# Determinants of the outcomes of services outsourcing: an empirical study of transport services

(presented at the 6th IESM Conference, October 2015, Seville, Spain) © I4e2 2015

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***Abstract*— The purpose of our study is to examine whether the design and management of the interfaces and interaction processes between customer and provider in services outsourcing are determinants of the results achieved by the outsourcing company. Following the conceptual framework initiated in the study by Wynstra et al. [11], this study focuses on transport services and hypothesized relationships are tested using the Partial Least Squares (PLS) statistical technique. The primary data used was obtained from a survey in three different countries (Germany, Japan and Spain), and from manufacturing companies in the electronics, automotive and machinery sectors. Among other things, the results show that both the structural dimensions of interaction (the organization's resources that it must commit) and the process dimensions of interaction (that consider the dynamic nature of the relationships), are important for obtaining adequate performance from transport services outsourcing.**

**Keywords— Outsourcing services, logistics, transport.**

## I. INTRODUCTION

Outsourcing any activities generates relationships between the buying and selling companies that need to be well managed to ensure that a positive effect comes from said relationship [1]. In the particular case of logistics activity there are many companies that forge long term links with specialized suppliers (Logistics services providers, LSPs). The success of the relationship and, by extension, of the outsourcing of the logistics activity can become important for achieving a competitive advantage [2]. Unfortunately, the difficulty of managing relationships between the customer company and the logistics services provider has been recognized and this difficulty is considered to be at the root of the wide differences found in the results of logistics outsourcing [3], as can be observed in a range of studies (e.g. [4-6]). Accordingly, it seems that it is essential for special attention to be given to the design and management of the interfaces of the interaction that determines the logistics outsourcing buyer-service provider relationship. A variety of authors state in relation to this that the design and management of the interfaces and interaction processes are two major determinants of the results that come from customer-provider relationships (e.g. [7-8]) and that it is essential to know what the aspects of management and design are that impact positively the results of outsourcing [9]. Despite the importance of the topic, empirical research in the field is limited [10].

With respect to the above, Wynstra et al. [11] suggest that there are two groups of dimensions (or determinants) to take into account: Structural dimensions of interaction (related to the organization's resources that should be committed to the interaction) and Interaction process dimensions (which take into consideration the dynamic nature of the relationships). In addition, they state that the configuration of these dimensions is influenced by the key objective pursued in the interaction, which depends on how the buying company uses the outsourced service in its business process. Using this criterion they distinguish four outsourced services types: consumption, instrumental, semi-manufactured and component. Each requires a different configuration of these dimensions resulting in ideal interaction patterns for each type of service. According to van der Valk et al. [12-13] these patterns are what determine the services outsourcing outcome.

The same authors that propose these patterns state the need for them to be tested empirically for specific services. It seems that it can be deduced from the examination of the bibliography undertaken for the present study that, despite the stated importance for logistics services outsourcing (an instrumental service type), no research has been published that has focused on this field. This is the reason why this study will focus on said services and, more specifically, on transport services, as this is the part of logistics with the highest rate of outsourcing. Thus this study's main objective is to establish whether complying with the interaction patterns proposed in the prior literature and adapted to our specific case has a positive impact on the success of transport services outsourcing. In addition, the study seeks to determine whether the risk level associated

with the outsourcing of this logistics service is decisive for complying with said patterns [13].

For this the results of a survey of senior management at Spanish, German and Japanese manufacturing plants in the machinery, electronics and automotive sectors will be used. This survey is framed in the international High Performance Manufacturing (HPM) project, which will be described in the section on the design of the sample and surveyees.

To achieve this objective, the following section sets out the research hypotheses, preceded by the corresponding theoretical framework. The methodology section details the way in which the data required for the present research were obtained. Subsequently, the results are presented and finally a series of conclusions and implications are set out along with some possible future lines of research.

## II. THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

To develop the ideas that were briefly commented in the previous section Wynstra et al. [11] took as their basis the Håkansson [14] study of the interaction between buyers and suppliers of industrial goods which identified different types of goods depending on how they were used by the buying company. Transferring the idea to the services field Wynstra et al. [11] proposed a classification of outsourced services depending on how the buying company uses them within its own business process, and distinguished four services types: component services (distributed to customers with no type of processing by the buying company); semi-manufactured services (are transformed by the buyer before being distributed to customers); instrumental services (affect the way the company's primary processes are carried out but are not distributed to customers); and consumption services (are consumed within the organization and do not directly affect the way that the buyer's basic processes are carried out).
Using this classification, Wynstra et al. [11] and van der Valk et al. [12-13] conducted a series of exploratory case studies for these different service types in which they analyzed the different interaction dimensions that had appeared in the Håkansson [14] model. Initially, these models enabled differences to be determined in the key objectives of interaction depending on the type of service purchased by the company. In addition, the authors also observed that these objectives required different requirements regarding the organization's resources that had to be committed to the interaction, both on the buyer's side and on the seller's side, specifically, the type of functional representatives involved in the continuous interaction and the required critical capabilities [15]. These aspects configure the structural dimensions of interaction.

van der Valk et al. [12] consider it important to take into account the dynamic character of the interactions, which is an issue that is not sufficiently reflected in the previously commented structural dimensions. Said authors therefore incorporate interaction process dimensions into the theoretical framework. These are made up of customer-provider communication and fit. Communication is related to the main issues addressed in the dialogue between buyer and seller, which should reflect the key objectives of the interaction). As to fit, this refers to the specific changes that are required in the relationship in order to facilitate buyer-seller collaboration.
The results of the Wynstra et al. [11] and van der Valk et al. [12-13] exploratory studies show that the two above-mentioned groups of dimensions require different configurations for each of the service types and that these are influenced by the key objective pursued in the interaction. Accordingly, the above-mentioned studies propose some ideal interaction patterns for each service type and indicate that these are the determinants of services outsourcing performance.

van der Valk et al. [13] also propose that the risk level perceived by the buyer in relation to the service being outsourced should be taken into account, and indicate that this will depend on the importance and uncertainty that is given to the activity outsourced. These authors consider this aspect to be a determining factor for complying with the established interaction patterns. They also state that a service considered high risk by the buying company will require it to design and define more explicitly the different dimensions, including both the structural and interaction process dimensions.
The following subsections detail the various interaction dimensions, the risk and the performance associated with the specific case of transport services. Although the generic conceptual framework developed by the above-mentioned authors has been taken as the starting point, the framework has been adapted for the specific case that concerns us here.

### *A. Effective interaction patterns for transport services*

According to the Wynstra et al. [11] classification of outsourced services, transport services, the object of the present research, belong to the instrumental type. The key to the interaction in this service type is that the service has the desire effect on the buying company's primary processes. Therefore, as previously stated, this key objective should guide the way that the structural dimensions and the interaction process are configured. These are described in detail in the following.

#### *1) Structural dimensions of interaction*s.

The buyer's critical capabilities refer to the ability to specify the desired features of the transport process to the provider. For this, the company that purchases the service should have the ability to identify, translate and communicate effectively the demands of service final users and of the organization's internal customers. This should facilitate the adaptation of the transport operations to the processes of the company that buys the service. In addition, the buyer should be capable of following up service user satisfaction.

The provider's critical capabilities relate to its ability to understand the processes of the buying company with which it must interact and, on this basis, to design a transport service that has the desired effect on said processes. For this, the providers should possess the capabilities of development,

innovation and adaptation, among others. They should also help the buying company to implement the designed service correctly.

The second group of structural dimensions comprises the representatives involved in the interaction, which in the outsourcing company should be connected with the processes related to the outsourced service. In the present case they should be all the internal users affected by (or who affect) transport services. This should include professionals in the areas of marketing, production/operations management and supply chain management. In the case of the provider, the representatives involved in the interaction should be professionals in the same areas as in the buying company.

2) *Interaction process dimensions*.

For instrumental services, *communication* with the providers should focus on sharing information as to the outsourcing company's and its customers' needs. Also, information is required about the company's main processes and about the effect that the outsourced service has on said processes. The possibilities of transforming the services depending on the needs, and the assessment that the buying company makes of the outsourced services should also be communicated, thus enabling its continuous improvement. This could all entail the need for confidential information to be shared with the provider (such as issues related to company strategy). This will facilitate the provider to better adapt to the buying company's processes.

Finally, a successful long term relationship between the buyer and the supplier requires *adaptation* between the outsourcing company and its transport provider. Any adaptation should include both strategic aspects (e.g. adapting to the service specification and design, in the process to deliver the service and in organizational structure) and aspects relating to capacity and demand management.

3) *Perceived risk in transport services*.

As stated above, risk is determined by the *importance* and *uncertainty* attributed to the outsourced activity. *Uncertainty* depends on the level of *complexity* and *novelty* associated with said service.

The following can be considered for measuring the *importance* associated with transport services: the expense entailed, how essential (or not) it is for customer satisfaction and for the continuity of daily operations, and also whether they are essential for complying with regulations.

*Complexity* refers to the degree of specialization and customization of services. Whether they have features that are difficult to assess, and whether said services need to be integrated with the company's processes and systems and/or customer participation may also be taken into consideration.

Finally, the degree of *novelty* depends on the prior experience that the buying company has of the outsourced service 's use, purchase, integration or/and assessment.

4) *Performance assessment in transport services outsourcing*.

Success in services outsourcing in general, and in transport in particular, can be evaluated by distinguishing between the outsourcing's Process success and the Outcome success [13].

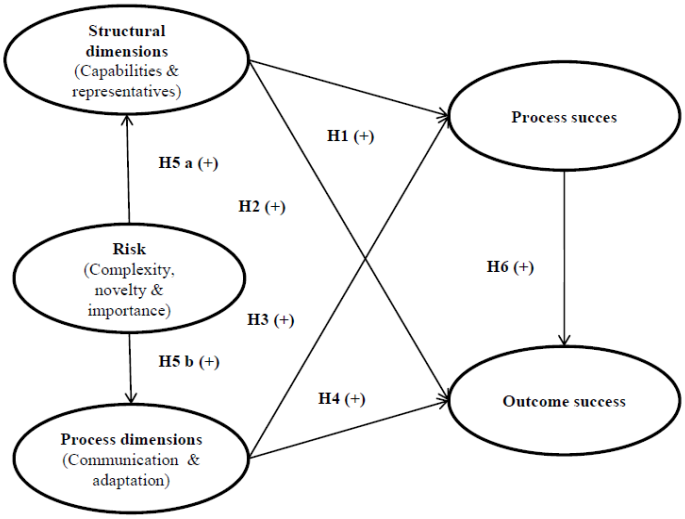
In the present case, measuring the Process success seeks to determine whether processes are executed satisfactorily by the service transport provider. This is reflected in aspects, such as fulfilling the agreed objectives, solving critical issues, whether an orientation towards collaboration exists and contributing competences required by the buying company.

As far as the measuring Outcome success of the outsourcing is concerned, this has been done considering that the expected benefits of transport services outsourcing should constitute a relevant element [16-18]. On this basis, among others items related to the following have been included in the scale used in the survey administered to senior management to measure this aspect: costs, return on assets, customer service, flexibility, the focus on key competences and access to cutting edge technologies and knowledge.

## B. *Conceptual model and research hypotheses*

According to the proposed theoretical framework, the aim is to analyze whether complying with the interaction patterns, in the form of both their structural dimensions and the interaction process, leads to a positive impact on the process success and outcome success of transport services outsourcing. A further objective is to determine whether the perceived risk level with respect to transport services outsourcing is a determining factor for complying with said interaction patterns. Figure 1 shows the conceptual model and the corresponding hypotheses, which are commented on below.

FIG. 1 – CONCEPTUAL MODEL



H1 fulfilling the structural dimensions of buyer-provider interaction has a positive influence on the result of transport services outsourcing processes.

H2 fulfilling the structural dimensions of buyer-provider interaction has a positive influence on the outcome success of transport services outsourcing.

H3 fulfilling the process dimensions of buyer-provider interaction has a positive influence on the result of transport services outsourcing processes.

H4 fulfilling the process dimensions of buyer-provider interaction has a positive influence on the outcome success of transport services outsourcing.

H5 (a, b) The greater the buying company's perceived risk of transport services outsourcing, the greater the degree to which the proposed ideal interaction patterns for said services should be fulfilled.

H6 Better transport services outsourcing process success results in a better outcome success of same.

## III. METHODOLOGY

### *A. Design of the sample and surveyees*

To test the hypotheses a survey was conducted of senior management at Spanish, German and Japanese production plants in the machinery, electronics and automotive sectors. Said survey was conducted in the framework of the international High Performance Manufacturing project (ongoing), which uses stratified sampling to obtain a similar number of cases for each country-industry combination. Although more countries are taking part in the HPM survey, data was only available for the three mentioned countries at the time of writing the present study.

In the following we specify the procedure followed in Spain, in which the authors have taken active part. This procedure is analogous with that followed in the other two participating countries. For the sampling in Spain, the SABI (Iberian Balance Sheets Analysis systems) databases were used. This resource showed that there were 473 companies with over 100 employees in Spain in the three previously mentioned sectors (this is the company size required for the analysis unit in the international survey). A random selection was made of 70 of these 100 companies (15% of the total census). Telephone and email contact was made with these companies to explain the objective and content of the survey and the benefits that they would obtain through their participation, and to request their collaboration. If they said yes, the questionnaires were sent to them by courier. The questionnaires indicated the posts held by the people responsible for answering them. In the case of the transport services outsourcing scales, these were answered by: Logistics Directors, Sales Directors, Marketing Directors, Customer Relations Directors, Customer Services Directors, Demand Directors and After-Sales Service Directors.

Senior management from 17 Spanish manufacturing plants (24.3% of the selected plants) returned the questionnaire with the transport services outsourcing scales fully filled out. To these were added (see Table 1) those of 16 German and 18 Japanese plants in the three sectors under study, resulting in a final sample of 51 plants.

TABLE 1 NUMBER OF PLANTS BY SECTOR AND COUNTRY

| **Country /Sector** | **Electronics** | **Machinery** | **Automotive** | **Total** |
|---|---|---|---|---|
| Spain | 3 | 6 | 9 | 17 |
| Germany | 5 | 5 | 6 | 16 |
| Japan | 6 | 4 | 8 | 18 |
| **Total** | 13 | 15 | 23 | 51 |

### *B. Measurement scales and data analysis.*

The questionnaire for the scales used to measure transport services outsourcing contains a total of 68 questions distributed in scales relating to all the dimensions (both structural and process), to risk, to process success and to outcome success. They are all quantified on a five point Likert scale. All the scales have been designed to be reflective. This design is very widespread in the area of Operations Management. In this respect, Roberts et al. [19] indicate that 97% of studies use these types of scales as they are the scales that best conceptualize the truly theoretical character of Operations Management.

The conceptual model and the hypotheses have been tested using the Partial Least Squares (PLS) technique to estimate variance-based structural equation models (SEM) [20]. The importance of this technique is growing in Business Management research in general and in Operations Management in particular [21]. This technique has been used as it enables both the relationships between the constructs to be estimated and the model used to be validated [22]. It is also appropriate for predicting the dependent variables [23] with a small sample [24], which is the case of the research that has been conducted.

As reflective scales have been used, the minimum number of observations needed to test the model is the result of multiplying by 10 the highest number of structural paths going in the direction of a specific endogenous construct in the structural model [25-27]. Taking into account the conceptual model established in the present case (see Figure 1), it is the outcome success endogenous construct that possesses the greatest number of preceding constructs, 3 in all, as a result of which the minimum number of plants required is 30. As we have a total of 51 plants available, the present study complies with this requirement.

Both the structural and interaction process dimensions and risk are complex concepts and so second order constructs have been designed composed of various first order constructs. For this the hierarchical component model proposed by Wold [28] has been used.

## IV. RESULTS

The suitability of the model was verified in two steps: a) Testing of the validity and reliability of the measurement model; b) Assessment of the structural model [29].

### *A. Measurement model assessment*

The following have to be analyzed in a PLS model with reflective indicators: individual item reliability, construct reliability, convergent validity and discriminant validity [30].

The most widespread rule of thumb for individual item reliability is for it to be considered suitable when the corresponding loading has a value equal to, or greater than, 0.707 [31]. However, this rule becomes more flexible in a case like this, where we are in the initial stages of scale development, and minimum values of 0.6 are accepted [25, 32]. This is the criterion followed in the present study. Table 2 shows the loadings assigned to the items considered for the initial model. Those that did not fulfill this criterion (the two in bold in Table 2) were omitted.

Construct reliability enables the internal consistency of all the indicators that it comprises to be verified when measuring the corresponding concept. Composite reliability was used for this. This is considered to be a better measure than Cronbach's alpha [33]. The suggested value for reliability for basic research should be above 0.8, and all the constructs in the present study comply with this (see Table 3, column 2).

Convergent validity has to be tested to check that the different items related with a construct really measure this. For this Average Variance Extracted (AVE) is used. A value of over 0.5 is recommended for AVE [33]. All the constructs used are equal to or surpass this value (Table 3, column 3).

Finally, discriminant validity indicates the extent to which one construct is different from others. For this it has to be checked whether the construct shares more variance with its measures than with other constructs in the same model ([25]). The measure used to verify this is the square root of the AVE, which should be greater than the correlations with other constructs. The values in the last five columns of Table 3 show that this condition is also complied with.

Once the measurement model has been verified to be satisfactory with respect to the established criteria, the next step is to assess the structural model.

### *B. Structural model assessment*

Table 4 shows the endogenous constructs' determination coefficients (R2) that indicate the amount of variance explained by the constructs that predict them. For a model to have adequate predictive power these should be above 0.1 [34], and this is the case in the present research for all the R2 (see Table 4). In addition, the Q2 values used to calculate the model's predictive relevance are all above 0, showing that the model used evidences adequate fit [35, 36]

The standard path coefficients that represent each of the research hypotheses should have values that are above 0.2, and they should ideally be above 0.3 [26]. In the case of transport services outsourcing the results indicate that the structural dimensions of interaction have a significant effect on process success (0.543; $p<0.05$). Thus Hypothesis H1 is confirmed. However, these dimensions do not have any significant effect on outcome success, so hypothesis H2 is not supported.

TABLE 2 – ITEM LOADING

| Item | Weight |
|---|---|
| *Structural Dimensions* | |
| SturctDim1 | 0,855 |
| StructDim2 | 0,609 |
| StructDim3 | 0,73 |
| StructDim4 | 0,839 |
| *Process Dimensions* | |
| ProcDim1 | 0,775 |
| ProcDim2 | 0,912 |
| ProcDim3 | 0,896 |
| *Risk* | |
| Risk1 | 0,908 |
| Risk2 | **0,577** |
| Risk3 | 0,672 |
| *Outcome success* | |
| OutSucc1 | 0,602 |
| OutSucc2 | 0,695 |
| OutSucc3 | 0,659 |
| OutSucc4 | 0,702 |
| OutSucc5 | 0,83 |
| OutSucc6 | 0,749 |
| OutSucc7 | 0,76 |
| OutSucc8 | 0,703 |
| OutSucc9 | 0,698 |
| OutSucc10 | 0,643 |
| *Process success* | |
| ProcSucc1 | 0,864 |
| ProcSucc2 | 0,708 |
| ProcSucc3 | **0,076** |
| ProcSucc4 | 0,835 |
| ProcSucc5 | 0,896 |
| ProcSucc6 | 0,889 |
| ProcSucc7 | 0,642 |

The interaction process dimensions only have a significant effect on outcome success (which confirms hypothesis H4) (0.366; p<0.01). The same is not true for process results, so hypothesis H3 is not supported.

The influence of risk on structural and process dimensions is significant in both cases (p<0.001), which confirms hypotheses H5a and H5b.

Finally, as the influence of process success on outcome success is significant (0.294; p<0.01), hypothesis H6 is confirmed.

TABLE 3 - RELIABILITY, AVE AND CONSTRUCT MATRIX

| Construcs | Reliability | AVE | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|---|---|
| **StructDim (1)** | 0,847 | 0,58 | *0,764* | | | | |
| **ProcDim (2)** | 0,897 | 0,75 | 0,741 | *0,863* | | | |
| **OutSucc (3)** | 0,908 | 0,5 | 0,587 | 0,582 | *0,707* | | |
| **ProcSucc (4)** | 0,888 | 0,57 | 0,457 | 0,287 | 0,504 | *0,942* | |
| **Risk (5)** | 0,809 | 0,68 | 0,733 | 0,749 | 0,527 | 0,338 | *0,856* |

**Note**: Italicized figures on the diagonal are the square root of AVE, while off diagonal elements are correlations among constructs

TABLE 4 – PLS RESULTS

| | $R^2$ | $Q^2$ | | |
|---|---|---|---|---|
| Outcome success | 0,643 | 0,526 | | |
| Process success | 0,453 | 0,718 | | |
| Structural dimensions | 0,479 | 0,625 | | |
| Process dimensions | 0,268 | 0,854 | | |
| **Path** | **Path c. stand.** | **Stand. dev.** | **t-value** | **Sig. level** |
| H1. Structural dim. → Process succ. | 0,545 | 0,285 | 1,913 | *p<0.01 |
| H2. Structural dim. → Outcome succ. | 0,483 | 0,135 | 3,578 | *p<0.01 |
| H3. Process dim. → Process succ. | 0,194 | 0,328 | 0,59 | n.s. |
| H4. Process dim. → Outcome succ. | 0,43 | 0,147 | 2,929 | *p<0.01 |
| H5a. Risk → Structural dim. | 0,719 | 0,075 | 9,523 | **p<0.001 |
| H5b. Risk → Process dim.. | 0,543 | 0,189 | 2,881 | **p<0.001 |

**Notes**: Significance at: *p , 0.10, * *p , 0.01; n

## V. FINAL CONSIDERATIONS AND CONCLUSIONS

The present study seeks to provide the first survey-based empirical evidence as to the impact produced by compliance with interaction patterns (structural and process dimensions) on the process success and outcome success of outsourcing. The specific case addressed is transport services. The aim is to verify whether, as various authors claim ^11-13, these are determinants of the performance attained in services outsourcing.

The findings show that structural dimensions –sd- (capabilities and representatives involved in the interaction) are direct determinants of process results - pr-, although this is not the case for outcome success -os. However, the relationship of an indirect relationship has been confirmed to exist (via process results- pr-) between structural dimensions and said outcome success. In other words, if sd have a significant direct effect on pr, and these, in turn, have a similar significant direct effect on os, it can be stated (albeit indirectly) that sd have a determinant effect on os. It can therefore be stated that structural dimensions affect both process success (the way that the interaction is executed), the success of the final results obtained by the outsourcing company. It should be pointed out that the use of a small sample produces direct effects among the variables which, even though they may exist, are not detected, and this might be occurring in the present case. The use of a larger sample would enable us to address this aspect in greater depth in the case in point.

As far as process dimensions of interaction–pdi- (communication and adaptation) are concerned, these are seen to be determinants of outcome success –os. However, their possible influence on process success has not been supported. On the basis of the findings in the present case, the process dimensions of interaction can be stated to affect the success of the final results, but the same cannot be said with regard to the process success of transport services outsourcing. As in the previously commented case, the use of a larger sample in the near future would enable us to see whether this is confirmed or not.

With regard to the level of perceived risk, this is confirmed to be a predictive variable of compliance with interaction patterns (with respect to both their structural dimensions and the interaction process). However, the findings seem to indicate that not all the variables proposed by van der Valk et al. [13] to explain perceived risk (importance, complexity and novelty) explain this. This is the case in the present study for the importance of the services. Once more, a larger sample will be used to try to clarify whether these conclusions remain the same or not.

The findings show that both the structural dimensions of interaction and the interaction process dimensions are important for obtaining adequate transport services outsourcing performance. However, it should be noted that the former have a more evident impact on the success of the mentioned outsourcing.

The present study is not without its limitations. On the one hand, although, as indicated, the sample used clearly complies with the requirements for using the PLS model, it is small. This can lead to some of the effects among variables not being detected. It would therefore be interesting to extend the present research to a larger sample and a higher number of countries, and it is our intention to do so in the near future.

This will be possible when the full database for the fourth round survey of the HPM becomes available.

In other respects, the research focuses on a specific instrumental service type, transport, and it cannot be guaranteed that the results and conclusions can be generalized. A suitable line of future research would be to conduct similar studies of other instrumental services (whether related to logistics or not) to determine whether it is possible to extrapolate the conclusions reached here to instrumental services as a whole

## ACKNOWLEDGMENT

This study has been done within the framework of the following competitive funding: Spanish National Program of Industrial Design and Production (DPI 2009 11148) ; Junta de Andalucía (Spain) PAIDI Excellence Projects (P08-SEJ-03841) and Acción especial para HPM 2015.

## REFERENCES

[1] Pfeffer, J; Salancik, G. R. (1978): "*The external control of organizations: A resource dependence perspective*", New York: Harper and Row.

[2] Fawcett, S. E.; Cooper, M. B. (1998). "Logistics performance measurement and customer success", *Industrial Marketing Management*, Vol. 27, No. 4, pp. 341-357.

[3] Hartmann, E.; de Grahl, A. (2012): "Logistics outsourcing interfaces: the role of customer partnering behavior".

[4] Boyson, S.; Corsi, T.; Dresner, M.; Rabinovich, E. (1999): "Managing effective third party logistics relationship: what does it take?", *Journal of Business Logistics*, Vol. 20, No.1, pp. 73-100.

[5] Lieb, R.; Bentz, B. A. (2005): "The use of third-party logistics services by large American manufacturers: the 2004 survey". *Transportation Journal*, pp. 5-15.

[6] Gadde, L. E.; Hulthén, K. (2009): "Improving logistics outsourcing through increasing buyer–provider interaction". *Industrial Marketing Management*, Vol. 38, No. 6, pp. 633-640.

[7] Sampson, S. E. (2000): "Customer-supplier duality and bidirectional supply chains in service organizations". *International Journal of Service Industry Management,* Vol. 11, No. 4, pp. 348-364.

[8] Hertz, S.; Alfredsson, M. (2003): "Strategic development of third party logistics providers". *Industrial marketing management*, Vol. 32, No. 2, pp. 139-149.

[9] Deepen, J.; M., Goldsby, T. J.; Knemeyer, A. M.; Wallenburg, C. M. (2008): "Beyond expectations: an examination of logistics outsourcing goal achievement and goal exceedance", *Journal of Business Logistics*, Vol. 29, No. 2, pp. 75-105.

[10] Wallenburg, C.M.; Cahill, D.L., Goldsby, T.J. and Knemeyer, A.M. (2010): "Logistics outsourcing performance and loyalty behavior: comparisons between Germany and the United States. International", *Journal of Physical Distribution & Logistics Management*, Vol. 40, No 7, pp. 579-602

[11] Wynstra, F.; Axelsson, B.; Van der Valk, W. (2006): "An application-based classification to understand buyer–supplier interaction in business services". *International Journal of Service Industry Management*, Vol. 17, No. 5, pp. 474−496.

[12] van der Valk, W., Wynstra, F.; Axelsson, B. (2008): "An empirical investigation of interaction processes between buyers and sellers of business services". *IMP Journal*, Vol. 2, No. 2, pp. 3-24.

[13] van der Valk, W.; Wynstra, F.; Axelsson, B. (2009): "Effective buyer-supplier interactions patterns in ongoing service exchange", *International Journal of Operations and Production Management*, Vol. 29, No. 8, pp. 807-833.

[14] Håkansson, H. (Ed.) (1982): "International Marketing and Purchasing of Industrial Goods: An Interaction Approach", Wiley, London.

[15] Cunningham, M.T.; Homse, E. (1986): "Controlling the marketing-purchasing interface: resource development and organisational implications". *Industrial Marketing and Purchasing*, Vol. 1 No. 2, pp. 3-27.

[16] Heide, J.B.; John, G. (1992): "Do norms matter in marketing relationships?", *Journal of Marketing*, Vol. 56, No. 1, pp. 32-44.

[17] Engelbrecht, C. (2004): "*Logistikoptimierung durch Outsourcing. Erfolgswirkung und Erfolgsfaktoren*", Wiesbaden: Deutscher Universitat Verlag.

[18] Krakovics, F.; Leal, J. E.; Mendes, P.; Santos, R. L. (2008): "Defining and calibrating performance indicators of a 4PL in the chemical industry in Brazil". *International Journal of Production Economics*, Vol. 115, No. 2, pp. 502-518.

[19] Roberts, N.; Thatcher, J. B.; Grover, V. (2010): "Advancing operations management theory using exploratory structural equation modelling techniques", *International Journal of Production Research*, Vol. 48, No. 15, pp. 4329-4353.

[20] Roldán, J. L.; Sánchez-Franco, M. J. (2012): "Variance-based structural equation modelling: guidelines for using partial least squares in information systems research", *Engineering and Information Systems*. IGI Global, Hershey, PA, pp. 193–221.

[21] Peng, D. X.; Lai, F. (2012): "Using partial least squares in operations management research: A practical guideline and summary of past research", *Journal of Operations Management*, Vol. 30, No. 6, pp. 467-480.

[22] Barroso, C.; Carrión, G. C.; & Roldán, J. L. (2010): "*Applying maximum likelihood and PLS on different sample sizes: studies on SERVQUAL model and employee behavior model*". Handbook of partial least squares. Springer Berlin Heidelberg.

[23] Chin, W. W. (2010): "How to write up and report PLS analyses". *Methods and Applications*. Springer-Verlag, Berlin, pp. 655–690.

[24] Reinartz, W.; Haenlein, M.; Henseler, J. (2009): "An empirical comparison of the efficacy of covariance-based and variance-based SEM". *International Journal of. Research Marketing*, Vol. 26, No. 4, pp. 332–344.

[25] Barclay, D.; Higgins, C.; Thompson, R. (1995): "The Partial Least Squares (PLS) Approach to Causal Modelling:

Personal Computer Adoption and Use as an Illustration", *Technology Studies*, Special Issue on Research Methodology, Vol. 2, No. 2: pp. 285-309.
[26] Chin, W. W. (1998a): "Issues and Opinion on Structural Equation Modeling", *MIS Quarterly*, Vol. 22, No. 1.
[27] Chin, W. W.; Marcolin, B. L.; Newsted, P. R. (2003): "A partial least squares latent variable modeling approach for measuring interaction effects: results from a Monte Carlo simulation study and an electronic mail emotion/adoption study". *Information Systems Research*, Vol. 14, No. 2; pp. 189-217.
[28] Wold, Herman. "*Path models with latent variables: The NIPALS approach*". Acad. Press, 1973.
[29] Cepeda, G.; Roldán, J. L. (2004). "Aplicando en the práctica the técnica PLS en la Administración de Empresas. Conocimiento and Competitividad". *XIV Congreso Nacional ACEDE*. Murcia (págs. 74-8).
[29] Hulland, J. (1999), "Use of partial least squares (PLS) in strategic management research: a review of four recent studies", *Strategic Management Journal*, Vol. 20 No. 2, pp. 195-204.
*International Journal of Physical Distribution & Logistics Management,* Vol. 42, No. 6, pp. 526-543.
[31] Carmines, Edward G. Richard, A.; Zeller, "Reliability and validity assessment". Vol. 17. Sage, 1979.
[32] Chin, W. W. (1998b): "The partial least squares approach to structural equation modeling", *Modern methods for business research*, Vol. *295*, No. 2, pp. 295-336.
[33] Fornell, C.; Larcker, D. F. (1981): "Evaluating Structural Equation Models with Unobservable Variables and Measurement Error", *Journal of Marketing Research*, Vol. 18, Februay, pp. 39-50.
[34] Falk, R F.; Miller, N. B. (1992): "*A Primer for Soft Modeling*". Akron, Ohio: The University of Akron.
[35] Stone, M. (1974): "Cross-validatory choice and assessment of statistical predictions", *Journal of the Royal Statistical Society*, Series B, Vol. 36, No. 2, pp. 111–133.
[36] Geisser, S. (1975): "The predictive sample reuse method with applications", *Journal of the American Statistical Association*, Vol. 70, No. 350, pp. 320–328.