

Analysis of the Impact of Supply Chain Management Techniques: A Competitive Advantage in the Market

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Abstract

Over the past two decades, managers have seen a dramatic change in the world due to technology advances, markets globalization and new political and economic conditions. In such a competitive environment, companies which stay in the rolling competition and keep pace with changing and dynamics conditions of a competitive market are able to survive. Supply chain management is put forward as one of the fundamental principles of the implementation of “business process” in the world. “Supply chain management” associates with commercial process benefits. It also provides a new approach to commercial activities’ management and relationship with the other members of the supply chain. In this study we attempt to explain and identify the impact of supply chain management techniques on gaining a competitive advantage in the organization. Thus, we try to provide a conceptual framework to examine the impact of five typical techniques of supply chain management included strategic partnerships with supplier, customer relationship management, informing quality, informing level and procrastination on achievement to a competitive advantage in organizations. The current study has a correlational nature and its executive method is survey. Statistical population includes 500 marketing managers of the industrial town of Nain. Using random sampling and Cochran formula, 167 people are considered as the sample estimation. Structural equation modeling by Liserel software is used for data analysis. Our model confirmed the relationship between supply chain management measures (strategic partnership with supplier, customer relationship management, informing level, informing quality and procrastination) and a competitive advantage’s component.

Keywords: Supply chain management, Competitive advantage, Marketing performance, Organizational performance, Structural equation

Introduction

Nowadays, providing the best performance in a marketing context has become a major concern for managers of manufacturing companies. It makes them try to utilize a variety of techniques to achieve superior performance. Today's Supply Chain Management is put forward as one of the fundamental principles of business implementation in the world. "Supply chain management" suggests opportunities for achieving a positive increase in integration and inter company and intra-company management. In this case, supply chain management associates with commercial process benefits. It also provides a new approach to commercial activities' management and relationship with the other members of the supply chain. In a global competition in current era, various products should be available to customers, according to their demands.

An increased pressure on companies is appeared due to customer demands included high quality and instant service. Therefore, companies can no longer carry out all tasks alone. In the existent competitive market, manufacturing and economic enterprises not only address internal resources but also need to manage and monitor the resources and related components outside the organization. The purpose of supply chain management is to provide the long-term benefits for all stakeholders through collaboration, coordination and resource sharing. It is tried to provide win-win situation for all members in supply chain management. (Hamidi and Maleki, 2010).

To manage resources aligned with the chain, dealing with supply chain management in organizations can be an effective step for achieving a better performance. It, also, can lead organizations towards achieving a stable competitive advantage. Therefore, the present study provides a model to evaluate a framework that determines the relationship between supply chain management techniques and a competitive advantage.

Literature review

Supply chain management practices:

SCM practices have been defined as a set of activities undertaken in an organization to promote effective management of its supply chain.

Donlon (1996) describes the latest evolution of SCM practices, which include supplier partnership, outsourcing, cycle time compression, continuous process flow, and information technology sharing.

Tan et al. (1998) use purchasing, quality, and customer relations to represent SCM practices, in their empirical study.

Alvarado and Kotzab (2001) include in their list of SCM practices concentration on core competencies, use of inter-organizational systems such as EDI, and elimination of excess inventory levels by postponing customization toward the end of the supply chain. Tan et al. (1998) identify six aspects of SCM practice through factor analysis: supply chain integration, information sharing, supply chain characteristics, customer service management, geographical proximity and JIT capability.

Min and Mentzer (2004) identify the concept SCM as including agreed vision and goals, information sharing, risk and award sharing, cooperation, process integration, long-term relationship and agreed supply chain leadership. Thus the literature portrays SCM practices from a variety of different perspectives with a common goal of ultimately improving

organizational performance. In reviewing and consolidating the literature, five distinctive dimensions, including strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing and postponement, are selected for measuring SCM practice. The five constructs cover upstream (strategic supplier partnership) and downstream (customer relationship) sides of a supply chain, information flow across a supply chain (level of information sharing and quality of information sharing), and internal supply chain process (postponement). It should be pointed out that even though the above dimensions capture the major aspects of SCM practice, they cannot be considered complete. Other factors, such as geographical proximity, JIT/lean capability (Tan, Kannan, Handfield, 1998)

cross-functional teams, logistics integration, agreed vision and goals, and agreed supply chain leadership are also identified in the literature. Though these factors are of great interest, they are not included due to the concerns regarding the length of the survey and the parsimony of measurement instruments. The present study, therefore, proposes SCM practices as a multi-dimensional concept. (Min, Mentzer, 2004)

Strategic supplier partnership:

Is defined as the long-term relationship between the organization and its suppliers. It is designed to leverage the strategic and operational capabilities of individual participating organizations to help them achieve significant ongoing benefits. A strategic partnership emphasizes direct, long-term association and encourages mutual planning and problem solving efforts (Gunasekaran, Patel, Tirtiroglu, 2001)

Such strategic partnerships are entered into to promote shared benefits among the parties and ongoing participation in one or more key strategic areas such as technology, products, and markets. Strategic partnerships with suppliers enable organizations to work more effectively with a few important suppliers who are willing to share responsibility for the success of the products. Suppliers participating early in the product-design process can offer more cost-effective design choices, help select the best components and technologies, and help in design assessment (Tan, Kannan, Handfield, 1998).

Strategically aligned organizations can work closely together and eliminate waste of time and effort (Balsmeier, Voisin, 1996).

Customer relationship:

Comprises the entire array of practices that are employed for the purpose of managing customer complaints, building long-term relationships with customers, and improving customer satisfaction. Tan et al (1998) consider customer relationship management as an important component of SCM practices. As pointed out by Day (2000), committed relationships are the most sustainable advantage because of their inherent barriers to competition. The growth of mass customization and personalized service is leading to an era in which relationship management with customers is becoming crucial for corporate survival. Good relationships with supply chain members, including customers, are needed for successful implementation of SCM programs (Moberg, Cutler, Gross, Speh, 2002).

Close customer relationship allows an organization to differentiate its product from competitors, sustain customer loyalty, and dramatically extend the value it provides to its customers.

Level of information sharing:

Information sharing has two aspects: quantity and quality. Both aspects are important for the practices of SCM and have been treated as independent constructs in the past SCM studies (Moberg, Cutler, Gross, Speh, 2002).

Level quantity aspect) of information sharing refers to the extent to which critical and proprietary information is communicated to one's supply chain partner. Shared information can vary from strategic to tactical in nature and from information about logistics activities to general market and customer information (Mentzer, Min, Zacharia, 2000).

Many researchers have suggested that the key to the seamless supply chain is making available undistorted and up-to-date marketing data at every node within the supply chain. By taking the data available and sharing it with other parties within the supply chain, information can be used as a source of competitive advantage. Lalonde (1998) considers sharing of information as one of five building blocks that characterize a solid supply chain relationship. According to Stein and Sweat (1998) supply chain partners who exchange information regularly are able to work as a single entity. Together, they can understand the needs of the end customer better and hence can respond to market change quicker. Moreover, The empirical findings of Child house and Towill (2003) reveal that simplified material flow, including streamlining and making highly visible all information flow through out the chain, is the key to an integrated and effective supply chain.

Quality of information sharing

includes such aspects as the accuracy, timeliness, adequacy, and credibility of information exchanged (Moberg, Cutler, Gross, Speh, 2000).

While information sharing is important, the significance of its impact on SCM depends on what information is shared, when and how it is shared, and with whom (Holmberg, 2000).

Literature is replete with example of the dysfunctional effects of inaccurate/delayed information, as information moves along the supply chain. Divergent interests and opportunistic behavior of supply chain partners, and informational asymmetries across supply chain affect the quality of information. It has been suggested that organizations will deliberately distort information that can potentially reach not only their competitors, but also their own suppliers and customers. It appears that there is a builtin reluctance within organizations to give away more than minimal information since information disclosure is perceived as a loss of power. Given these predispositions, ensuring the quality of the shared information becomes a critical aspect of effective SCM (Feldmann, Müller, 2003).

Organizations need to view their information as a strategic asset and ensure that it flows with minimum delay and distortion.

Procrastination

is defined as the practice of moving forward one or more operations or activities (making, sourcing and delivering) to a much later point in the supply chain. Two primary considerations in developing a postponement strategy are: (1) determining how many steps to postpone, and (2) determining which steps to postpone. Postponement allows an organization to be flexible in developing different versions of the product in order to meet changing customer needs, and to differentiate a product or to modify a demand function (Waller, Dabholkar, Gentry, 2000).

Keeping materials undifferentiated for as long as possible will increase an organization's flexibility in responding to changes in customer demand. In addition, an organization can

reduce supply chain cost by keeping undifferentiated inventories. Postponement needs to match the type of products, market demands of a company, and structure or constraints within the manufacturing and logistics system. In general, the adoption of postponement may be appropriate in the following conditions: innovative products; products with high monetary density, high specialization and wide range; markets characterized by long delivery time, low delivery frequency and high demand uncertainty; and manufacturing or logistics systems with small economies of scales and no need for special knowledge.

Competitive advantage

Competitive advantage is the extent to which an organization is able to create a defensible position over its competitors. It comprises capabilities that allow an organization to differentiate itself from its competitors and is an outcome of critical management decisions. The empirical literature has been quite consistent in identifying price/cost, quality, delivery, and flexibility as important competitive capabilities. In addition, recent studies have included time-based competition as an important competitive priority. Handfield and Pannesi (1995), Zhang (2001) identifies time as the next source of competitive advantage.

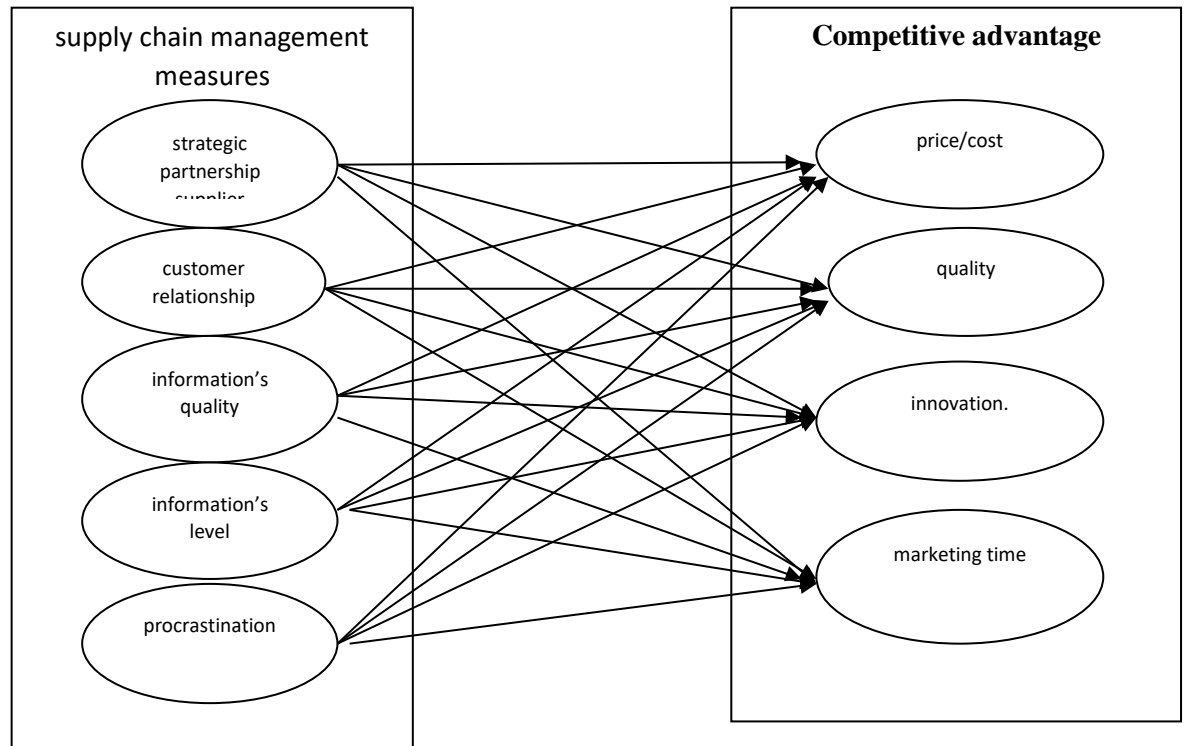
On the basis of prior literature, Koufteros et al. (1997) describe a research framework for competitive capabilities and define the following five dimensions: competitive pricing, premium pricing, value-to-customer quality, dependable delivery, and production innovation. These dimensions are also described by (1999). Based on the above, the dimensions of the competitive advantage constructs used in this study are price/cost, quality, delivery dependability, product innovation, and time to market. Because of the importance of SCA to the long-term success of firms, a body of literature addresses its content as well as its sources and the different types of strategies that may help companies to achieve SCA. The idea of SCA surfaced in 1984, when Day (2000) suggested types of strategies that may help sustain competitive advantage. The actual term "SCA" emerged in 1985, when Porter (1985) discussed the basic types of competitive strategies firms can possess (low-cost or differentiation) to achieve SCA. Interestingly, no formal conceptual definition was presented by Porter in his discussion. Barney (1991) suggests that a firm has a sustained competitive advantage when a firm is implementing a unique value-creating strategy which any current or potential competitors do not implement simultaneously and when these other firms are unable to duplicate the benefits of this strategy. Based on both Barney's work and the definitions of each term, this study proposes the following formal conceptual definition of SCA: Sustainable competitive advantage is the long-term benefit of implementing some unique value-creating strategy which competitors do not implement simultaneously, along with the inability to duplicate the benefits of this strategy.

Peter Trkman and et al (2010) in their research entitled "The impact of business analytics on supply chain performance" investigated the relationship between analytical capabilities in the plan and source of the supply chain and its performance using information system support and business process orientation as moderators. Their findings suggested the existence of a significant relationship between analytical capabilities and performance. They also found that the moderation effect of information systems support is considerably stronger than the effect of business process orientation.

Mehmet Murat Kristal and et al (2010) provided an article entitled "The effect of an ambidextrous supply chain strategy on combinative competitive capabilities and business performance". This study investigated the influence of an ambidextrous supply chain strategy on manufacturers' combinative competitive capabilities and business performance. The

results suggested that an ambidextrous supply chain strategy should be considered coincide with combinative competitive capabilities and business performance. They also indicated that supply chain managers built practices to gain operational efficiency while simultaneously searching for opportunities to gain operational advantages.

The research's conceptual model



Research hypotheses

1: It seems that the supply chain management measures through strategic partnership with supplier affect price/cost.

Equation 2: It seems that the supply chain management measures through strategic partnership with supplier affect product's quality.

3: It seems that the supply chain management measures through strategic partnership with supplier affect innovation.

4: It seems that the supply chain management measures through strategic partnership with supplier affect marketing time.

5: It seems that the supply chain management measures through customer relationship affect price/cost.

6: It seems that the supply chain management measures through customer relationship affect product's quality.

7: It seems that the supply chain management measures through customer relationship affect innovation.

8: It seems that the supply chain management measures through information's quality affect marketing time..

9: It seems that the supply chain management measures through information's quality affect price/cost.

10: It seems that the supply chain management measures through information's quality affect product's quality.

- 11: It seems that the supply chain management measures through information's quality affect innovation.
- 12: It seems that the supply chain management measures through information's quality supplier affect marketing time.
- 13: It seems that the supply chain management measures through information's level affect price/cost.
- 14: It seems that the supply chain management measures through information's level affect product's quality.
- 15: It seems that the supply chain management measures through information's level affect innovation.
- 16: It seems that the supply chain management measures through information's level affect marketing time.
- 17: It seems that the supply chain management measures through procrastination affect price/cost.
- 18: It seems that the supply chain management measures through procrastination affect product's quality.
- 19: It seems that the supply chain management measures through procrastination affect innovation.
- 20: It seems that the supply chain management measures through procrastination affect marketing time.

Methods

This study aims to "examine the impact of supply chain management to on gaining an organizational competitive advantage in the market,". So, the current research is an applicable research according to its purpose, a descriptive-survival research based on its data collection using questionnaires, and correlational research based on its nature.

Community sample

The research population consisted of 500 marketing managers and producers in the industrial town of Nain. Simple random sampling was used in this study, and Cocran formula was used for the finite sample size to determine the least required sample size, thus at least 167 people are required in the sample.

Data collection methods and tools

The main methods of data collection in general are as follows:

library studies, world wide computer network(internet) and field research using questionnaires. In this research, questionnaire is the method of data collection. In current research a five-item Likert scale was used with regard to purpose, hypothesis and question type(degree) and the ease of making and interpreting the results. Cronbach's alpha was obtained using statistical software, SPSS, and the reliability rate was obtained equal to 0.84.

Data analysis methods

Statistical data analysis is done through structural equation modeling and using LISREL 8.5 software. Analysis of covariance structures, or causal model in structural equation modeling is one of the main methods for complex data structures' analysis. Since so many variables in this research were independent, which their effects on the dependent variable must be examined, it would be necessary to use structural equation modeling.

The model's goodness of fit test

Given the model, several indexes were used to estimate its goodness of fit. To confirm the model, using 3-5 indexes is typically coefficient.

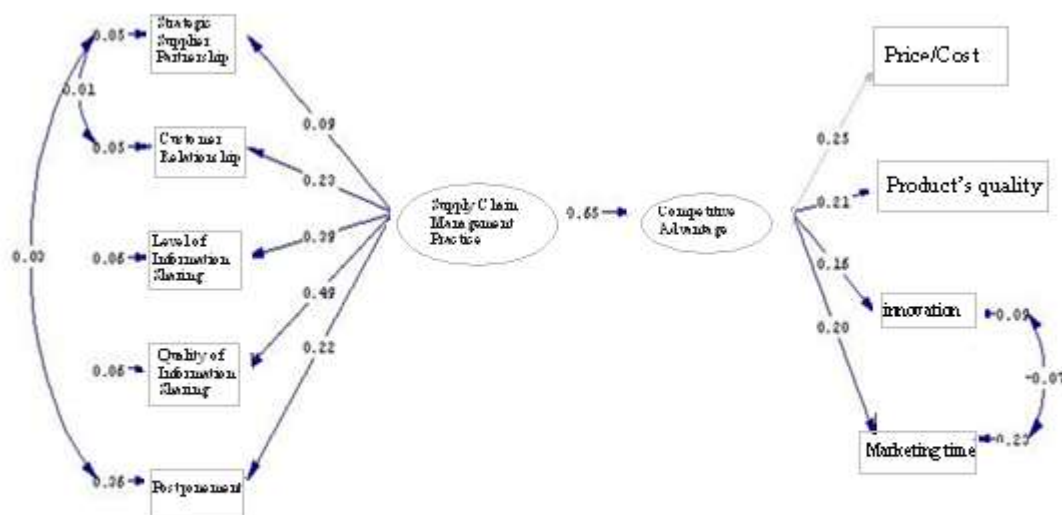
Model	K-score	P	RFI	RMR	GFI	AGFI	RMSEA
Default model	46.02	0.0030	0.85	0.018	0.94	0.89	0.077

RFA index: its value is varied between 0 and 1, so that the more this value is near to 1, the better the model is fitted to data. In this study RFI=0.85 which indicates a good model fit.

P-value: it tests whether model fit is good or not. In this study P-value= 0.003 which does not indicate a perfect model fit.

RMR index: it is used to measure the average residuals, and can be changed only with connection to variances and covariance. The smaller this index is (next to zero), the better the model is fitted. In this study RMR=0.018 which indicates a good model fit. GFI and AGFI indices: the more GFI and AGFI indices are near to 1, the model's goodness of fit to observed data is better. In this study, GFI=0.94 and AGFI=0.89 which indicate a good model fit, i.e. the model is confirmed.

RMSEA index: it is less than 0.05 for a good model fit; the higher values up to 0.08 indicate a reasonable error for approximation in the community. Those models which their RMSEA index is 0.1 or higher have a poor fit. Thus, given the RMSEA is equal to 0.077, the model is fitted well. According to the suggested indexes, it can be said that model is fitted rather well. After the model is being fitted, the impact and correlation coefficients between variables were calculated and expressed as the standard and nonstandard values. Model's diagram included estimated values and T- test, which were cited in the following, confirmed all of the coefficients.



Chi-Square=45.25, df=23, P-value=0.00371, RMSEA=0.077

Model's diagram included T-test

Optimized constructs	Constructs' effect	Path coefficient	t	Test result
Price/Cost	Competitive advantage	0.25		The zero (null) hypothesis was rejected
Product's quality		0.25	3.84	The zero (null) hypothesis was rejected
innovation		0.26	3.42	The zero (null) hypothesis was rejected
Marketing time		0.20	3.07	The zero (null) hypothesis was rejected
Strategic partnership with supplier	Supply chain management measures	0.087	4.53	The zero (null) hypothesis was rejected
Customer relationship management		0.23	10.05	The zero (null) hypothesis was rejected
Information's quality		0.39	12.96	The zero (null) hypothesis was rejected
Information's level		0.49	13.71	The zero (null) hypothesis was rejected
Procrastination		0.22	1.28	The zero (null) hypothesis was rejected
Competitive advantage	Supply chain management measures	0.65	3.66	The zero (null) hypothesis was rejected

Reference: author's calculation

Equation 1: It seems that the supply chain management measures through strategic partnership with supplier affect price/cost. The effect of chain management measures on strategic partnership is calculated 0.087 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on price/cost is calculated 0.25. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 2: It seems that the supply chain management measures through strategic partnership with supplier affect product's quality. The effect of chain management measures on strategic partnership is calculated 0.087 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on product's quality is calculated 0.21. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 3: It seems that the supply chain management measures through strategic partnership with supplier affect innovation. The effect of chain management measures on strategic partnership is calculated 0.087 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on innovation is calculated 0.16. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 4: It seems that the supply chain management measures through strategic partnership with supplier affect marketing time. The effect of chain management

measures on strategic partnership is calculated 0.087 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on marketing time is calculated 0.20. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 5: It seems that the supply chain management measures through customer relationship management affect price/cost. The effect of chain management measures on customer relationship management is calculated 0.23 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on price/cost is calculated 0.25. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 6: It seems that the supply chain management measures through customer relationship management affect product's quality. The effect of chain management measures on customer relationship management is calculated 0.23 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on product's quality is calculated 0.21. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 7: It seems that the supply chain management measures through customer relationship management affect innovation. The effect of chain management measures on customer relationship management is calculated 0.23 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on innovation is calculated 0.16. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 8: It seems that the supply chain management measures through information's quality affect marketing time. The effect of chain management measures on customer relationship management is calculated 0.23 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on marketing time is calculated 0.20. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 9: It seems that the supply chain management measures through information's quality affect price/cost. The effect of chain management measures on information's quality is calculated 0.39 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on price/cost is calculated 0.25. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 10: It seems that the supply chain management measures through information's quality affect product's quality. The effect of chain management measures on information's quality is calculated 0.39 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on product's quality is calculated 0.21. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 11: It seems that the supply chain management measures through information's quality affect innovation. The effect of chain management measures on information's quality is calculated 0.39 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on innovation is calculated 0.16. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 12: It seems that the supply chain management measures through information's quality supplier affect marketing time. The effect of chain management measures on information's quality is calculated 0.39 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on marketing time is calculated 0.20. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 13: It seems that the supply chain management measures through information's level affect price/cost. The effect of chain management measures on information's level is calculated 0.49 and on competitive advantage is calculated 0.65. Also, the effect of

competitive advantage on price/cost is calculated 0.25. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 14: It seems that the supply chain management measures through information's level affect product's quality. The effect of chain management measures on information's level is calculated 0.49 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on product's quality is calculated 0.21. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 15: It seems that the supply chain management measures through information's level affect innovation. The effect of chain management measures on information's level is calculated 0.49 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on innovation is calculated 0.16. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 16: It seems that the supply chain management measures through information's level affect marketing time. The effect of chain management measures on information's level is calculated 0.49 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on marketing time is calculated 0.20. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 17: It seems that the supply chain management measures through procrastination affect price/cost. The effect of chain management measures on procrastination is calculated 0.22 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on price/cost is calculated 0.25. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 18: It seems that the supply chain management measures through procrastination affect product's quality. The effect of chain management measures on procrastination is calculated 0.22 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on product's quality is calculated 0.21. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 19: It seems that the supply chain management measures through procrastination affect innovation. The effect of chain management measures on procrastination is calculated 0.22 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on innovation is calculated 0.16. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Equation 20: It seems that the supply chain management measures through procrastination affect marketing time. The effect of chain management measures on procrastination is calculated 0.22 and on competitive advantage is calculated 0.65. Also, the effect of competitive advantage on marketing time is calculated 0.20. Since t values for the calculated parameter are above 1.96, this hypothesis is confirmed.

Conclusions

According to the obtained results of the LISREL model, supply chain management measures through strategic partnership with suppliers affect price/cost, product's quality, innovation and marketing time; supply chain management measures through customer relationship management affect price/cost, product's quality, innovation and marketing time; supply chain management measures through information's quality affect price/cost, product's quality, innovation and marketing time; supply chain management measures through information's level affect price/cost, product's quality, innovation and marketing time.

Eventually, supply chain management measures through procrastination affect price/cost, product's quality, innovation and marketing time. According to the obtained results in this study, several recommendations for the use of supply chain management techniques to gain a competitive advantage are suggested as follows:

Making close relationship with suppliers, using outside organization's supply network experts, participating in suppliers sourcing decisions, participating in products' design and development by suppliers, increasing company's authority in supply network through making trust and confidence between supply network's members, optimizing suppliers and customers geographical distance in supply network, creating supply chain management teams to cover divers companies, having long-term relationship with suppliers rather than several relationships to hold key customers, having contact with final users and customers to get feedback through usual methods such as survey, e-mail, customer segmentation based on their required services,..., encouraging customers to become familiarize with organization's capabilities, improving ease of access to the after sale services, determining customer's and company's future strategic requirements, deepening long-term relationships with customers by providing technical advise and comprehensive support for them, responding quickly to customers' needs and demands, developing the after sales services networks, using new and progressed informational system, simplifying information flow between different units and business partners, utilizing e-commerce, utilizing total quality management (TQM) in the organization, utilizing business process re-engineering (BPR) in the organization, utilizing manufacturing resources planning (MRP), applying flexible network's qualitative and quantitative technologies, using new software to design and construct industry's subcategories, researching in the desired industry's subcategories, saving due to scale economy (in the production, design, time and market), standardizing according to future needs .

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