

THE IMPACT OF STRATEGY AND LOGISTICS ON PERFORMANCE: THE CASE OF BULGARIA

Miroslava Rakovska*

* Logistics Department, University of National and World Economy, Sofia, 1700, Bulgaria,
Email: mirar@unwe.bg

Abstract: The paper presents the results of an empirical study of the impact of strategy and logistics on company performance and of the role of logistics in mediating the impact of strategy on performance. The research revealed that companies pursuing differentiation strategy demonstrate better performance and higher internal and external integration of the management of material and related to them flows. The results proved that logistics measured with definite practices plays a role in mediating the impact of differentiation strategy on competitiveness. In particular, the practices that reflect the positive influence of differentiation strategy on competitiveness are: developing technological capabilities for the management of logistics activities and for information sharing between supply chain members; practices related mainly to communication and relational issues; and achieving greater integration within the company and in the supply chain as well.

Paper type: Research Paper

Published online: 31 December 2016
Vol. 6, No. 6, pp. 499–512
DOI: 10.21008/j.2083-4950.2016.6.6.2

ISSN 2083-4942 (Print)

ISSN 2083-4950 (Online)

© 2016 Poznan University of Technology. All rights reserved.

Keywords: *strategy, logistics, performance, relationship*

1. INTRODUCTION

Research in logistics increases significantly in different countries and the studies differ in aims, subject, and scientific hypotheses. Recently, there is a great focus on supply chain management (SCM) and on the integration efforts of the supply chain (SC) members. Many of the research works in the area of logistics and SCM prove their influence on company performance (Bielecki, 2012, p. 163; Zhao, Droge & Stank, 2001; Tracy, Lim & Vonderembse, 2005, etc.). On the other hand, the impact of business strategy on SCM is confirmed in various research works too (Gonzalez-Benito, 2010; Cousins, 2005, etc.). Logistics, as a management function, is generally considered to be a means for realizing company strategy. In spite of the many arguments in literature about the relationship between strategy and logistics, they are predominantly theoretical and partially confirmed with proofs mainly from the practice of leading companies. The aim of the paper is to study empirically the impact of business strategy and logistics on performance, as well as the role of logistics as an effective means for strategy implementation directed towards performance improvement. The paper contains results from a research, financed from the fund for scientific research at the University of National and World Economy under contract №NID NI 1-1/2012.

2. LITERATURE REVIEW

Most studies focus on separate aspects of logistics and SCM in the internal, inbound or outbound part of the chain. Some researchers relate to competitiveness a limited number of measures of logistics and SCM in the link with direct suppliers (Scannell, Vickery & Droge, 2000; Vonderembse & Tracey, 1999). Other researchers focus on the links with customers (Alvarado & Kotzab, 2001; Clark & Lee, 2000). Zhao, Droge & Stank (2001) discovered that customer-focused capabilities are significantly related to firm performance. A few authors consider the links both with customers and suppliers (Li, Rao, Ragu-Nathan & Ragu-Nathan, 2005; Fawcett, Magnan & Ogden, 2007), but the relationships between the used practices and performance are not examined. Vickery, Calantone & Dröge (1999) investigate the relationship between SC flexibility and financial performance indicators. Morash & Lynch (2002) reveal that customer service capabilities such as delivery reliability and speed, for example, lead to better performance. Tracy, Lim & Vonderembse (2005) investigate the impact of three types of SCM capabilities on performance. Other researchers examine more measures of SCM and their impact on competitiveness (Tan, 2002), effectiveness (Elmuti, 2002) and performance (Kim, 2006). There are only several research works in Bulgaria on the internal logistics integration (Dimitrov, 2003) or on SCM practices, although in separate industries (Rakovska, 2006; Vodenicharova, 2010; Ivanov, 2011). There is a need

to research both the internal and external aspects of logistics and the relationships between practices that are representative of these aspects and company performance measured with the improvement of the financial and market status and different dimensions of competitiveness.

A number of researchers have tested the links of company performance either with Porter’s generic strategies (Porter, 1985; In De Wit & Meyer, 1994) or with company capabilities and competences, but the two approaches were not considered together (Lynch, Keller & Ozment, 2000). Others explore the effect of business strategy on SCM (Gonzalez-Benito, 2010; Cousins, 2005) and, more particularly, on socially responsible SCM (Hoejmoose, Brammer & Millington, 2013). It is supposed that logistics practices should comply with strategy in order to achieve the desired competitive advantage. Cost leadership requires more efficient control of logistics leading to reduction of logistics costs in the SC while differentiation strategy implies a different logistics approach directed towards providing higher customer service levels although at higher costs. It is of an interest to understand whether logistics, and subsequently which logistics practices, allow a given strategy to be turned into better performance.

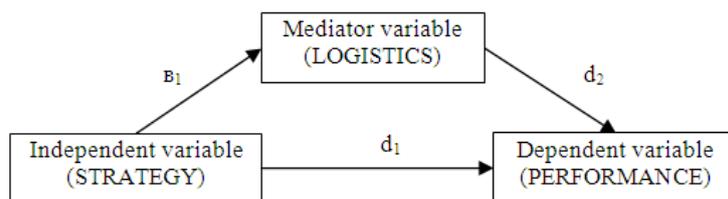
3. METHODOLOGY

Figure 1 illustrates the relationship between strategy, logistics and performance. It outlines three hypotheses:

H1: The higher extent of use of the logistics concept has a positive effect on performance.

H2: The clear strategic focus has a positive effect on the use of logistics.

H3: The impact of strategy on performance is mediated by the use of logistics.



Direct effect = d_1 Indirect effect = $B_1 \cdot d_2$ Total effect = $d_1 + B_1 \cdot d_2$

Fig. 1. Hypothetical relationships between the researched variables

It is assumed that the following models reflect the three hypotheses:

$$\text{PERFORMANCE} = a_0 + a_1 \text{LOGISTICS} + \varepsilon_1 \quad (1) \quad \text{testing hypothesis H1}$$

$$\text{LOGISTICS} = b_0 + b_1 \text{STRATEGY} + \varepsilon_2 \quad (2) \quad \text{testing hypothesis H2}$$

$$\text{PERFORMANCE} = c_0 + c_1 \text{STRATEGY} + \varepsilon_3 \quad (3) \quad \text{testing hypothesis H3}$$

$$\text{PERFORMANCE} = d_0 + d_1 \text{STRATEGY} + d_2 \text{LOGISTICS} + \varepsilon_4 \quad (4)$$

The mediating effect is estimated on the basis of the difference between the coefficients c_1 and $d_1 - d_2$ – d_1 should be smaller in absolute value than c_1 . Only measures that in equation 1, 2 and 3 have shown statistically significant relationships with the resultant variable should be tested in model 4.

The methodology for the hypotheses testing includes the development of scale items for measuring the constructs of strategy, logistics and performance, constructing a questionnaire, data collection using a key informant survey research method and applying statistical methods for testing the hypothesized relationships. The scales for business strategy, logistics and company performance were developed on the basis of the literature review. They are shown, together with the corresponding coefficients Alpha Cronbach, in Appendix A. Strategy is conceptualized as cost leadership or differentiation as defined by Porter and the scales are adapted from the research of Lynch, Keller & Ozment (2000). Logistics is considered in two aspects: internal integration of the material and related to them flows and external integration between SC members (for more details concerning the conceptual framework for measuring the impact of strategy and logistics on performance see Rakovska, 2013). The internal integration encompasses the extent of integration of logistics activities and processes within the company and the cross-functional coordination. The external integration encompasses the characteristics of SCM application with regard to the management of the material, information, knowledge flows and the relationships.

Company performance can generally be classified as financial and operational or non-financial performance (Venkatraman & Ramanujam, 1986). Operational performance is closely related to competitiveness. Thus, in this research performance is expressed with competitiveness and the improvement of market-financial performance. Perceptual measures are used and respondents were asked to assess their companies' positions in industry concerning the dimensions of competitiveness (price, quality, delivery, flexibility, service), and the improvement for the last years of measures like sales, market share, net profit, ROA. Some researchers have discovered that perceptual measures correlate closely with real financial and marketing data (Dess & Robinson, 1984; Fawcett, Stanley & Smith 1997).

The data for this research were collected through structured questionnaires in 159 manufacturing and trading companies. Responses were measured via 5-point scales. Questionnaires were filled in through personal interviews. Trading companies represent 50.9% of the sample and the share of the manufacturing companies is nearly the same (49.1%). Concerning the number of employees, 26.4% of the companies are micro enterprises (below 9 employees), 33.3% – small (10–49 employees), 25.8% – medium (50–249 employees) and 14.5% are large enterprises (more than 250 employees). The division of the companies into groups according to the strategy focus is made depending on the means of the scale items for the two

strategies. Those companies with higher means for one of the strategies are assigned in the group representing this strategy. Some companies have the same means for the two strategies and they are considered to be without a strategic focus. The differentiation strategy is characteristic for more than half of the companies (56.6%), cost leadership strategy – for 34.6%, while the rest 8.8% do not have a clear strategic focus. The data were analyzed with SPSS version 17.0.

4. FINDINGS

Hypothesis 1. The first step is to prove that the cost leadership strategy, differentiation strategy and logistics, when considered separately, have a significant impact on competitiveness and market-financial performance (equations 1 and 3).

Table 1. Regression coefficients resulting from testing Hypothesis 1

Independent variables	Dependent variables	
	Competitiveness	Market-financial performance
Cost leadership	-0.052	-0.002
Differentiation	0.230***	0.240***
Internal integration		
Investments in areas leading to higher integration	0.167***	0.136*
Using information systems in the management of logistics activities	0.130 ***	0.084
Extent of cooperation between functions	0.193 ***	0.173**
Consistency of internal goals and performance measures	0.234***	0.066
External integration		
Content of communication	0.179***	0.019
Consistency of goals between SC members	0.101*	-0.025
Consistency and sharing of performance measures	0.076	-0.028
Receiving feedback from customers and providing feedback to suppliers	0.207***	0.172*
Technological capabilities for information sharing between SC members	0.181***	0.156*
Methods for communication	0.206***	0.187*
Participation of representatives from different functions in the inter-company communication	0.137**	0.193*
Knowledge management	0.108**	-0.074
Stable, long-term relationships	0.185***	0.193**
Deployment of integration practices beyond direct suppliers and customers	0.146**	0.105

* p<0.1; ** p<0.05; *** p<0.01

Thirteen of the fourteen measures of logistics influence significantly competitiveness (Table 1). Only the consistency and sharing of performance measures do not have such an influence. A possible explanation of that is the weak application of this practice (mean 2.77). Hardly 12% of the companies apply it in a great or very great extent (responses 4 and 5). Seven of the logistics measures have an effect on market-financial performance. This smaller number of dependencies may be due to the unstable financial state of the Bulgarian enterprises after the economic crisis. The results so far clearly show that Hypothesis 1 is supported. Differentiation strategy influences both performance measures at very high significance levels, while their relationships with cost leadership strategy are negative. Since the significance of these relationships is very low, we cannot conclude that cost leadership strategy has a negative influence on performance, but definitely it does not influence performance.

Hypothesis 2. The next step is to determine whether the differentiation strategy influences significantly the thirteen logistics measures (equation 2). As it can be seen in Table 2, the differentiation strategy has a positive effect on the application of all internal and external integration practices, which on their part influence competitiveness (Table 1). Thus Hypothesis 2 is supported too. None of the measures drops out of the analysis at this stage.

Table 2. Regression coefficients resulting from testing Hypothesis 2

Dependent variables	Independent variable: Differentiation
Internal integration	
Investments in areas leading to higher integration	0.381 ***
Using information systems in the management of logistics activities	0.435 ***
Extent of cooperation between functions	0.335 ***
Consistency of internal goals and performance measures	0.271 ***
External integration	
Content of communication	0.227 ***
Consistency of goals between SC members	0.204 **
Receiving feedback from customers and providing feedback to suppliers	0.328 ***
Technological capabilities for information sharing between SC members	0.350 ***
Methods for communication	0.274 ***
Participation of representatives from different functions in the inter-company communication	0.170 **
Knowledge management	0.283 ***
Stable, long-term relationships	0.254 ***
Deployment of integration practices beyond direct suppliers and customers	0.239 ***

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Hypothesis 3. Thirteen logistics measures meet strictly the conditions for testing the mediation model. Table 3 is divided into two parts. The upper one shows the coefficients for the differentiation strategy, when it serves as an individual factor influencing performance. The lower part illustrates the effect of including the logistics measures in the model. Table 3 reveals that eight logistics measures partially mediate the impact of differentiation strategy on competitiveness. The arguments for this conclusion are the following: First, the logistics measures remain statistically significant when included in the multiple regression models, and second, the coefficient in front of STRATEGY becomes weaker, yet still significant. None of the practices mediates the impact of differentiation strategy on market-financial performance, because in the mediation tests the coefficients for these practices lose their significance.

The conclusion is that companies that pursue the differentiation strategy achieve higher competitiveness by means of a large part of the practices for internal and external integration included in the research. These companies have to focus on those logistics practices that mediate the impact of logistics on company performance to a greater extent (the coefficient in front of STRATEGY decreases significantly). Differentiation implies cooperation and integration, and that statement is supported by the research results. Concerning the internal practices, using information systems in the management of logistics activities appears to exert a considerable effect. Other important practices for achieving differentiation are harmonization of goals and performance measures within companies and stimulation of functional cooperation. These practices allow the creation of conditions for effective coordination of activities related to material flows management between different organizational units. The capability to coordinate the interdependences between company functions increases the speed, reliability and flexibility of the response to customer needs. Based on the improved coordination, investments in areas leading to higher integration, such as ERP systems for example, also create opportunities for increasing competitiveness.

Differentiation strategy extends beyond company boundaries and implies an orientation towards supply chain integration in order to achieve conformity between market requirements and SC members' performance. Among external integration practices, the technological capabilities for information sharing between SC members and the communication methods mediate to a greater extent the impact of differentiation strategy on competitiveness. This means that the capability to share with customers and suppliers operational and strategic information related to material flows management, as well as the use of various communication methods, including team meetings and joint teams, allow the effective movement of products towards the end customers because of easier problem solving and operations coordination. Part of this communication, which is important for the

proper decision making with regard to meeting customer requirements, is the feedback from customers and to suppliers.

Table 3. Regression coefficients resulting from testing Hypothesis 3

Independent variables	Dependent variables	
	Competitive ness	Market- financial performance
Differentiation strategy	0.230***	0.240***
Test for mediation		
Internal integration		
Differentiation strategy	0.188 ***	0.215 **
Investments in areas leading to higher integration	0.109 **	0.069
Differentiation strategy	0.207 ***	
Using information systems in the management of logistics activities	0.082 *	
Differentiation strategy	0.172 ***	0.206 **
Extent of cooperation between functions	0.145 ***	0.116
Differentiation strategy	0.180 ***	
Consistency of internal goals and performance measures	0.184 ***	
External integration		
Differentiation strategy	0.192 ***	
Content of communication	0.111	
Differentiation strategy	0.201 ***	
Consistency of goals between SC members	0.061	
Differentiation strategy	0.208 ***	0.219 **
Receiving feedback from customers and providing feedback to suppliers	0.135 **	0.098
Differentiation strategy	0.183 ***	0.204 **
Technological capabilities for information sharing between SC members	0.120 **	0.084
Differentiation strategy	0.186 ***	0.212 **
Methods for communication	0.147 **	0.090
Differentiation strategy	0.224 ***	0.202 **
Participation of representatives from different functions in the inter-company communication	0.085	0.148
Differentiation strategy	0.205 ***	
Knowledge management	0.063	
Differentiation strategy	0.198 ***	0.208 **
Stable, long-term relationships	0.135 **	0.122
Differentiation strategy	0.211 ***	
Deployment of integration practices beyond direct suppliers and customers	0.091	

* p<0.1; ** p<0.05; *** p<0.01

Actually, academic research has proved that these practices have the greatest effect on performance, because they contribute to higher SC visibility concerning real demand, manufacturing and delivery schedules, tracking and tracing, all of which allow SC members to better plan their operations and make possible the reduction of time to bring products to customers.

6. CONCLUSION

This study contributes to the current state of logistics research with an assessment of the impact of strategy and logistics on performance. It revealed that, firstly, companies with clearly defined differentiation strategy demonstrate higher internal and external integration and better performance. On the other hand, no evidences were provided that the cost leadership strategy influences the competitiveness and market-financial performance. This result supposes the conduction of additional research on the relevant reasons. They may be grounded in the improper implementation of the cost leadership strategy or the changing needs and priorities of customers.

Secondly, the results support the mediation model, i.e. logistics measured with concrete practices plays a role in mediating the impact of differentiation strategy on competitiveness. It was discovered that developing technological capabilities for the management of logistics activities and for information sharing between SC members reflects in the greatest extent the positive influence of differentiation strategy on competitiveness. Other practices reflect this influence too to a lesser but still significant extent. They are related mainly to communication and relational issues and achieving greater integration within the company and in the SC as well. It can be inferred that the differentiation of product packages requires integration of logistics activities not only in the company but in the relations with the suppliers and customers as well.

Instead of minimizing costs, many companies choose to provide differentiated product offerings in order to increase market share. When logistics contributes to this goal achievement, it has the potential to turn the product offerings into profitable solutions. This implies that the implementation of differentiation strategy is reflected on interdependencies within the company and between SC members. However, it is important to emphasize that the discussed practices mediate the impact, but are not the only means, by which the differentiation strategy influences company competitiveness (the coefficient in front of the independent variable does not become zero with the inclusion of the mediator in the model). For that reason, it is necessary to study which other means and management techniques, not only in the area of logistics but in other management areas too, allow for achieving positive results from differentiation strategy.

REFERENCES

- Alvarado U.Y. & Kotzab H. (2001), Supply chain management: the integration of logistics in marketing, *Industrial Marketing Management*, Vol. 30, No. 2, pp. 183–198.
- Bielecki M. (2012), The influence of development stages of logistics management on the logistics strategies of small manufacturing enterprises, K. Grzybowska (ed.), *Logistics – Selected Concepts and Best Practices*, Publishing House of Poznan University of Technology, Poznan, pp. 159–179.
- Clark T.H. & Lee H.G. (2000), Performance, interdependence and coordination in business-to-business electronic commerce and supply chain management, *Information Technology and Management*, Vol. 1, No. 1–2, pp. 85–105.
- Cousins P.D. (2005), The alignment of appropriate firm and supply strategies for competitive advantage, *International Journal of Operations & Production Management*, Vol. 25 No. 5, pp. 403–428.
- Dess G.G. & Robinson J. (1984), Measuring organizational performance in the absence of objective measures: The case of the privately-held firm and conglomerate business unit, *Strategic Management Journal*, Vol. 5, No. 3, 265–273.
- Dimitrov P. (2003), Logistics development in the industrial companies in Bulgaria, P. Dimitrov (Ed.), *Logistics in Bulgaria – Theory and Practice*, (in Bulgarian), IBIS, Sofia, pp. 13–28.
- Elmuti D. (2002), The perceived impact of supply chain management on organizational effectiveness, *Journal of Supply Chain Management*, Vol. 38, No. 2, pp. 49–57.
- Fawcett S.E., Stanley L.L. & Smith S.R. (1997), Developing a logistics capability to improve the performance of international operations, *Journal of Business Logistics*, Vol. 18, No. 2, pp. 101–127.
- Fawcett S., Magnan G. & Ogden J. (2007), *Achieving world-class supply chain collaboration: Managing the transformation*, Center for Advanced Purchasing Studies.
- Gonzalez-Benito J. (2010), Supply strategy and business performance: an analysis based on the relative importance assigned to generic competitive objectives, *International Journal of Operations & Production Management*, Vol. 30, No. 8, pp. 774–797.
- Hoejmose S., Brammer S. & Millington A. (2013), An empirical examination of the relationship between business strategy and socially responsible supply chain management, *International Journal of Operations & Production Management*, Vol. 33, No. 5, pp. 589–621.
- Kim S.W. (2006), Effects of supply chain management practices, integration and competition capability on performance, *Supply Chain Management: An International Journal*, Vol. 11, No. 3, pp. 241–248.
- Li S., Rao S.S., Ragu-Nathan T.S. & Ragu-Nathan B. (2005), Development and validation of a measurement instrument for studying supply chain management practices, *Journal of Operations Management*, Vol. 23, No. 6, pp. 618–641.
- Lynch D., Keller S. & Ozment J. (2000), The effects of logistics capabilities and strategy on firm performance, *Journal of Business Logistics*, Vol. 21, No. 2, pp. 47–65.

- Morash E.A. & Lynch D.F. (2002), Public policy and global supply chain capabilities and performance: A resource-based view, *Journal of International Marketing*, Vol. 10, No. 1, pp. 25–51.
- Ivanov N. (2011), Improvement of supply chain management for compressed natural gas, A Dissertation for a PhD Degree, (in Bulgarian), UNWE, Sofia.
- Porter M. (1985), *Generic competitive strategies*, B. De Wit & R. Meyer (Eds.), (1994), *Strategy. Process, Content, Context*, West Publishing Company, pp. 218–239.
- Rakovska M. (2013), The impact of strategy and logistics on performance: A methodological framework, *Research in Logistics&Production*, No. 3, pp. 213–223.
- Rakovska M. (2006), Supply chain management for cosmetic and confectionery products in Bulgaria, A Dissertation for a PhD Degree, (in Bulgarian), UNWE, Sofia.
- Scannell T., Vickery S. & Droge C. (2000), Upstream supply chain management and competitive performance in the automotive supply industry, *Journal of Business Logistics*, Vol. 21, No. 1, pp. 23–48.
- Tan K.C. (2002), Supply chain management: Practices, concerns, and performance issues, *The Journal of Supply Chain Management*, Vol. 38, No. 4, pp. 42–53.
- Tracy M., Lim J.S. & Vonderembse M.A. (2005), The impact of supply-chain management on business performance, *Supply Chain Management: An International Journal*, Vol. 10, No. 3, 179–191.
- Venkatraman N. & Ramanujam V. (1986), Measurement of business performance in strategy research: A comparison of approaches, *Academy of Management Review*, Vol. 11, No. 4, pp. 801–814.
- Vickery S., Calantone R. & Dröge C. (1999), Supply chain flexibility: An empirical study, *Journal of Supply Chain Management*, Vol. 35, No. 2, pp. 16–24.
- Vodenicharova M. (2010), The role of logistics in the company management of the meat processing companies in Bulgaria, *Meat and Meat Products*, (in Bulgarian), No. 4, pp. 38–41.
- Vonderembse M.A. & Tracey M. (1999), The impact of supplier selection criteria and supplier involvement on manufacturing performance, *Journal of Supply Chain Management*, Vol. 35, No. 2, pp. 33–41.
- Zhao M., Droge C. & Stank T.P. (2001), The effects of logistics capabilities on firm performance: Customer-focused versus information-focus capabilities, *Journal of Business Logistics*, Vol. 22, No. 2, pp. 91–107.

BIOGRAPHICAL NOTES

Miroslava Rakovska is an Associate Professor in the Logistics Department at the University of National and World Economy, Sofia, Bulgaria. She holds a master's degree in International Economic Relations and a PhD degree in Supply Chain Management from the University of National and World Economy. Her research interests include business logistics, supply chain management, global supply chains, logistics service providers, operations management. She is the President of the Bulgarian Logistics Association.

APPENDIX A

Dimensions of the researched constructs, scale items and Coefficients Alpha Cronbach

Dimensions of strategy, logistics and performance	Scale items	Coefficient Alpha Cronbach
Strategy		
Differentiation	1. New products development in short time	0.760
	2. Offering customized products	
	3. Offering products that are distinguishable from competitors' products	
	4. Offering a great variety of products	
Cost leadership	1. Greater emphasis on cost reduction than on value added	0.668
	2. Product redesign to reduce costs (for manufacturing companies) / Selection of low-cost suppliers (for trading companies)	
	3. Keeping costs on their lowest possible level to provide lower prices	
	4. Offering products with acceptable quality and service but at lower prices	
Internal integration		
<i>A. Integration of logistics activities and processes</i>		
A1. Investments in areas leading to higher integration	1. Computer hardware	0.923
	2. Computer software	
	3. Productivity improvement	
	4. Production/warehouse automation	
	5. Just-in-time systems	
	6. Material requirements planning systems	
	7. Distribution requirements planning systems	
	8. Enterprise resource planning systems	
	9. Information system that integrates procurement, production/warehousing and distribution	
A2. Using information systems in the management of logistics activities	1. Order processing	0.921
	2. Inventory management	
	3. Production/sales planning and management	
	4. Quality control	
	5. Warehouse management	
	6. Procurement management	
	7. Distribution management	
	8. Demand forecasting	
	9. Transportation management	
<i>B. Cross-functional coordination</i>		
B1. Extent of cooperation between	1. Operations and marketing/sales	0.695
	2. Distribution and marketing/sales	
	3. Distribution and procurement	

functions		
B2. Consistency of internal goals and performance measures between functional departments.	1. Employees know company goals	0.835
	2. Company goals are clearly formulated and recorded	
	3. Company goals are determined in quantitative terms	
	4. The company uses quantitative performance measures	
	5. Different function areas use consistent performance measures	
	6. The company carries out total costs analysis	
	7. Supplier performance in different aspects is measured	
	8. Customer profitability is measured	
External integration		
C. Material flows management		
C1. Content of communication	1. Prices	0.897
	2. Delivery terms	
	3. Sales	
	4. Coordination of customer service programs	
	5. Forecasts	
	6. Inventories	
	7. Costs	
	8. Promotional plans	
	9. Plans for growth and development	
	10. Joint planning	
C2. Consistency of goals between SC members	1. Consistent operational goals	0.871
	2. Consistent strategic goals	
	3. Joint mission	
	4. Joint competitive weapons	
C3. Consistency and sharing of performance measures	1. Consistent performance indicators	0.901
	2. Sharing performance indicators	
	3. Common methodology for performance measurement	
C4. Receiving feedback from customers and providing feedback to suppliers	1. Receiving feedback from direct customers in some areas	0.862
	2. Providing feedback to direct suppliers in some areas	
	3. Measuring the total satisfaction of direct customers	
	4. Providing information for our total satisfaction to direct suppliers	
	5. Measuring the satisfaction of end customers	
D. Information flows management		
D1. Technological capabilities for information sharing between SC members	1. Satellite systems for delivery tracking	0.852
	2. Radio-frequency identification	
	3. Point-of-sales systems	
	4. Web-based catalogues	
	5. E-business, Internet trading	
	6. Customer relationship management systems	
	7. Supplier relationship management systems	
	8. Information systems for supply chain management	
	9. Integration of information systems with those of customers and suppliers	
D2. Methods for communication	1. Telephone/fax	0.777
	2. E-mail	
	3. Electronic data interchange	
	4. Team meetings	
	5. Joint teams	

		6. Site visits to/from suppliers	
D3. Participation of representatives from different functions in the inter-company communication		1. Procurement 2. Production/warehousing 3. Distribution 4. Marketing/sales 5. Finance/accounting	0.746
E. Knowledge management		1. Sharing technical information 2. Sharing technologies 3. Sharing knowledge and experience in quality and material and information flows management 4. Sharing knowledge in new products development 5. Sharing knowledge and experience in company management	0.907
F. Relationships management			
F1. Stable, long-term relationships		1. Long-term contracts 2. Rules for roles and responsibilities allocation 3. Mutual help in improving performance 4. Each party considers the financial interests of the other one 5. Rules for risks and rewards sharing	0.840
F2. Deployment of integration practices beyond direct suppliers and customers		1. Understanding the requirements of our customers' customers 2. Participating in the marketing decisions of our customers 3. Helping indirect suppliers to improve their performance 4. Participating in the procurement decisions of our suppliers 5. Helping our customers/suppliers to solve problems with their customers/suppliers	0.748
Performance			
Competitiveness		1. Price 2. Product quality 3. Order cycle time 4. Delivery reliability 5. Variety of products 6. Products/service customization 7. Time for new products development 8. Time for adapting to demand changes 9. Guarantees and service	0.821
Market-financial performance		1. Sales 2. Market share 3. Net profit 4. ROA	0.891