	0.696
KMO_{GEX} = 0.846		
Total variance explained (cumulative): 79.6%		

To assess the internal consistency reliability, Cronbach's alpha coefficient was calculated. A value of 0.6 or less generally indicates unsatisfactory internal consistency reliability. The value tends to increase when the number of scale items rises (Malhotra and Birks, 2000). Cronbach's Alpha, shown in Table 8, for all latent variables indicates satisfactory internal consistency reliability.

Following basic descriptive analysis (examination of coding errors, means, and standard deviations) and exploratory factor analysis (EFA), the data were subjected to CFA by means of PLS. The analysis was carried out using the SmartPLS 2.0 statistical package (Ringle et al., 2005).

5.2 Convergent Validity and Reliability Measures

A reliable and valid measurement of a construct is the main goal of developing a measurement model. We assessed the adequacy of the measurement model by examining individual item reliabilities, convergent, and discriminant validity.

Composite reliability that measures the internal coherency of all indicators related to the construct is also called construct reliability. The threshold value should be greater than 0.6. Composite reliability for all latent variables is greater than the requirements (Table 8) so the constructs are reliable.

Convergent validity is the extent to which the scale correlates positively with other measures in the same construct. Student T-tests for path coefficients were calculated after computing a bootstrap method in order to validate all of the model's items for convergent validity (Chin and Newsted, 1999; Anderson and Gerbing, 1988). T-values greater than |1.96| determine a significant path at $p \leq 0.05$. A single indicator was strongly correlated with the latent variable as shown in the T-values in Table 6.

TABLE 6: *T-values for indicators for latent variables in the measurement model*

Indicators	T-value	Correlation with latent variable
INV 1	39.804	0.919
INV 2	37.357	0.909
KSH 1	9.760	0.706
KSH 2	23.352	0.864
KSH 4	9.876	0.717
INN 1	28.523	0.875
INN 2	31.339	0.850
INN 3	66.243	0.921
INN 4	51.663	0.893
INN 5	57.534	0.918
GAC 1	26.875	0.864
GAC 2	9.596	0.685
GAC 3	65.421	0.916
GAC 5	62.092	0.897
GEX 1	25.202	0.857
GEX 2	28.470	0.880
GEX 3	17.800	0.777
GEX 4	18.147	0.818

$p \leq 0.001$

The convergent validity measure represents the common variance between the indicators and their construct. It is measured by the Average Variance Extracted (AVE) and the acceptable threshold should be superior to 50% (Fornell and Larcker, 1981). The AVE of all latent variables complies with this requirement (Table 8).

Finally, Fornell and Larcker (1981) suggest the use of the average variance extracted to assess discriminant validity. They propose that sufficiently high discriminant validity exists if the AVE of a construct in pairs exceeds the squared correlation between them. All constructs comply with this requirement (Table 7).

TABLE 7: *Discriminant validity using the Fornell-Larcker criterion*

Construct pairs	AVE ₁	AVE ₂	γ^2	CONFIRMED Fornell-Larcker criterion
GAC-INN	0.715	0.796	0.430	YES
GAC-GEX	0.715	0.696	0.489	YES
GAC-INV	0.715	0.721	0.223	YES
GAC-KSH	0.715	0.586	0.225	YES
GEX-INV	0.696	0.721	0.138	YES
GEX-INN	0.696	0.796	0.493	YES
GEX-KSH	0.696	0.586	0.101	YES
INV-KSH	0.721	0.586	0.347	YES
INN-INV	0.796	0.721	0.392	YES

AVE1 – AVE of the first construct in a pair; AVE2 – AVE of the second construct in a pair

The communality index measures the quality of the measurement model for each block of indicators. The cross-validated communality index measures the quality of the measurement model for each block. It is calculated by a blindfolding procedure available in Smart PLS. Table 8 represents overall results for the convergent validity and reliability for latent variables in the measurement model of logistics outsourcing performance.

TABLE 8: *Convergent validity and reliability measures*

Latent variable	Cronbach's Alpha	Composite reliability	AVE	Communality	Cross-validated communality (H ²)
INV	0.803	0.910	0.721	0.836	0.426
KSH	0.660	0.808	0.586	0.586	0.206
INN	0.936	0.951	0.796	0.796	0.674
GAC	0.869	0.908	0.715	0.715	0.526
GEX	0.855	0.901	0.696	0.696	0.487

Once the validities and the composite reliability was stated, the structural model could be tested with an analysis of regression coefficients (γ , β) and with the explained variance (R^2) of each endogen construct (Fornell and Cha, 1994).

5.3 Hypotheses testing

To measure the construct in a research study we must be sure that the measures we have chosen are reasonable measures of the theoretical construct. From a measurement aspect, nomological validity measures the degree to which the constructs fit within the logical network of the theory.

The structural equation model includes the exogenous latent variables of involvement and of knowledge sharing, and the endogenous latent variables of innovation, goal achieve-

ment, and goal exceedance. In the structural model, all the proposed hypotheses find support. The variables of involvement and knowledge sharing explain 44.5% of the variance of innovation. Innovation is therefore relatively well explained by the independent variables. The antecedents of logistics outsourcing performance (INV, KSH and INN) in the model explain 43.0% of the variance of goal achievement. Innovation has a strong effect and direct influence on both dimensions of logistics outsourcing performance. The effect of innovation is stronger on goal achievement than it is on goal exceedance. The variable of goal exceedance is explained by two endogenous variables, innovation and goal achievement, with almost equally predictive quality. The contributions on R^2 are: $f^2_{INN} = 13.9\%$ and $f^2_{GAC} = 14.2\%$. Both variables explain 59.3% of the variance of goal exceedance.

The quality of each structural equation is measured by the cross-validated (cv) redundancy index (i.e. Stone–Geisser’s Q^2) (Tenenhaus et al., 2005). The cv-redundancy index was computed using the blindfolding cross-validation method in SmartPLS. In our model, all blocks of indicators have an acceptable cv-redundancy index F^2 . Due to blindfolding, the cv-communality and the cv-redundancy measures may be negative, which implies that the corresponding latent variable is badly estimated.

TABLE 9: Redundancy and cv-redundancy index for the structural model

Latent variable	Redundancy	Cross-validated redundancy index (F^2)
INV	0.000	0.000
KSH	0.000	0.000
INN	0.211	0.348
GAC	0.292	0.280
GEX	0.283	0.399

PLS path modelling, different from other SEM (e.g. LISREL), does not optimise any global scalar function (Tenenhaus et al., 2005) so they propose a global criterion of goodness-of-fit (GoF). The GoF represents an operational solution to the problem as it may be meant as an index for validating the PLS model globally. The GoF for our model is 0.596, meaning that the model is able to take into account 59.6% of the achievable fit. The obtained results are shown to be statistically significant (Tenenhaus, Amato and Vinzi, 2000).

The results reveal a positive path coefficient between involvement and innovation ($\gamma=0.458$; $p \leq 0.001$), knowledge sharing, and innovation ($\gamma=0.286$; $p \leq 0.001$), innovation and goal achievement ($\beta = 0.656$; $p \leq 0.001$), innovation and goal exceedance ($\beta = 0.428$, $p \leq 0.001$), and goal achievement and goal exceedance ($\beta = 0.418$; $p \leq 0.001$). All path coefficients are statistically significant and therefore all five hypotheses were supported. The final results for testing the hypotheses are shown in Figure 2.

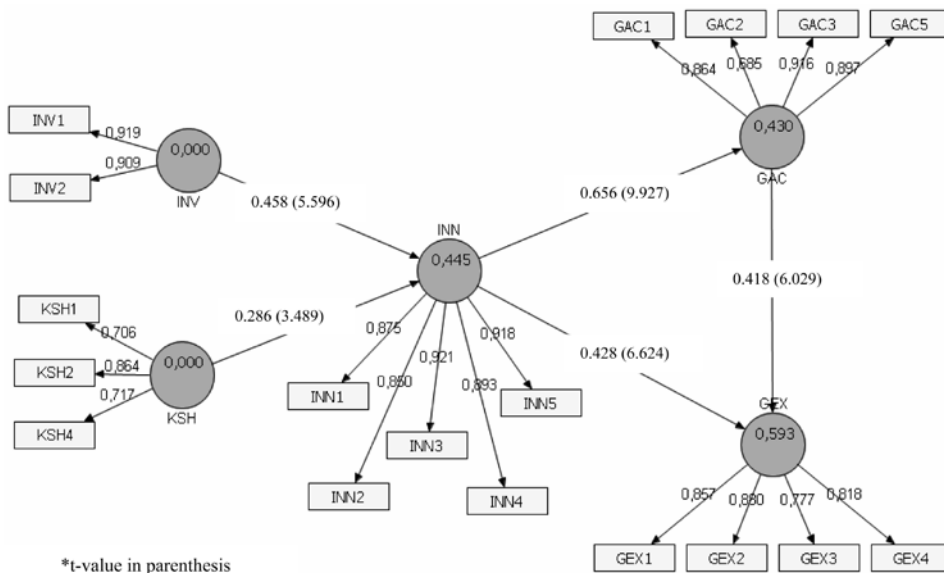


FIGURE 2: The structural model: path-coefficients and t-values* between latent variables

6. DISCUSSION

The purpose of this article is to contribute to theoretical and methodological findings in logistics outsourcing discussions by analysing the relationship variables of *involvement*, *knowledge sharing*, and *innovation* as antecedents of *logistics outsourcing performance*, measured in two dimensions: *goal achievement* and *goal exceedance*. As Anderson and Gerbing (1988) suggested, a two-step approach has become a widely accepted standard and it was also used in our research.

The empirical findings generally support the proposed model of the consequences of relationship variables in logistics outsourcing. First, all construct measurement scales were developed and tested for validity and reliability. Once the validities and reliabilities were stated, the structural model was tested with an analysis of regression coefficients and with the explained variance of each endogen construct. The results show that involvement and knowledge sharing have a positive and strong influence on innovation of the LSP. Innovation is therefore relatively well explained by the independent variables. The antecedents of logistics outsourcing performance (involvement, knowledge sharing, and innovation) influence the logistics performance in both dimensions. The effect of innovation is stronger on goal achievement than it is on goal exceedance. The variable of goal exceedance is explained by two endogenous variables, innovation and goal achievement, with almost equally predictive quality. The structural model is reliable and the obtained global goodness-of-fit criterion shows that the model is able to take 59.6% of the achievable fit into account. All path coef-

ficients between the constructs were statistically significant and therefore all five hypotheses were supported.

In general, LSPs' involvement produces a positive impact on logistics performance through organisational innovation. According to Englebrecht (2004), it is crucial that employees from both sides collaborate efficiently and effectively to ensure an optimal implementational performance. This can be achieved through early LSP involvement in the outsourcing process. Involvement ensures that a healthy relationship prospers (Qureshi et al., 2007). But, as Hult et al. (2000a, 2000b) argue, involvement itself is not sufficient as partners should exchange their knowledge about outsourcing performance improvement through organisational learning. A sub-construct of organisational learning is knowledge sharing – for this we hypothesise a positive link with innovation. It refers to the organisation-wide activity of creating and using knowledge to enhance a competitive advantage which is crucial for service providers in Slovenia since their logistics knowledge is still in the process of developing. Logistics practitioners also recognise that knowledge sharing is so significant for success that it should begin well before the logistics contract is signed (Kerr, 2005). Organisational learning theory suggests that the development of new knowledge occurs best in conditions where there are few or no existing organisational routines to unlearn (Autio *et al.*, 2000; Cohen and Levinthal, 1990) so it can facilitate innovation processes in organisations. As Sinkula (1994) argued that organisational learning is characterised by the presence of an intra-organisational culture that values, among others, the intra-organisational sharing of knowledge, we found it to be an important variable that impacts on the innovative behaviour of service providers. Like some other authors, we also recognise literature gaps in the field of logistics and supply chain management with regard to the relationship of knowledge sharing with inter-organisational marketing (e.g. Panayides, 2007; Stank et al., 1999). Knowledge sharing, similar to other sub-constructs of organisational learning, is 'an intangible resource' and, in order to be manifested in practice, there must be 'an understanding from management of its importance and consequent commitment towards it' (Panayides, 2007, 136). Innovation is desirable and it is important for management to have a commitment to pursuing an innovative culture in their organisation. That is why we included the construct of knowledge sharing in our model and hypothesised the direct impact on innovation. As the results show, knowledge sharing has a positive and statistically significant link with service providers' innovation.

It must be mentioned that the respondents on average rated the variables measuring both involvement and knowledge sharing slightly higher than the variable of innovation. They expressed the lowest agreement with the statement that '*the LSP was involved in the outsourcing relationship at an early stage*'. The statement shows that the customer transfers logistics activities to the LSP after the decision on the outsourcing arrangement is made. It would be much better for both if the LSPs are involved when the benefits and risks are considered, and solutions concerning performance are created. The variable measuring innovation is on average rated the lowest of all variables. Therefore, LSPs' innovation and proactive improvement still have the opportunity to expand and contribute to the success of both partners in logistics and overall business performance.

In this research, innovation was found to be a mediator and a facilitator in logistics outsourcing performance within the customers' sample group in Slovenia. Innovation makes logistics performance more efficient and more effective, first, by achieving the goals that are set between the service provider and its customer and, second, when the customer desires a superior service and that the goals should be exceeded. Indicators of service performance mainly refer to service quality and service costs.

Finally, as mentioned at the beginning, another goal of this research was to develop recommendations for practice and outline some managerial implications for logistics service providers and their customers. The driver of the logistics outsourcing performance is the relationship with the LSP. Factors such as early involvement and knowledge sharing are directly connected with LSPs' innovation of the processes. Through it, the LSP makes the outsourcing arrangement more successful. Depending on the goals of the customer, whether the main focus is costs or the quality of services, the customer must select an LSP that acts innovatively and continuously improves the logistics processes.

7. CONCLUSION

Customers in the Slovenian sample, on average, believe their LSPs still have possibilities for improvement with involvement in the early stages of the logistics processes, by mutual learning and knowledge sharing, and by innovative orientation. These empirical results are in line with findings from the in-depth interviews conducted with logistics managers of manufacturing and retail companies who had built long-term relationships in logistics outsourcing with two of the largest LSPs in Slovenia. The findings concerning the proposed antecedents and their influence on logistics outsourcing performance are mostly in line with results achieved in other contexts (e.g. Engelbrecht, 2004; Deepen, 2007). Despite the lower development of logistics outsourcing activities in Slovenia, the main drivers of logistics performance remain the same and their impact on performance is relevant.

The results of this study must be interpreted in view of certain limitations – the sample was restricted to LSPs in Slovenia and their customers. Slovenia is still a growing economy, but quite small, and outsourcing processes are not very common in our retail and manufacturing organisations. Due to economic recession and smaller investments in technologies, opportunities for further growth lie in building relationships among dependent organisations.

The sample was restricted to two of the largest LSPs in Slovenia. The criteria for selection of the sample were: first, the LSPs must be able to offer complete logistics services and, second, the relationships they build have to be on a long-term basis.

The analysis for this research was undertaken using data collected from the customer side. Future research may seek to collect data by adopting a dyadic approach since both partners are equally responsible for future success.

This study only shows one part of the whole picture and many opportunities thus exist for a future investigation of factors that influence the development of relationships and improved logistics outsourcing performance (e.g. trust, commitment, co-operation and others). Early involvement, knowledge sharing, and innovation are some of the most important relationship factors in outsourced services that influence performance. In our findings, they apparently play an important role in the LSPs' efforts to consolidate their relationships with their customers, but there are still opportunities for improvement.

Last but not least, this framework could be tested in other developed as well as transitional economies to see if differences in logistics outsourcing exist compared to our findings.

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Appendix

TABLE A-1: Means and standard deviations for the latent variables

Latent variable	N	MEANS	SD
GAC	58	5.080	1.236
GEX	58	3.764	1.265
INN	58	4.194	1.444
INV	58	4.779	1.535
KSH	58	5.743	1.237

TABLE A-2: Correlation matrix for the latent variables

	GAC	GEX	INN	INV	KSH
GAC	1.000	0.000	0.000	0.000	0.000
GEX	0.699	1.000	0.000	0.000	0.000
INN	0.656	0.702	1.000	0.000	0.000
INV	0.473	0.372	0.626	1.000	0.000
KSH	0.474	0.319	0.555	0.589	1.000