"An empirical study on the impact of standardization of materials and purchasing procedures on purchasing and business performance"

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Abstract:

Many studies claim that implementing standardization of materials and purchasing procedures (*standardization in purchasing*) can help organizations to improve both purchasing and business performance. The objective of this research was to examine a structural model in which standardization in purchasing has a direct impact on purchasing performance and an indirect impact on business performance mediated through purchasing performance. The results of the research provide support for the relationships hypothesized.

1. INTRODUCTION

An effective purchasing function constitutes a key business process in the supply chain (Fawcett and Fawcett, 1995; Giunipero and Brand, 1996; Lambert et al., 1998). Purchasing's role in supply chain management is very important as an intermediary in the supply chain because it connects suppliers with purchasing's internal customers who, in turn, provide products and services for external customers (Stanley and Wisner, 2001). The importance of the purchasing function can be easily understood if one also considers that purchased goods and services typically represent from 50 to 70 percent of a company's revenues (Spekman et al., 1999). Consequently, purchasing decisions have a potentially great impact on the firm's end product and the overall business performance.

Standardization of materials (i.e., replacement of several materials/components by a single component that has all the functionalities of the materials/components it replaces) is one important purchasing department decision. Purchasing professionals have ranked purchasing's responsibility for standardization second to the highest in terms of projected future responsibility of purchasing in strategic decision making (Ellram and Pearson, 1993). More recently, a survey showed that materials standardization was the third most implemented cost reduction strategy in US firms (Anonymous, 2002). Although there exists some anecdotal literature (e.g., Avery, 1998; Porter, 2002) that reports the benefits of using standardization of materials (e.g., reduced purchasing costs, lower inventory levels, and improved supplier delivery performance), the empirical literature is rather scarce.

A second source of standardization contained in the literature pertains to the standardization of the procedures (i.e., pre-set procedures and reference material for performing normal daily purchasing tasks

such as ordering, expediting, selection of suppliers, and receipt and inspection of goods) implemented in procuring the goods and services for manufacturing. Like standardization of materials, the standardization of purchasing procedures could also be a potential point of cost savings for companies (Bennett, 1982). However, the literature on standardization of purchasing procedures is minimal. In fact, we could not identify any study concerned with the standardization of purchasing procedures and its impact on purchasing performance.

Because there is a lack of empirical evidence about the impact of standardization of materials and purchasing procedures (*standardization in purchasing*) on purchasing and business performance, the purpose of this paper is three-fold. We first aim to verify whether standardization in purchasing significantly and positively affects purchasing performance. Another major objective is to empirically examine the effect of purchasing performance on business performance. Finally, we were interested in examining the indirect positive impact of standardization in purchasing on business performance mediated by purchasing performance.

2. LITERATURE REVIEW

A number of studies on standardization of materials referred to it as "component-part commonality," that is, replacing many unique parts with a single common part – one that has all the functionality of the parts it replaces (Hillier, 2002; Perera et al., 1999). These studies have covered such issues as the development of a measure of component-part commonality (Collier, 1981; Wacker and Treleven, 1986); the influence of component-part commonality on workload (Collier, 1982; Guerrero, 1985; Vakharia et al., 1996), safety stock (Baker, 1985; Collier, 1982; Gerchak et al., 1988; Hillier, 2002; Perera et al., 1999),

planning, and scheduling (Berry et al., 1992); and on operational performance indicators such as set-up and holding costs (Collier, 1981, 1982), order quantity economies (Gerchak et al., 1988), inventory costs (Eynan and Rosenblatt, 1996; Hillier, 1999), and production costs (Nagarur and Azeem, 1999). While the impact of materials standardization on manufacturing performance has received considerable attention, the number of studies dealing with its impact on purchasing performance is rather scarce.

Dowlatshahi (1992), in her paper about concurrent engineering, discussed the role of materials standardization as an area of collaboration between the purchasing and design functions. However, the effect of materials standardization on purchasing performance was not addressed. Jayaram and Vickery (1998) empirically analyzed the relationship between procurement lead-time and overall performance and identified standardization as an antecedent to procurement lead-time performance. They defined standardization as "the use of standard procedures, materials, parts, and/or processes in designing and manufacturing a product (p. 23)," which does not consider the use of standard procedures in purchasing. Using the same definition of standardization as in Jayaram and Vickery (1998), Jayaram et al. (2000) empirically examined the direct and complementary effects of information system infrastructure and process improvements strategies on several time-based performance indicators. They (2000) found that standardization was the most influential enabler affecting delivery speed and responsiveness to a customer's performance. According to this result, it seems that standardization of procedures, parts, and processes has a positive influence not only on being able to deliver on time but also on meeting customer needs effectively, which in turn is likely to have a positive effect on business performance. However, Jayaram et al. (2000), like Jayaram and Vickery (1998), did not consider the use of standard procedures in purchasing and did not test the effect of standardization on purchasing performance.

Additional literature has shown that purchasing managers can save money by developing standard purchasing procedures that would enable them to spend more valuable time on "non-routine" activities (Bennett, 1982), such as cost/value analysis, supplier development, and concurrent engineering. According to Imai (1997), standard procedures have the following features:

- they represent the best, easiest, and safest way to do an activity
- they provide a method for managing knowledge through the preservation of "know how" and expertise
- they can be used as a reference to evaluate performance
- they provide a basis for both maintenance and improvement activities
- they provide a basis for training, auditing, and diagnosis

The use of standard purchasing procedures should reduce the possibility of errors and ease the tasks involved in identifying the root causes of a problem in the purchasing process. Once a problem has been fully identified, corrective action can be quickly implemented and the procedures may be rewritten to eliminate the problem. To date, our study appears to be the extent of the literature that currently explores the standardization of purchasing procedures and provides us the opportunity to investigate the effect of standardization of purchasing procedures on purchasing and business performance.

Standardization of materials/components and standardization of purchasing procedures has been considered both by practitioners and academics as improving purchasing and business performance. However, the arguments supporting these relationships have been based on anecdotal evidence (e.g., Avery, 1998; Porter, 2002), case studies (e.g., Handfield, 1993), and empirical studies with limited samples (e.g., Jayaram and Vickery, 1998; Jayaram et al., 2000). Consequently, there is a need for more comprehensive empirical evidence that assesses the benefits associated with materials standardization and

standardization of purchasing procedures and, more specifically, their impact on purchasing and business performance. To address this gap in the literature, the following research model and hypotheses were developed.

3. RESEARCH MODEL AND HYPOTHESES

The proposed model in Figure 1 presents the research framework under investigation. The model establishes the key latent variables (constructs) of the study—standardization in purchasing, purchasing performance, and business performance—as well as the relationships among them.

<Take in Figure 1>

Standardization in purchasing (STP)- this construct was based on Jayaram and Vickery's (1998) definition of standardization presented earlier which was adapted to the purchasing context. Following their model, standardization in purchasing was defined as the standardization of purchased materials (i.e., replacement of several materials and components by a single component that has all the functionalities of the materials/components it replaces), and the standardization of purchasing procedures (e.g., standard procedures for ordering, expediting, receipt and inspection of goods, and selection and evaluation of suppliers). Accordingly, the standardization in purchasing construct included measures of *standardization of materials* and *standardization of purchasing procedures.*

Purchasing performance (PP)- this construct was based on Chao's et al. (1993) objective criteria for evaluating purchasing performance and included quality of materials purchased, on-time delivery, and actual versus target materials' cost. This construct also included an indicator that referred to

materials'inventory performance and another referring to internal customer satisfaction. Inventory performance is considered a common evaluation area of purchasing performance (Leenders et al., 2002).

Business performance (BP)- this construct is composed of four indicators of a company's overall effectiveness. These measures consisted of return on assets (e.g., Carr and Pearson, 1999; Curkovic et al., 2000; Tan et al., 1999); return on sales (e.g., Carr and Pearson, 1999; Tan et al., 1999); production costs (e.g., Narasimhan and Das, 1999; Tan et al., 1999); and market share (e.g., Curkovic et al., 2000; Tan et al., 1999).

The research issue of interest is the impact of standardization in purchasing on purchasing performance and business performance. Initial evidence from the literature suggests that standardization of materials' components improves purchasing performance. Standardization of materials provides the possibility of buying a smaller variety or number of brand-name materials in larger volume resulting in lower unit cost through quantity discounts, as well as lower transportation, procurement, and materials management costs (Bennett, 1982; Perera et al., 1999). Larger purchasing volumes through standardization can also allow buyers to leverage purchases and negotiate better purchasing conditions, which could result in better delivery, quality, and flexibility. Standardization of materials can also increase purchasing performance by improving the delivery reliability from suppliers and reducing the obsolescent cost of materials. Reducing the number of vendors and improving the relationships with suppliers, both of which can prevent unexpected delays, increases delivery reliability. A great reduction of obsolescent cost can be expected from standardization of materials among several products and among product generations (Perera et al., 1999).

The standardization of purchasing procedures can improve purchasing performance by allowing purchasing managers to spend more time on "non-routine" activities (Bennett, 1982), such as cost/value analysis, supplier development, and concurrent engineering. Additionally, the standardization of purchasing procedures is expected to increase the accuracy and effectiveness of the purchasing process, thereby resulting in better purchasing performance. The above discussion leads us to the first hypothesis:

H1: standardization in purchasing has a positive impact on purchasing performance.

As Chao and others have argued, "the overall performance of the organization is strongly affected by how well the purchasing function is able to contribute to the firm's strategies and goals" (1993, p. 34). The purchasing performance would determine, to some extent, an external customer's satisfaction or dissatisfaction with the firm's end products and, hence, would have an impact on the overall business performance. However, the empirical literature examining the relationship between purchasing performance and business performance is very limited (e.g., Jayaram and Vickery, 1998). Thus, we hypothesize:

H2: purchasing performance has a positive impact on business performance.

The preceding discussion for hypothesis 1 and 2 also leads us to speculate that there is an indirect and positive relationship between standardization in purchasing and business performance mediated by purchasing performance. Accordingly, we hypothesize:

H3: standardization in purchasing has a positive indirect impact (mediated by purchasing performance) on business performance.

4. METHODOLOGY

4.1. Sample description

The sample frame consisted of 1,200 purchasing managers who were selected from the year 2000 Dun and Bradstreet database of the largest manufacturing companies in Spain. Purchasing managers were determined as the most appropriate respondents because they are most familiar with their organization's materials and purchasing procedures' standardization practices and purchasing performance outcomes.

The survey was administered in three mailings following a modified version of Dillman's (1978) *Total Design* for survey research. In the first mailing, a cover letter explaining the purpose of the study and a survey questionnaire along with a postage-paid envelope were sent to all members in the sample frame. A letter encouraging non-respondents to participate in the research was sent three weeks later. Six weeks after the initial mailing, a second survey and cover letter were sent to the remaining non-respondents. We obtained 306 usable responses, 198 corresponding to the first mailing and 108 corresponding to the second mailing, which translated to a 25 percent total response rate. The respondent sample was composed of high-level purchasing executives, including 145 directors of purchasing (48%), 89 general managers of purchasing (29%), 19 purchasing managers (6%), and 45 "other" titles (17%).

Two approaches were used to assess non-response bias. The first approach consisted of comparing early with late respondents (i.e., first and second mailing) following Armstrong and Overton's (1977) recommendations. No significant differences were found between early and late respondents on all variables, which included sales volume, number of employees, and cost of raw materials and components.

The second approach involved comparing the sales volume and number of employees (extracted from the Dun and Bradstreet database) of the responding and non-responding companies in the sample frame. There were no significant differences between the two sample groups, and therefore the respondents' sample was considered representative of the targeted industries (see Table I).

Respondents reported an average of 779 employees with a total of 50 percent of the companies employing between 101 and 500 employees (155 firms). The largest firm employed 15,000 workers and also had the highest annual sales (€ 5.4 billion). A diverse group of manufacturing organizations participated in the study. In descending order of response frequency, food, automotive components, miscellaneous manufacturing, and chemicals were the most widely represented industries in the respondent group (see Table II). Annual gross sales for the year 2000 of the companies surveyed ranged from 34 million Euros (€) to € 5.4 billion, with an average annual sales of € 141 million.

<Take in Table I>

<Take in Table II>

4.2. Research instrument

A survey instrument incorporating a list of questions to measure the three constructs—that is, standardization (STP), purchasing performance (PP), and business performance (BP)—was developed based on the reviewed literature. Operations management faculty were used as expert judges for content validation to determine how well the chosen items measure the constructs of interest in this study.

Purchasing managers at five manufacturing sites were interviewed while they reviewed the questionnaire to identify any language ambiguities and perceived omissions of other relevant practices not included in the survey. Based on comments from the operations management faculty and the five purchasing managers, the only changes made to the survey instrument were slight wording clarifications but no significant changes where deemed necessary by either group.

The survey instrument pertaining to this study measured a total of ten items; two items referred to STP, four related to PP, and four items referred to BP. The measurement scales were developed based on a study by Carr and Pearson (1999) that explored buyer-supplier relationships and performance outcomes. In both Carr and Pearson's and our current study, respondents were asked to indicate the degree of agreement or disagreement with the statements using five-point Likert scales, where 1 represented "strongly disagree" and 5 represented "strongly agree" (see Appendix). For example, item V1 in Table III pertained to materials standardization; the question in the survey instrument was: "we make intensive use of standardization of raw materials and components." BP was measured in comparison to the company's direct competitors using a five-point Likert scale. For example, participants were asked, "How would you rate you return on assets, (profit / total assets) in comparison with your direct competitors?" Participants had to respond on a five-point Likert scale using the following anchors: 5 represented "well above our competitors," and 1 represented "well below our competitors." The items' descriptive statistics (means and standard deviations) are presented in Table III.

5. RESULTS AND DISCUSSION OF HYPOTHESES

5.1. Construct validation

Mean responses for both standardization practices showed a similar level of implementation with the mean = 4.27 for the standardization of purchasing procedures, and a mean = 4.13 for the standardization of materials. See Table III for the means and standard deviations for STD, PP, and BP.

Confirmatory factor analyses (CFA) were conducted to address the validity and reliability of the constructs in our study (Anderson and Gerbing, 1988). The individual constructs where confirmed simultaneously (see Figure 2), similar to other studies in the literature (e.g. Carr and Pearson, 1999; Dong et al., 2001; Krause et al., 2000). As recommended by many researchers (Bollen and Long, 1993; Hair et al., 1995), multiple fit criteria are used to evaluate the CFA model. As it can be seen in Table IV, the chi-square statistic was non-significant ($\chi^2 = 38.3$; d.f. = 32; $p = 0.20$) indicating that the covariance structure implied by the model does not significantly differ from the covariance structure determined from the sample data. In addition, other fit indices are presented in Table IV, which also indicated an acceptable fit of the CFA models to the data.

Figure 2. CFA for standardization in purchasing, purchasing performance, and business performance

<Take in Figure 2>

Convergent validity is demonstrated when a set of alternative measures accurately represents the construct of interest (Churchill, 1979). Once the CFA model fit was established for the constructs in the study, the

convergent validity was assessed based on the level of significance for the factor loadings. If all the individual item factor loadings are significant, then the indicators are effectively converging to measure the same construct (Anderson and Gerbing, 1988). The coefficients for all indicators in the three constructs STP, PP, and BP were large and significant ($p < 0.01$) providing strong evidence of convergent validity (see Table V).

<Take in Table IV>

Discriminant validity among the latent variables and their associated measurement variables can be assessed by fixing (i.e., constraining) the correlation between pairs of constructs to 1.0, then re-estimating the modified model (Segars and Grover, 1993). By fixing the correlation between the two constructs to 1.0, we are essentially converting a two-construct model into a single-construct model. The condition of discriminant validity is met if the difference of the chi-square statistics between the constrained and standard models is significant. The chi-square difference tests using the three constructs indicated that discriminant validity exists among STP, PP, and BP ($p < 0.01$).

Scale reliability provides a measure of the internal consistency and homogeneity of the items comprising the scale (Churchill, 1979) and it was calculated as follows (Hair et al., 1995):

$$\frac{\left(\sum \textbf{factor loading}\right)^2}{\left(\sum \textbf{factor loading}\right)^2 + \left(\sum \textbf{error variances}\right)}$$

All three constructs (STD, PP, and BP, see Table V) demonstrated scale reliabilities above 0.78, which is well above the recommended minimum of 0.70 (Churchill, 1979). Thus, these results provide supporting evidence that the scales used in this study are reliable.

<Take in Table V>

5.2. Hypothesis testing and discussion

The hypotheses presented in Section 3 were tested using structural equation modeling (SEM). SEM is an appropriate statistical technique when assessing the relationships among latent constructs that are measured by multiple scale items, where at least one construct is both a dependent and an independent variable (Hair et al., 1995). Additionally, it allows researchers to estimate the strength of relationships among scale items and latent constructs as well as giving the investigator an indication of overall model fit. For these reasons, we tested the study's hypotheses using structural equation modeling. Our theoretical model in LISREL notation is presented in Figure 1.

Prior to testing the study's hypotheses, the model's fit must be established (Bollen and Long, 1993). The results of the structural model estimation are shown in Figure 3. The model's chi-square statistic was non-significant ($\chi^2 = 38.3$; d.f. = 33; $p = 0.24$). In addition, LISREL provides multiple additional indices to assess model fit, which also should be taken into consideration. When the other indices were examined (see Table IV, structural model results) they indicated a good fit between the data and the model. Thus, there is strong evidence indicating that the correlation structure implied by the hypothesized model fits the correlation structure obtained from the sample data.

Researchers sometimes free additional paths (potentially, based on modification indices), such as correlations between error variances, solely to improve model fit. In many cases, these alterations to the model are difficult to justify theoretically and therefore are frequently not reported. Since our model provided strong evidence of adequate fit, such modifications were not undertaken so all error variances were left uncorrelated and all estimated paths are shown in Figure 3.

<Take in Figure 3>

The hypothesized model allows us to examine the direct effects of standardization in purchasing on purchasing performance, and purchasing performance on business performance, as well as the indirect effect of standardization in purchasing on business performance, as mediated by purchasing performance. Thus, the test of the proposed hypotheses is based on the direct and indirect effects in the structural model. Hypotheses were tested at the significance level $p < 0.05$, two tailed (T-value > 1.96). All measures are presented in their standardized forms.

Hypothesis 1 stated that "*standardization in purchasing has a positive impact on purchasing performance*." The path between STP and PP was significant and positive (γ coefficient = 0.36, T-value = 6.81) (see Table V and Figure 3); thus, hypothesis 1 was supported. This result suggests that companies that implement standardization in purchasing (standardization of materials and purchasing procedures) are expected to experience increasing levels of purchasing performance. These increases are in the form of higher levels of conformance on materials purchased, and higher accuracy in suppliers' delivery performance, meeting material expenditure targets, as well as inventory performance objectives.

Hypothesis 2 stated that "*purchasing performance has a positive impact on business performance.*" The path between PP and BP was significant and positive (β coefficient = 0.17; *T*- value = 2.4) (see Table V and Figure 3); thus, hypothesis 2 was supported. This result indicates that a company with a higher level of purchasing performance will experience a higher level of business performance. These higher levels in BP observed are in the form of more competitive levels of return on assets, return on sales, production costs, and market share. It appears that the result was expected and is consistent with other research findings (e.g., Jayaram and Vickery, 1998).

Hypothesis 3 stated that "*standardization in purchasing has a positive indirect impact (mediated by purchasing performance) on business performance*." The indirect effect of STP on BP (mediated by PP) was positive and significant (path coefficient = $\gamma \bullet \beta = 0.06$, *T*-value = 2.06) (see Table V and Figure 3); thus hypothesis 3 was supported. As expected, the effect of standardization in purchasing on business performance was very small, since many other factors (e.g., decisions in marketing, manufacturing, and finance) affect the overall business performance. However, this finding does indicate that standardization in purchasing can have a significant positive impact on the firm's business performance and, when implemented, should have an incremental increase in a company's bottom line.

6. CONCLUSIONS AND MANAGERIAL IMPLICATIONS

The main research question of this paper was to investigate whether standardization in purchasing, operationalized as standardization of materials and purchasing procedures, had a significant and positive impact on purchasing and business performance. The results of our research provide the answer to this

question so we can now conclude that standardization in purchasing has a significant positive effect on purchasing and business performance. Potentially, the most important finding of this research is that standardization in purchasing has an indirect effect on business performance. Since business performance is affected by a large number of factors, it was not surprising that the effect of standardization in purchasing on business performance is small. However, this study found the effect to be positive and significant. In an economic environment where businesses are constantly attempting to identify means to obtain incremental improvements and enhance the company's bottom line, managers can use this study as evidence that standardization of materials and purchasing procedures has a positive effect on business performance and, thereby, justify its implementation.

Purchasing managers interested in elevating the status of the purchasing function could also utilize the results of this research to make top management aware of the contribution of the purchasing function to the success of the company and, subsequently, increase the level of involvement of the purchasing department in the strategic decisions of the company.

This study also exposes a number of opportunities and areas for future research. Keeping in mind that the use of a single key informant could be seen as a potential limitation of the study, and that this study's findings should be confirmed in the future using information directly obtained from actual suppliers, the association between the variation of independent factors and the variation of performance could be further investigated. Future research could also expand the model in this study by considering additional factors, such as quality management and human resource management practices, or different types of purchased items such as MRO (maintenance, repair, and operating) items.

APPENDIX

On a scale of 1 to 5, (1 = strongly disagree, 5 = strongly agree), indicate your firm's situation on each of the following statements:

A.1. Standardization in purchasing

V1 We make intensive use of standardization of raw materials and parts.

V2 We make intensive use of standardization purchasing procedures.

A.2. Purchasing performance

V3 Most raw materials and parts received are in conformance with specifications.

V4 All raw materials and parts arrive within the delivery date.

V5 Purchasing meets its materials' target cost (standard cost or budgeted cost).

V6 The quantity of materials purchased in inventory meets the inventory performance objective.

How would you rate your company's performance in comparison with your direct competitors with respect to the following business performance indicators (5 represents "well above our competitors," and 1 represents "well below our competitors").

A.3. Business performance

V7 Return on assets (ROA)

V8 Return on sales (ROS)

V9 Production costs

V10 Market share

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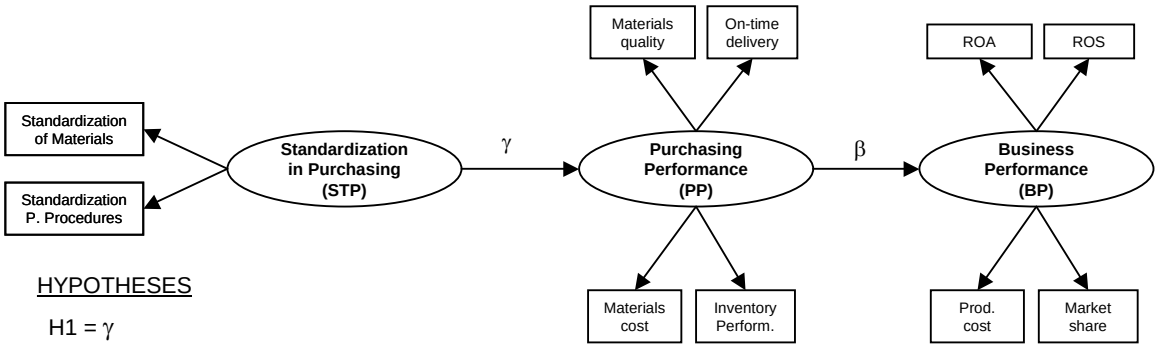
Figure 1. Research Framework



HYPOTHESES

H1 = γ

H2 = β

H3 = γ • β

Figure 2. CFA for Standardization In Purchasing, Purchasing Performance and Business Performance

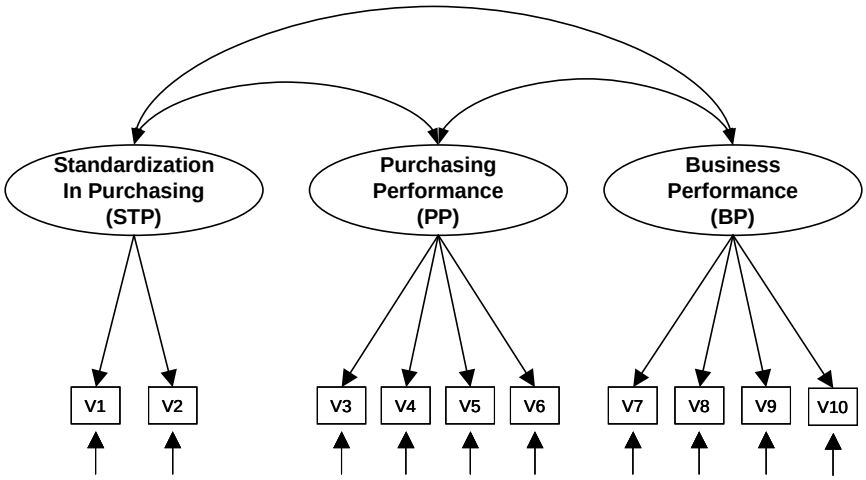
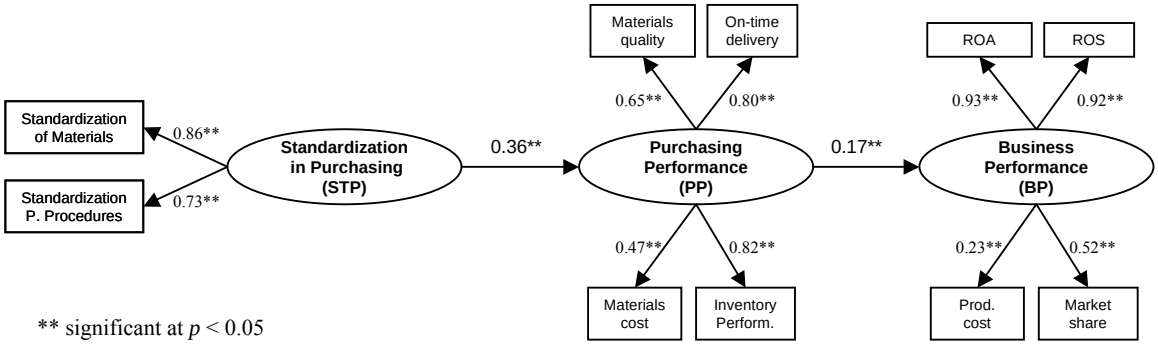


Figure 3. Structural model estimated paths



** significant at $p < 0.05$

Table I. Comparisons Between Respondents and Non-Respondents (Dun and Bradstreet Database)

		n	Mean	Standard Deviation	Significance
Sales (million Euros €)	Non-Respondents	898	169.38	514.11	0.383
	Respondents	302	141.61	349.83	
Number of employees	Non-Respondents	890	536	1,024	0.637
	Respondents	302	568	932	

Table II. The Proportion of Respondents' Industries as Reported in the Sample

Industry	Percentage of respondents	Cumulative percentage
Food and beverage	19.0	19.0
Auto components	15.0	34.0
Miscellaneous manufacturing	13.1	47.1
Chemicals	12.4	59.5
Machinery	6.5	66.0
Pharmaceutical products	4.9	70.9
Construction materials	4.6	75.5
Telecommunications and electronic equipment	3.9	79.4
Electricity materials	3.9	83.3
Primary metals	3.9	87.2
Paper	3.6	90.8
Electric appliances	3.3	94.1
Non ferrous metallurgy	2.9	97.0
Textile	2.9	99.9

Table III. Survey items, means and standard deviations

	Construct / Item	Mean	SD
STP	Standardization in purchasing		
V1	Standardization of materials	4.48	0.85
V2	Standardization of purchasing procedures	4.13	0.89
PP	Purchasing performance		
V3	Quality of materials	4.34	0.63
V4	On-time delivery	3.34	0.97
V5	Cost of materials	3.31	1.01
V6	Inventory performance	3.78	0.86
BP	Business performance		
V7	Return on assets (ROA)	3.60	0.75
V8	Return on sales (ROS)	3.50	0.75
V9	Market share	3.64	0.84
V10	Production cost	3.09	0.76

Table IV. Results of the overall model fit for the CFA and structural model

Fit Measures	Suggested values	CFA	Structural model
Chi-Square (χ^2)		38.40	38.49
Degrees of freedom (*df*)		32	33
p- value	≥ 0.05	0.20	0.24
χ^2/df	≤ 3.00	1.20	1.17
RMSEA	≤ 0.10	0.02	0.025
NFI	≥ 0.90	0.97	0.97
NNFI	≥ 0.90	0.99	0.99
CFI	≥ 0.90	0.99	1
GFI	≥ 0.90	0.99	1
AGFI	≥ 0.90	0.98	0.98
CN	>200	373	381

Table V. Loadings and Reliability for the CFA

Constructs and Indicators	Standardized loadings	*T*-values	Reliability
STZ			0.78
V1	0.86	8.16	
V2	0.73	7.35	
PP			0.79
V3	0.47	8.05	
V4	0.65	12.85	
V5	0.80	17.33	
V6	0.82	19.12	
BP			0.78
V7	0.93	26.79	
V8	0.94	20.89	
V9	0.23	3.23	
V10	0.52	9.98	