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## COOPERATION BETWEEN PARTNERS IN LOGISTICS OUTSOURCING

**Summary.** The purpose of this article is to present the research results from a study of impact of cooperation between logistics service providers (LSP) and their customers on logistics outsourcing performance conducted in the Slovenian market. On the basis of the existing literature and some new argumentations, derived from in-depth interviews with logistics experts of providers and customers, the measurement and structural models were empirically analyzed. Existing measurement scales for the constructs of cooperation, and outsourcing performance were slightly modified for this analysis. Their purification and measurement for validity and reliability were performed. Multivariate statistical methods (EFA, CFA and SEM - Partial Least Squares) were utilized and hypotheses were tested. Cooperation between partners has a significant impact on the relationship and reduces problems in logistics performance. Cooperation in the model explain 58.5% of the variance of goal achievement and 36.6% of the variance of goal exceedance logistics of outsourcing performance.

## СОТРУДНИЧЕСТВО МЕЖДУ ПАРТНЕРАМИ В ЛОГИСТИЧЕСКОМ АУТСОРСИНГЕ

**Аннотация.** Цель этой статьи состоит в том, чтобы представить результаты исследования влияния сотрудничества между операторами логистического обслуживания (LSP) и их клиентами на логистике, выполняющими сторонние задания на рынке Словении. На основе существующей литературы и некоторых новых аргументаций, полученных из всесторонних интервью с экспертами по логистике, от операторов и клиентов, были опытным путем исследованы структурные модели и данные измерений. Существующие весовые коэффициенты для моделей сотрудничества и реализация аутсорсинга были немного изменены для этого анализа. Было выполнено устранение ошибок для них и проведено измерение достоверности и надежности. Использовались многомерные статистические методы (EFA, CFA и SEM - частичных наименьших квадратов) и гипотезы были проверены. Сотрудничество между партнерами оказывает существенное влияние на взаимоотношения и уменьшает проблемы в логистической работе. Сотрудничество в модели объясняет 58.5% конфликтов при достижении цели и 36.6% конфликтов при превышении логистических целей при аутсорсинге.

## 1. INTRODUCTION

Logistics is an important business function that is being influenced by globalization and development. Its role and importance have changed rapidly. Logistics services have become specialized 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 risks in logistics outsourcing, improve efficiency, profitability, and to offer better customer service performance.

The development of marketing relationships, ranging from pure transactions to partnerships is also significant for the logistics service providers. Many different terms are used to describe long-term alliances between firms that cooperate under certain circumstances. All terms reflect the idea that cooperative actions are needed to achieve desired goals and result in the specific customer –provider relationship, established to increase benefits and decrease risks in logistics outsourcing, improve efficiency, profitability, and to offer better customer service performance. The term “partnership” is widely present in the discussion of logistics relationships [12, 14, 18, 17, 7, etc.]. According to Lambert et al., the definitions are incomplete if they address only some aspects of the partnership, so they introduced their own definition where partnership is said to mean “a tailored business relationship based upon mutual trust, openness, shared risk, and shared rewards, that yields a competitive advantage, resulting in business performance greater than would be achieved by the firms individually”. This definition is very comprehensive and covers the understanding of partnerships in this research.

The purpose of this paper is to present the results of logistics outsourcing research, conducted in the Slovenian market and to contribute to theoretical and methodological findings in logistics outsourcing discussions. We measure the impact of cooperation on logistics outsourcing performance. By analyzing the relationship, the goal of this research was also to develop recommendations for practical reasons. The key findings would have some managerial implications for firms which outsource their logistics services to logistics service providers (LSP). To work towards this goal, the rest of the article is structured as follows. First, we review the literature of cooperation, and the two dimensions of logistics outsourcing performance – the goal achievement and the goal exceedance. Building on prior research, we suggest that the constructs can be conceptualized as reflective, multi-item constructs. Then we formulated two hypotheses on the causal linkages between variables. Next, we tested our conceptualization using data from a survey conducted in the Slovenian market among the two largest Slovenian LSPs and their main customers. Limitations of the research were: (1) long term relationships (partnerships) that were established between LSP and customers and (2) the ability of LSP to offer complete outsourcing activities not just a single one (e.g. transport or warehousing alone). Then we present the scale development and refinement process. Finally, we discuss measurement assessments for validity and reliability, test and confirm the hypotheses, and suggest some managerial implications.

## 2. LITERATURE REVIEW

### 2.1. Cooperation

Cooperation plays a very important role in relationships between partners. It refers to situations in which parties work together to achieve mutual goals [2]. In the late 1970's, authors referred to cooperation as “endeavors to achieve individual and mutual goals” [24, 26, 3]. Benefits can be achieved with the cooperation of both parties. Knemeyer and Murphy [15], instead of cooperation use the term “attachment” which can be enhanced if customers and providers have similar corporate cultures. This was also revealed from the in-depth interviews conducted in this study. According to their statements, the long term relationship is established when corporate cultures are similar enough to eliminate the risk of outsourcing performance failure.

The commitment-trust theory contributes to the discussions of cooperation. According to Morgan and Hunt [22], “cooperation is the only outcome posited to be influenced directly by both relationship commitment and trust. A partner committed to the relationship will cooperate with another member because of a desire to make the relationship work”.

Forming cooperative norms is an essential step in guiding the cooperation-oriented outsourcing practices. Cooperative norms are the shared belief and expectation of two parties that they must work together to achieve mutual goals [5]. Cai and Yang [4] stated that cooperative norms positively influence suppliers’ performance, which subsequently affects buyers’ satisfaction. Ties are stronger when the cooperation is long-term, but the opportunistic behavior performed by one party will negatively influence the cooperation [20]. Cooperation in this study is defined as by Anderson and Narus [2] definition.

## 2.2. Logistics outsourcing performance

Logistics outsourcing performance is usually defined as the mutual logistics activities of both partners involved in the 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 have been 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. Logistics outsourcing performance has to be measured in a multi-dimensional way, reflecting multiple stakeholders and interests. Stank et al. [25] proposed the construct of three dimensions as antecedents of customer satisfaction with outsourcing arrangements: operational, cost, and relational performance. Knemeyer and Murphy [16] suggest the construct consisting of operations, channel, and asset reduction performance. Engelbrecht [8] and Deepen [7] 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 provided services. The LSP can deliver better services and added value by exceeding the expectations of the customer. The second dimension, goal exceedance is included to address the LSP exceeding the expectations of the customers. The goals are usually agreed upon in contracts between partners, but goal 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, must be realized as stated by Deepen [7].

In this study, Deepen’s arguments were assumed and the logistics outsourcing performance construct is measured in two dimensions: goal achievement and goal exceedance.

## 3. DEVELOPMENT OF THE HYPOTHESES

Based on our literature review, the variables proposed to affect logistics performance were conceptualized and the hypotheses on the causal linkages for the construct model were generated. The conceptualization is schematically depicted in fig. 1.

As argued in the existing literature, the cooperative relationships are more rewarding than adversarial relationships. Therefore, the closer the cooperation between the two parties exists, the more benefits will be available for the partners. The definition of cooperation refers to situations in which parties work together to achieve mutual goals [2] the hypothesis 1 proposes:

**H1:** Cooperation positively influences goal achievement.

In situations of very good cooperation, the benefits may well exceed the expectations the customer had before entering the outsourcing arrangement. The relationship is more successful if the expectations are not only fulfilled, but also are exceeded, thus hypothesis 2 is proposed:

**H2:** Cooperation positively influences goal exceedance.

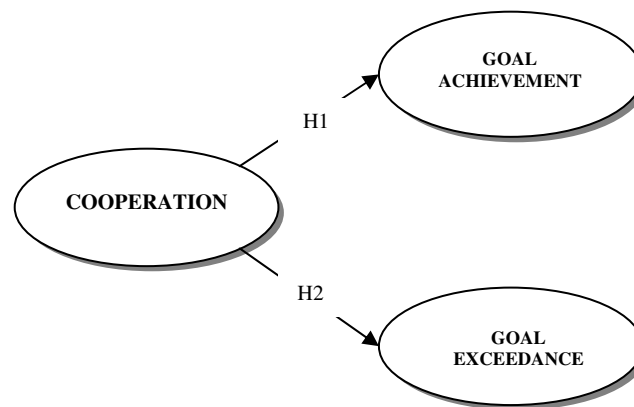


Fig. 1. Conceptual model

Рис. 1. Концептуальная модель

### 3.1. Operationalization of the variables

In order to assure relevant indicators for the constructs, in-depth interviews were conducted in March–April 2008. Fifteen managers of two companies from the 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 variables with their partner (provider or customer) in logistics outsourcing. The interviews were audio taped and then transcribed.

Cooperation has been defined as the main variable of successful relationships. In spite of that, as per the Deepen study [7], no established reflective scales exist for the logistics outsourcing relationships. Since the Frazier [11] and Larson and Kulchitsky [19] studies were appropriate for our needs, we modified the indicators after the in-depths interviews, and put 6 of them into our scale as shown in table 1.

Table 1

Indicators for the Measurement of the Construct of Cooperation

	<i>Please indicate the level of agreement with the following statements on your relationships with this particular LSP.</i>
COOP 1	The goals of our relationships were jointly set by us and our LSP.
COOP 2	The approach to doing business in logistics services is very similar for both partners.
COOP 3	When problems in relationship occur, we solve them together.
COOP 4	In our relationship, both parties fully respect each other.
COOP 5	Long-term cooperation between parties has a positive impact on logistics outsourcing performance.
COOP 6	We are cooperating with our LSP very well.

For measuring operational research outsourcing performance, the scale developed by Engelbrecht [8] and adopted by Deepen [7] was selected. The reason for this selection was that the scale was successfully used in logistics outsourcing studies with German and American companies. The operationalization was aggregated to a more basic level of the construct of goal achievement, where it covers two aspects: achievement of the actual goals agreed upon in the contract, and the quality of the relationship. Goal achievement is the minimum condition that must be obtained in order to satisfy the customer. The LSPs have to be engaged in activities that significantly exceed the set goals such as customer orientation, innovation, and cooperation [7]. In-depth interviews conducted in our research showed strong evidence supporting the importance of exceeding the goals in order to maintain

satisfaction in relationships. The measurement scale is rather new, developed by Deepen [7], therefore only slight modifications have been made. Both scales are displayed in table 2.

Table 2

Indicators for the Measurement of the Construct of Goal Achievement and Goal Exceedance

	<i>Please indicate the level of agreement with the following statements on how satisfied you are with the relationship between this LSP and your company.</i>
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 agreement quality.
GAC 4	Through this cooperation, our logistics outsourcing costs have been reduced to the level we expected.
GAC 5	We are very satisfied with the relationship with our LSP.
GEX 1	The goals and expectations we jointly set in the agreement have been mainly exceeded.
GEX 2	Our expectations concerning the quality of performance have been mainly exceeded.
GEX 3	Our expectations concerning the reduction of costs in service performance have been mainly exceeded.
GEX 4	In comparison with the price for providing services, the overall service quality performance is better than expected.

### 3.2. Questionnaire design and pretest

The development of the questionnaire was based on the conceptualization of the variable theorized to affect the outsourcing relationship and performance. To measure the constructs, the seven point Likert-scale was utilized, which was anchored with responses to the statements ranging from 1 = strongly disagree to 7 = strongly agree with statements. Since the 7 category Likert-scale is assumed suitable to fulfill the requirement of continuously scaled data, we chose the latter.

In the second part of the questionnaire, participants were invited to respond to the 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 respondents were competent. Hence, the questionnaire contained the final set of questions that refer to the respondent position and tenure with the company.

The questionnaire and the cover letter for this study were first (as 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 from the pretest indicated that respondents had no difficulty in comprehending the directions or questionnaire items. This procedure has been recommended as a means to avoid logical errors, misunderstandings and misinterpretations [6, 21].

### 3.3. Data collection

Empirical data were gathered in the survey among logistics managers of manufacturing and retail companies. The study was conducted in cooperation with the chosen LSPs (called A and B). Based on the LSPs customer lists, we contacted by e-mail, 40 companies of LSP A and 27 companies of LSP B; 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. A total of 67 questionnaires were sent resulting in 58 useable responses after the two follow-ups, representing a response rate of 86.5%.

### 3.4. Measurement assessment

Several steps were taken to assess the reliability and validity of the construct scales. A two-step covariance structure analysis approach described by Anderson and Gerbing [1] was used to analyze the data.

For the measurement of the constructs, empirically observable indicators were utilized that reflect the characteristics of the latent variables. They create the measurement model. On the basis of empirical data, the measurement model is then tested for validity and reliability in order to become a part of structural model. For the assessment of reliability and validity, exploratory factor analysis and the Cronbach alpha coefficient are used in this study. Due to the relatively small sample size, the threshold values for factor loadings and communalities were increased. Small sample size is the reason that Partial least squares regression (PLS) has been employed to assess the measurement model. PLS is a general method for the estimation of path models involving latent constructs indirectly measured by multiple indicators. The test of the structural model then constitutes a confirmatory assessment of nomological validity (i.e., the structural model tests the significance of the hypothesized causal relationships among the constructs).

## 4. 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%) 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 variables included in the study, univariate statistical analyses of variables (the calculation of arithmetic means and standard deviations) were performed. Data was analyzed using the SPSS 15.0 statistical package. Results are as follows.

The respondents on average rated the variables measuring cooperation around 6, which expresses high agreement with the indicators of cooperation. The lowest score on average was to the statement that “*the approach to doing business in logistics services is very similar to both partners*”. There are still differences in organizing activities that both partners perform.

The variables measuring goal achievement are on average rated slightly higher than the variable of goal exceedance. The means for all indicators are around 5. The respondents expressed the lowest agreement with the statement “*through this cooperation, our logistics outsourcing costs have been reduced to the level we expected*” (mean: 4.53; std. dev.: 1.42). But the statement that customers are “*very satisfied with the relationship with the LSP*” (mean: 5.34; std. dev.: 1.09) shows that respondents on average rate give this statement the greatest agreement and express their satisfaction with the goal achievement. We were not surprised with the results of indicators measuring goal exceedance where the respondents have on average less than a neutral attitude to the statements. Mean values between 3.34 and 4.07 indicate, that on average, the LSPs do not exceed the set goals concerning cost reduction and quality of service performance. The findings are in accordance with statements made during the in-depth interviews.

Correlation coefficients for indicators of all constructs were calculated and the results show predictable correlation between indicators.

### 4.1. 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 in cases where a single factor is extracted can convergent validity be assumed, and that factor must explain at least 50% of the variance of its indicators. Hair *et al.* [13] suggest minimum factor loading of 0.70 for small samples such as 60 units. Our sample has 58 units, so items with a loading of less than 0.75 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. For the construct of cooperation, four of them remain, as well as for the construct of goal achievement. And finally, five items remain after the purification for the construct of goal exceedance. All results are shown in table 3.

To assess internal consistency reliability Cronbach's Alpha coefficient was calculated. A value of 0.6 or less generally indicates unsatisfactory internal consistency reliability. Cronbach's Alpha, shown in table 3, indicates good internal consistency reliability.

Following basic descriptive analysis 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 [23].

#### 4.2. Convergent Validity and Reliability Measures

The reliable and valid measurement of a construct is the main goal of measurement model development. We assessed the adequacy of the measurement model through examination of individual item reliabilities, convergent, and discriminant validity.

Composite reliability that measures internal coherency of all indicators related to the construct is also called construct reliability. Threshold value should be greater than 0.6. Composite reliability for all latent variables is greater than the prerequisites (table 4), so the constructs are reliable.

Convergent validity is the extent to which the scale correlates positively with other measures in the same construct. T-test's for path coefficients have been calculated after computing a bootstrap method in order to validate all the model's items for convergent validity [1]. T-values greater than  $|1.96|$  determine a significant path at  $p \leq 0.05$ . A single indicator in the model was strongly correlated with the latent variable.

Table 3

EFA for Indicators of Constructs		
<i>Constructs</i>	<i>Factor loading</i>	<i>Communality</i>
<b>Cooperation:</b> $KMO_{coop} = 0.784$ ; Total variance explained (cumulative): 70.1%; $\alpha = 0.857$		
<b>COOP 3</b>	0.895	0.801
<b>COOP 4</b>	0.839	0.705
<b>COOP 5</b>	0.812	0.660
<b>COOP 6</b>	0.798	0.636
<b>Goal Achievement:</b> $KMO_{GAC} = 0.846$ Total variance explained (cumulative): 79.6%; $\alpha = 0.866$		
<b>GAC 3</b>	0.898	0.753
<b>GAC 5</b>	0.873	0.558
<b>GAC 1</b>	0.868	0.806
<b>GAC 2</b>	0.747	0.762
<b>Goal exceedance:</b> $KMO_{GEX} = 0.846$ Total variance explained (cumulative): 79.6%; $\alpha = 0.853$		
<b>GEX 2</b>	0.864	0.710
<b>GEX 1</b>	0.843	0.746
<b>GEX 4</b>	0.834	0.634
<b>GEX 3</b>	0.796	0.696

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% [9]. AVE of all latent variables complies with this prerequisite (table 4).

Table 4

Convergent Validity and Reliability Measures				
<i>Latent variable</i>	<i>Composite reliability</i>	<i>AVE</i>	<i>Communality</i>	<i>Cross-validated communality (<math>H^2</math>)</i>
<b>COOP</b>	0.903	0.700	0.700	0.488
<b>GAC</b>	0.909	0.716	0.716	0.528
<b>GEX</b>	0.900	0.695	0.695	0.487

Finally, Fornell and Larcker [9] suggest the use of the AVE to assess discriminant validity. They propose that sufficiently high discriminant validity exists if the AVE of factors in pairs exceeds the squared correlation between them. All indicators comply with this prerequisite

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 4 represents overall results for convergent validity and reliability for latent variables in the measurement model of logistics outsourcing performance.

Once the validities and the composite reliability were stated, the structural model could be tested with the analysis of regression coefficients ( $\gamma$ ) and with the explained variance ( $R^2$ ) of both endogen constructs [10].

### 4.3. Hypotheses testing

To measure the construct in a research study, we must assure that the measures we have chosen are reasonable measures of the theoretical construct. From a measurement concern, 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 variable of cooperation and the endogenous variables of goal achievement, and goal exceedance. In the structural model, both proposed hypotheses find support. Cooperation has a strong effect and direct influence on both dimensions of logistics outsourcing performance. The variable cooperation explains 58.5% of the variance of goal achievement, and 36.6% of the variance of goal exceedance. The effect of cooperation is stronger on goal achievement than it is on goal exceedance.

The quality of each structural equation is measured by the cross-validated (cv) redundancy index (i.e. Stone–Geisser's  $Q^2$ ) [28]. Using the blindfolding cross-validation method in SmartPLS the cv-redundancy index was computed. 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 5

Redundancy and Cv-redundancy Index for Structural Model		
<i>Latent variable</i>	<i>Redundancy</i>	<i>Cross-validated redundancy index (<math>F^2</math>)</i>
<b>GAC</b>	0.401	0.392
<b>GEX</b>	0.249	0.241

PLS path modeling, different from other SEM (e.g. LISREL), does not optimize any global scalar function [28], 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. GoF for our model is 0.578, meaning that the model is able to take into account 57.8% of the achievable fit. The obtained results are shown to be statistically significant [27].



Results revealed positive correlation between cooperation and goal achievement ( $\gamma = 0.765$ ,  $p \leq 0.01$ ), and cooperation and goal exceedance ( $\gamma = 0.605$ ,  $p \leq 0.01$ ). All correlations were statistically significant, and all hypotheses were supported.

## 5. CONCLUSIONS AND IMPLICATIONS

The purpose of this article is to contribute to the theoretical and methodological findings in logistics outsourcing discussions by analyzing the relationship variable cooperation and its impact on *logistics outsourcing performance*, measured in two dimensions: *goal achievement* and *goal exceedance*. As Anderson and Gerbing [1] suggested, a two-step approach was used in our research.

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 the analysis of regression coefficients and with the explained variance of each endogenous construct. The results show that long-term cooperation influences the logistics performance on both dimensions. The effect of cooperation is stronger on goal achievement than it is on goal exceedance. The structural model is reliable, and the obtained global goodness-of-fit criterion shows that the model is able to take into account 57.8% of the achievable fit. All correlations are statistically significant therefore both hypotheses were supported.

Cooperation is very important in logistics outsourcing performance. These empirical results are in line with findings from the in-depth interviews conducted with logistics managers of manufacturing and retail companies who built long term relationships in logistics outsourcing with two of the largest LSPs in Slovenia. The findings concerning the influence of cooperation on the logistics outsourcing performance are mostly in line with the results in other contexts [e.g.: 8, 7]. The results from this study must be interpreted in view of certain limitations – the sample was restricted to LSPs in Slovenia and their customers with whom they built a long-term relationships and the LSP were able to offer the complete logistics service to their customers. Analysis was undertaken with data collected from the customer side, so we suggest that future research may seek to collect data by adopting a dyadic approach.

Besides theoretical implications, the key findings will have some managerial implications for Slovenian firms who develop their logistics outsourcing relationships. This study shows only one part of the whole picture, a positive impact of cooperation, and many opportunities thus exist for future investigation on factors that positively influence the development of relationships and improved logistics outsourcing performance (e.g. trust, commitment, proactive improvements, organizational learning). In our findings, cooperation apparently does play an adequate role in the partner effort to consolidate the relationships that will last and contribute to their profitability.

Finally, some further research using this framework could be tested in other developed, as well as transitional economies, to see if differences in impact of logistics outsourcing variables exist as compared to our findings.

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