

## The Effect of Supply Chain Integration on Operational Efficiency and Value Creation

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**Abstract.** Supply chain integration represents the extent based on which a producer strategically cooperates with its supply chain partners and collaboratively manages inter-organizational and intra-organizational processes. The current research has been conducted to examine the effect of supply chain integration on operational efficiency and value creation. In order to do this, Annan's et al. (2016) standard questionnaire was used to measure the research variables. The research method was descriptive correlational. In order to answer the research questions and investigate the research hypotheses, structural equations and path analysis by means of the partial least squares method (PLS) were used with Smart-PLS software. The obtained results indicate that there is a positive and significant relationship between the inter-firm networking resources and dysfunctional competitions on the supply-chain integration. The results also approve the positive and significant effect of supply chain integration on customer value creation and the company's operational efficiency.

**Keywords:** Supply Chain Integration, Operational Efficiency, Value Creation.

### 1. Introduction

In today's business world, organizations face conditions such as intensely

variable markets, global competition, declining cycle of technology innovation, global and timely access to information, also extensive changes in cultural, social and political settings, which have challenged sustainable competitive advantage, and more importantly, their survival, but the ability of organizations to achieve sustainable competitive advantage, and continuous preservation of their survival in dynamic and turbulent, and especially hostile unpredictable environments, are dependant on their ability to offer long-lasting and superior value for customers, and as a result their adaptive capabilities, information processing, learning and problem solving (Khorshid and Pashazadeh, 2014). What needs to be said about this fact is that Stevens (1989) found that companies that manage their supply chain from a strategic perspective as an independent entity (integrated), and use tools and techniques that respond to market needs will survive. Frohlich and Westbrook (2001) ask the question that how one can identify the best supply chain strategies. With regard to the evidence of the literature about the subject matter, they propose that a higher level of integration will create more potential benefits. In line with analyzing the results of a study on a global sample with 322 manufacturers, the researchers found that there is compatible evidence with this fact that companies that have higher integration with customers and suppliers will achieve higher performance. Frohlich and Westbrook's (2001) findings have been developed in recent years by Schoenherr and Swink (2012). Vickery et al. (2003) identified two main elements of an integrated supply chain strategy which were integrated information technology and integrating the supply chain with information as an introduction. By means of analyzing the data from the first 150 independent supplier companies for three large automotive companies, they found that there is a direct relationship between integrated information technology and the integration of the supply chain and customer service. Nowadays, to meet market demand and the customers' needs, different organizations must establish collaboration with other elements of the supply chain; consequently, the performance of an organization is affected by the activities of other members of the supply chain. Today, the competition between companies has been replaced by the competition between supply chains. In fact, companies, in addition to a focus on the resources and

activities within their company, pay special attention to the integration with suppliers and customers (Moshkdanian, 2012). Supply chain management is composed of a series of approaches and methods to integrate suppliers, manufacturers, distributors, and customers effectively to improve the individual companies and the entire supply chain long-term performance in a coherent and high-performance business model (Chopra and Meindl, 2001). Optimization at supply chain level via supply chain capability leads to enhanced organizational performance for each partner who is present in the supply chain. Global optimization at the supply chain level leads to improved regional performance that creates this impression (Green et al., 2014). The decision to compete at the supply chain level leads to the acceptance of a supply chain management strategy that leads to the adoption of procedures and policies that integrate and coordinate business processes with customers and suppliers (Wisner, 2003). Some studies have tried to scrutinize a series of issues related to supply chain management and performance. That's while, different topics are effective on the company's performance, and the researchers pay attention to these topics in different ways (Hosseini and Sheikhi, 2012). Perhaps, after managing customer relationships, the main problem of manufacturing and service organizations is the appropriate management of the supply chain and the supply and provision of production and service requirements. Currently, organizations can not gain competitive advantage and increase their market share independently as a single production or service unit anymore, and they need a planned and systematic corporation with their suppliers and customers. This corporation needs an accurate and systematic monitoring, which if you neglect it; the organization will be degraded and gives its competitive power to rivals or newcomers to the existing industry (Annan et al., 2016). On the other hand, in the contemporary conditions of the competitive market, companies not only pay attention to the internal considerations of their organization but also manage and monitor other relevant resources outside their organization, because they want to benefit from the chances available to achieve competitive advantage. In fact, the reason for this is to achieve a competitive advantage(s) with the aim of accumulating the company's competitiveness level (Annan et al., 2016).

## 2. Background

Moshkdanian (2012) explored the effect of supply chain integration on operational performance of Bahman Group that by means of investigating the relationship between supply chain integration in Bahman Group, concluded that information integration (using information technology and information sharing) has a positive impact on logistics integration and the performance improvement. In addition, this investigation has revealed that long-term relationships with the supplier are effective indirectly in improving performance through the effectiveness of information and logistics integrity. Hosseini and Sheikhi (2012) have examined and clarified the role of supply chain management in improving company performance. The results designate that logistics operations do not have an effect on the performance of the company. Also, the research findings indicate that production and distribution operations have a direct and positive effect on the company's performance and performance improvement. Khazaei et al. (2015) inspected the effect of supply chain integration on organizational performance in Manizan Dairy Company of Islamabad-e Gharb, and concluded that supply chain integration has a significant effect on organizational performance, also the result obtained from hypothesis testing disclosed that packaging, order processing, and transportation time had a significant effect on organizational performance, but the effect of warehousing on organizational performance was not statistically significant. Yousefpour (2015) examined the effect of supply chain integration on satisfaction, customer loyalty and financial performance in food industry companies in Gilan province that the results indicated that one of the external integration dimensions, that is, supplier integration had a significant relationship with financial performance, and also the results expressed that customer satisfaction had a significant and positive relationship with financial performance and completely modified the relationship between customer integration and financial performance. Rahimi Badkury et al. (2016) inspected the effect of integrating supply chain information on operational performance and cost performance of wholesale companies located in the city of Ahvaz and by examining the results, it was determined that that the information integration in the supply chain performance had a positive and significant effect on

operational and cost performance, but its impact on operating performance was more than cost performance. Azar and Hajati (2016), the effect of supply chain integration on customer satisfaction and financial performance in the industrial estates in the city of Ahvaz that the results indicated that internal integration has a positive effect on the customers integration and the suppliers integration and customer integration and the supplier integration has a positive impact on customer satisfaction and financial performance, and finally, customer satisfaction has a positive effect on financial performance. Zohdifar (2016) probed the relationship between supply chain integration and operational performance with regard to the mediating role of information sharing in Aqqala industrial estates companies and the obtained results showed that logistics integration has a significant relationship with operational performance and information technology capabilities and information sharing both have significant direct and indirect relationship. The indirect relationship is related to information integration and integration of logistics relationship. Rasoulkia (2017) has conducted a research entitled "Integrating the design of multi-product supply chain and balancing the assembly line with a robust optimization approach." He indicated that supply chain network designing is the transparent and rational locating of the facilities in the supply chain, determining the capacities and the way of selecting the source for the demand on the network and choosing the mode of transportation so that this design should provide the required level of serving the customer at the lowest cost. In order to enhance the efficiency of the supply chain network design, it is necessary to integrate strategic decisions with operational decisions, and considering them simultaneously will help to make the network design more comprehensive. One of the operational decisions that can be used in line with designing the supply chain network is balancing the assembly line. In the studies related to this thesis, designing the supply chain network has infrequently been discussed along with the assembly line balancing, also the assembly line that is selected is suitable for one commodity but this is not the case in the real world. On the other hand, in the model which is related to this thesis, there is the uncertainty nature and in order to cope with this uncertainty, the model stabilizing approach was

presented in order to indicate the reassurance of the model provided for the problem under discussion. At first, the suggested original problem is in the form of non-linear programming of the mixed integer, and then, the linearized state of the mixed integer is presented. Designing the network will be done by means of decision-making and long-term strategic planning method; consequently, a solving method is needed to precisely solve problems in different dimensions and due to their high importance, the costs of deploying facilities, in the long run, is identified by this method. In this regard, the Benders Decomposition method is used, which is a precise problem-solving method, small, medium and large dimensions problems can be solved with this method, and results are much better than problem-solving without the use of the Benders Decomposition method, that is, CPLEX. The number of binary variables that Benders Decomposition, for the model of this thesis, supports for small, medium and large scales, is about 2000, 50000, and over 500000 variables, respectively. Torabi (2017) has done a study entitled "The Impact of Green Supply Chain Management on Performance Sustainability in the Oil Industry". The main aim of this research is to identify and rank behavioral factors which are effective for the implementation of green supply chain management and their relationship in a unified model (Tavakkoli, 2014). Increased global competitiveness in the 21st century, rather than the individual viewpoint toward to companies, has highlighted the supply chain. On the other hand, Iran, as a developing country that is going to be industrialized, has faced problems with industrial pollutants and hazardous consumables in recent decades. The rapid growth of industry and industrial development put the natural environment of the country under pressure. In addition, using inappropriate and old technologies and ineffective management in the industries has led to excessive use of primary resources. The severity of environmental pollution resulted from waste materials in cities and industrial gathering centers are so much that has attracted the attention of scientific and executive resources to correct disposal or the normative recycling of these materials. On the other hand, industries directors, especially in advanced countries, are looking for ways, while protecting the environment, to increase their organizational performance. One of the tools of this approach is the green supply chain. In fact, the green

supply chain has been developed by the traditional supply chain and pays special attention to the environmental elements as the basis of achieving the goals of the supply chain. Heydari Abrandabad (2017) conducted a research entitled "Offering a Dynamic-System-Based Approach to Assess the Effectiveness of Integrated Supply Chain Management: A Case Study of the XYZ Chain Store in Iran". He maintained that a potential way to preserve competitive advantage and improve organizational performance is the efficient supply chain. Supply chain management is considered a strategic factor for better attaining organizational goals such as increasing effectiveness, improving customer service and increasing profitability. The appropriate efficiency of the integrated supply chain plays a key role in the success of an organization and the sustainable achievement of its goals. In this research, in line with attaining the main goal of the research, which is the evaluation of the efficiency of integrated supply chain management for broiler in the chain store, this chain has been simulated and modeled in the main and rival manufacturers, main and rival chain stores, and end-users. In this study in order to do this, the simulation of system dynamics and dynamic systems modeling have been used. It is also one of those rare studies that have investigated the related issues more completely by means of the integrated supply chain indicators in the distributor sector that is one of the innovations of this research. At first in this research, by means of the system dynamics approach, system evaluation indices are simulated, then, by means of the simulation results, the supply chain system model will be designed and its identity will be discussed through the concept of dynamic systems modeling. The ultimate result of the research demonstrates that the efficiency of the chain stores is decreasing and in the manufacturing sector, it is increasing. In order to progress system performance, the scenarios have been proposed for increasing the sales capacity to the final customer, increasing the efficiency of the measures in the store by the main manufacturer, increasing the efficiency of the main producer's marketing and, finally, a hybrid scenario in the sub-sectors, and the system behavior in each section and the impact on each other by performing each policy has been studied. Jabbari (2017) has done a research entitled "Identifying and Rating the Factors Affecting the Implementation of Sustainable Supply Chain Management

by means of the Fuzzy Delphi Integrated Approach and Fuzzy Interpretative Structural Modeling (Case Study: Iran Khodro Company"). The aim of this research is to provide an integrated framework to identify and evaluate the factors affecting the implementation of sustainable management of Iran Khodro under uncertainty conditions. By forming a panel of experts consisting of 15 managers and officials of the logistics and supply chain units of the company in a targeted manner, the required information was collected on identifying the factors affecting the sustainable management of the supply chain by the Delphi fuzzy method. Then, these factors were evaluated and ranked by means of interpretative structural modeling and fuzzy MicMac. The results of the implementation of this framework in Iran Khodro Industrial Company (as a case study) revealed the capabilities of this framework in identifying, ranking and determining the most effective factors in implementing sustainable management chain management in this company. So that, the factors of state laws and regulations, senior management commitment and employee training as the most influential and the factors of corporate social responsibility of the organization and customer satisfaction as the most impressive factor of stability in the chain were recognized by Iran Khodro Company. The findings of this study, by informing the managers and officials of Iran Khodro Company about the factors affecting the sustainability of the management of the supply chain, led them to make the right decisions in order to implement the more effective system of sustainable supply chain management in this company. Kim (2009) by means of the indicators used in his previous research (Kim, 2006) investigated the effect of supply chain operational capability on the Japanese and Korean companies' performance in various industries. The results of this research indicate that in Japanese companies, mutual relationship of the supply chain operational capability and competitiveness have a direct impact on the firm's performance, and this mutual relationship is shaped after the establishment of supply chain integrity. In the meantime, in the Korean companies, the interactive relationship between the operational capability of the supply chain and the company's competitiveness lead to the integration of the supply chain, And due to this fact, it will be related to the function. In general, it can be indicated that in Japanese



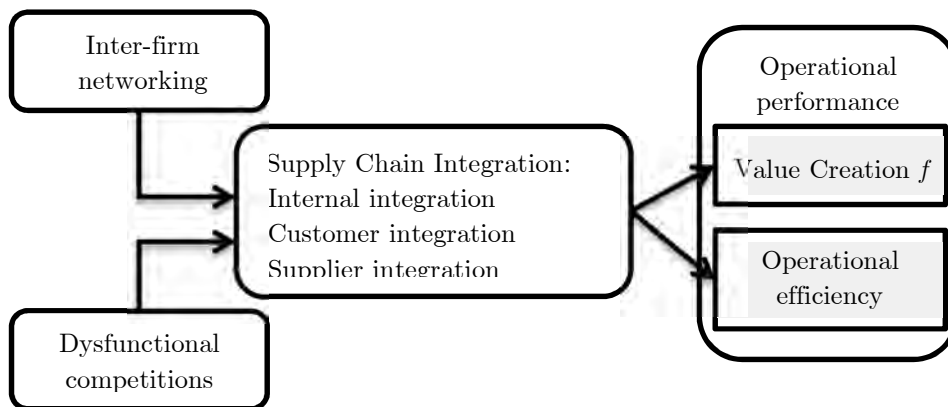
companies the mutual relationship of the supply chain operational capabilities and competitiveness have a direct relationship with the company's performance; nonetheless, in Korean companies, this interactive relationship is indirectly is shaped via the supply chain integration with the performance. Flynn et al. (2010) in an article entitled "The impact of supply chain integration on performance: a contingency and configuration approach" scrutinized the effect of supply chain integration on performance by means of two contingency and organizational approaches in China's various industries. The researchers analyzed the supply chain integration from the dimensions of customer integrity, supplier integration and internal integrity, and the effect of company performance on operational performance and business performance. The results of this research specify that supply chain integration is related to performance. Precisely, by means of the contingency approach, it was clarified that the internal consistency was directly related to operational and commercial performance, and integration with customers was directly related to operational performance. Chee et al. (2011) inspected the contingency effects of environmental uncertainty on the relationship between supply chain integration and operational performance. This paper develops the previous research conducted in line with the supply chain by empirical creating and testing of a theoretical model of the environmental uncertainty (EU) contingency effects on communications between 3 dimensions from the supply chain integration and 4 dimensions of the operational performance. Based on organizational information processing and contingency theories, under high uncertainty, we can contend that the relationships between customer/supplier integration and delivery and flexible operation will be strengthened between internal integrity and product quality and production cost. These hypotheses have been widely approved by means of group and structural path analysis of questionnaires collected from 151 automobile factories in Thailand. This research helps the operational management contingency studies and provides explanations for managers to discriminate the effects of internal and external integration efforts under different environmental conditions empirically. Oghazi (2014) in an article entitled "An Empirical study of Swedish Manufacturing Firms' Enterprise Systems Adoption" studied the

impact of supply chain integration on the company's performance in active manufacturing companies in numerous Swedish industries. He inspected supply chain integration based on suppliers' integration, integrity within the company, and integration with customers; and the company's performance in terms of market performance, financial performance, and customer performance. The results of the research indicate that supply chain integration has a direct and positive effect on the company's performance. Likewise, competitiveness acts as a mediator of the relationship between supply chain integration and firm performance; consequently, it turns out that supply chain integration has direct and indirect effects (through competitive capabilities) on firm performance. On the other hand, they examined the effect of company size controlling variable and concluded that the size of the company did not affect the results of the research. Zailani and Rajagopal (2015) in a research entitled "Supply chain integration and performance: the US versus East Asian companies" studied the impact of supply chain integration on performance. In this research, related electronics manufacturers and logistics companies were studied in the United States and East Asia. Supply chain integration was analyzed based on information sharing, internal integrity, external integration with suppliers, and external integration with customers; and company performance was examined in terms of productivity, quality, delivery, customer relationships, and flexibility. Evidence suggests that the greater the level of integrity with suppliers and customers in the supply chain, the more potential benefits. Zhu et al. (2016) conducted a study entitled "The role of customer relational governance in environmental and economic performance improvement through green supply chain management ". To explore the role of customer relational governance, this research has developed a conceptual model with four hypotheses to suggest mediator and moderator effects of customer relational governance on the relations between the two methods of green supply chain management, (green innovation, and green purchase) and economic/environmental performance. Based on 333 questionnaires from ordinary export cities in China, two factors of customer relational governance, that is, "trust and relationship" and "cooperation and interaction" were identified. The obtained statistical results via

hierarchical analysis disclosed that both have mediating and moderating effects. The customer relational governance partly mitigates the impact of green supply chain management practices on environmental performance. Anyway, the trust and the relation to green innovation can be determinative in providing environmental performance. If companies want to improve their economic performance through green purchases, they need to establish trust and relationship between themselves and their customers. Peng et al. (2016) conducted a research titled "Mediation effect of business process and supply chain management capabilities on the impact of IT on firm performance: Evidence from Chinese firms". Consequently, they created a theoretical framework for mediation factors in the relationship between information technology and enterprise performance. Based on a survey of 127 companies in China, it was observed that the ability to manage a company to manage both its internal and external business processes is completely based on the effect of IT on company performance. These two management capabilities in this study are business management and supply chain management capabilities. The results demonstrate that the only combination of IT capabilities with company capabilities to optimize business processes and to improve the management of the chain can improve the company performance. Annan et al. (2016) studied the company sources and the external environment leaders and the results of the supply chain integration. The research findings illustrate that an increase in the inter-firm networking resources and an increase in the position of dysfunctional competitive will result in a higher degree of supply chain integrity. In addition, the findings show that an increase in the companies supply chain integration in Liberia can deliver superior value to the customer and increase operational efficiency. These findings by showing how active companies in developing economies can integrate their supply chain and how this integration expanded the integration literature can help companies increase operational efficiency. Sung Bae (2017) has conducted a research entitled "The Effect of Environmental Capabilities on Environmental Strategy and Environmental Performance of Korean Exporters for Green Supply Chain Management ". To achieve the goal, data were collected and analyzed from 219 members of the Korean international trade union. Reliability and validity of data have

been tested by exploratory factor analysis and confirmatory factor analysis. The relationships between variables were tested by structural equation modeling analysis. The results are as follows. First, environmental capabilities have a positive impact on the environmental strategy. Second, the external environmental strategy has a positive impact on environmental performance. Third, environmental capabilities have a positive impact on environmental performance. Geng et al. (2017) have done a research entitled "The relationship between green supply chain management and performance: A meta-analysis of empirical evidences in Asian emerging economies." Accordingly, this research has provided a hybrid approach to cope with the multi-criteria evaluation problem. The proposed hybrid approach is an enhanced form of the green supply chains management and comparisons of several methods to enhance its performance in Taiwan electronic firm. The results designated that convergent weight compatible with actual methods, despite the difference with the current weighting method is moderate. In the long-term perspective: flexibility and operational improvement are higher aspects of weight. Ataseven and Nair (2017) in the paper "Assessment of Supply Chain Integration and Performance Relationships: A Meta-Analytic Investigation of the Literature" inspected many researches in line with the relationships between supply chain integration and various performance dimensions in the supply chain management and operation management literature by means of meta-analysis methods over the past two decades that in the first stage, the findings express experimentally that internal integration, supplier integration, and customer integration significantly affect the company's financial performance, and in the next step the effect of the internal integration, supplier and customer integration has been investigated separately on the operating performance of a company and its dimensions in terms of cost, quality, delivery, and flexibility. Generally, the results indicate that there is a positive and significant relationship between total integration (internal-supplier and customer) and total performance (financial and operational), and between total performance and each integration dimension separately. With regard to this fact that the aim of this study is to examine the effect of supply chain integration on Shiraz operational efficiency and value creation, the conceptual model is presented in Figure

1.



**Figure 1:** The conceptual model (Annan et al., 2016)

According to research literature and conceptual model, the research hypotheses are as follows:

Inter-firm networking resources have a significant impact on supply-chain integration.

Dysfunctional competitions have a significant effect on supply-chain integration.

Supply-chain integration has a significant effect on operational efficiency.

Supply chain integration has a significant impact on customer value creation.

### 3.Method

The descriptive-correlational method was used in the current research. This research is a descriptive study because it describes a situation or a range of conditions with many details. Also, in correlational research, the independent variables are recognized and their impact on the dependent variable is analyzed. In this research, a simple random sampling method was used to select the samples and the research questionnaire was randomly distributed among senior managers. Since the size of the statistical population is limited and it equals 591 companies, the Cochran formula has been used to select the sample size. 235 companies were investigated in the current research as the samples. In this research,

library and field methods were used to collect data. To measure the research variables, a standard questionnaire developed by Annan et al. (2016) was used. In this research, Cronbach's alpha coefficient was used to measure the reliability of the questionnaire. Its results are given in Table (1).

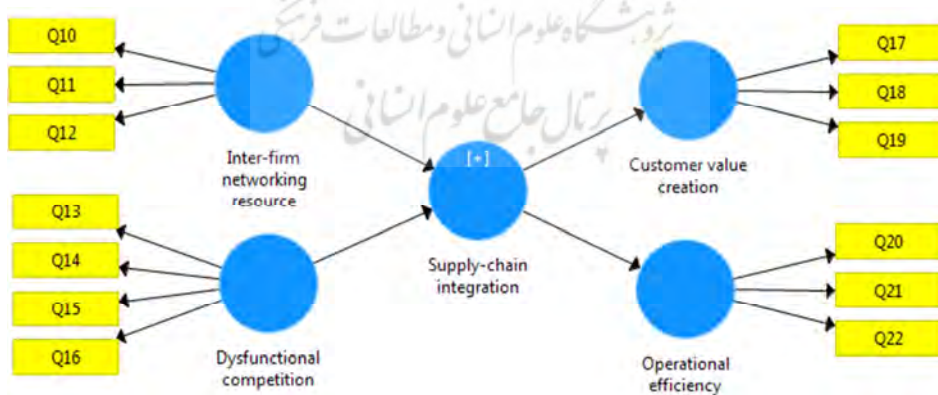
**Table 1:** The results of reliability

	Component	Cronbach's alpha value	Number of questions
Independent variables	Networking resource	0.83	3
	Dysfunctional competition	0.87	4
Mediator variable	Supply chain integration	0.834	9
Dependent variables	Value creation	0.79	3
	Operational efficiency	0.82	3
	The entire questionnaire	0.92	22

In order to answer the questions and examine the research hypotheses, the structural equation analysis method and path analysis by means of partial least squares (PLS) were used.

#### 4. Findings

Figure 2 clarifies the research conceptual model in PLS software.



**Figure 2:** Research model in PLS software

The first factor that should be considered in the reflexive model evaluation is the one-dimensionality of the indicators. This means that

any index in all of the indexes must be loaded with a large factor load to only one dimension or latent variable. For this end, factor loads more than 60% are introduced as acceptable. With regard to the model in the coefficients estimating state, we can estimate the factor loads and path coefficients.

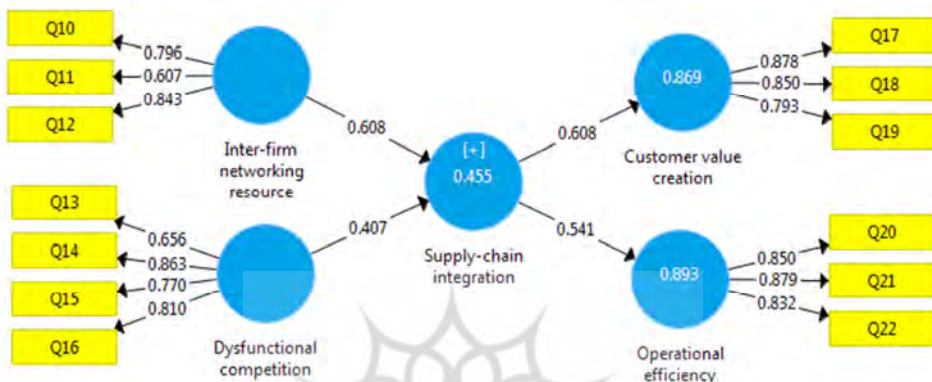


Figure 3: The research model in the standard coefficients estimating mode

Since the question number 4 in both primary and secondary models has a factor load of less than 0.6, it is omitted from both models and the model was restarted. The modified Figure 4 illustrates the model.

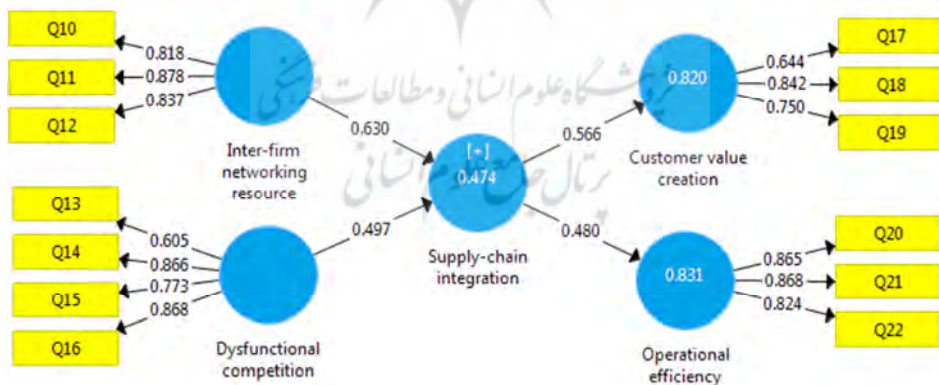


Figure 4: Modified research model in the standard coefficients estimating mode

By means of pls software, the factor loads of the measurement model for inter-firm networking resource, dysfunctional (unhealthy) competition, supply chain integration, customer value creation, and operational

efficiency were measured. The results of factor loads are presented in Table 2. All coefficients except the coefficient number 4 are significant at the 95% confidence level, so the results of the factor loads approve the model validity.

**Table 2:** Results of factor loadings

	Supply chain integration	Inter-firm networking sources	Dysfunctional competitions	Value creation for costumer	Operational efficiency
Q1	0.675				
Q2	0.800				
Q3	0.730				
Q4	0.748				
Q5	0.727				
Q6	0.698				
Q7	0.634				
Q8	0.873				
Q10		0.818			
Q11		0.878			
Q12		0.837			
Q13			0.605		
Q14			0.866		
Q15			0.773		
Q16			0.868		
Q17				0.644	
Q18				0.842	
Q19				0.750	
Q20					0.865
Q21					0.868
Q22					0.724

Figure 5 shows the research models in the coefficient significance (t-value) mode. According to the results of the t-test, all factor loads have been significant at 95% confidence level and played a significant role in measuring the structures.



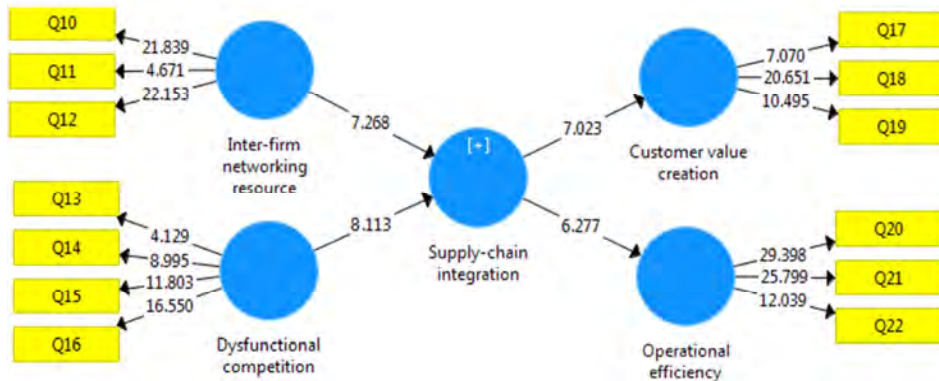


Figure 5: The significance coefficients of the hypotheses in the model

According to the path coefficient and t statistic obtained results which are presented in Table 3 also in the charts (research model and significant coefficients of the hypotheses in the model), the inter-firm networking resources have a significant effect on the supply chain integration. With regard to the path coefficient, it can be indicated that the effect of the inter-firm networking resources on the supply chain integrity is positive and significant because the path coefficient is positive. So, with the increase of the inter-firm networking resources, the supply chain integration will increase and with its decline, the supply chain integration will decrease.

Table 3: Direct effects, t statistic and the result of the first research hypothesis

Research hypothesis	Path coefficient ( $\beta$ )	t	The result of the research hypothesis
Inter-firm networking sources → Supply chain integration	0.630	7.268	Approved

With regard to the results obtained from the path coefficient and t statistic which are presented in Table 4 and the graphs (research model and significant coefficients of the model hypotheses), the dysfunctional competition dimension has a significant effect on supply chain integrity. According to the path coefficient, it can be indicated that the impact of the dysfunctional competition on the supply chain integration is positive and significant because the path coefficient is positive. Then, with

increasing dysfunctional competitions, the supply chain integration will increase and with its decline, the supply chain integration will decrease.

**Table 4:** Direct effects, t statistic and the result of the second research hypothesis

Research hypothesis	Path coefficient ( $\beta$ )	t	The result of the research hypothesis
Dysfunctional competitions → Supply chain integration	0.497	8.113	Approved

According to the results obtained from path coefficient and t statistic, in Table (5) as well as in graphs (research model and significant coefficients of hypotheses in the model), the dimension of supply chain integration has a significant effect on customer value creation. Regarding the path coefficient, it can be said that the effect of supply chain integration on customer value creation is positive and significant because the path coefficient is positive. Hence, by increasing the supply-chain integration, customer value creation will increase, and with its decline, customer value creation will be reduced.

**Table 5:** Direct effects, t statistic and the result of the third research hypothesis

Research hypothesis	Path coefficient ( $\beta$ )	t	The result of the research hypothesis
Dysfunctional competitions → Customer value creation	0.566	7.023	Approved

With regard to the results obtained from path coefficient and t statistic, in Table (5) and graphs (research model and significant coefficients of hypotheses in the model), the dimension of supply chain integration has a significant effect on operational efficiency. Concerning the path coefficient, it can be said that the effect of supply chain integration on operational efficiency is positive and significant because the path coefficient is positive. Hence, by increasing the supply-chain integration, operational efficiency will increase, and with its decline, operational efficiency will be reduced.

**Table 6:** Direct effects, t statistic and the result of the fourth research hypothesis

Research hypothesis	Path coefficient ( $\beta$ )	t	The result of the research hypothesis
Dysfunctional competitions → Operational efficiency	0.480	6.277	Approved

## 5. Conclusion

Studies express that inter-firm networking resource is an important predictor of supply chain integration. As it was indicated in resource-based view, organizations have been formed from tangible and intangible resources. Those companies that have the competent and qualified personnel (e.g., skilled supply chain personnel) can be effective in managing and communicating with other members of the channel. As the research results express, companies that have exclusive supply chain units will better coordinate their supply chain activities. This motivating idea is important for upgrading inter-firm networking resources and serves as a strong inter-firm source embedded for the skills and expertise of supply chain personnel to help companies learn best practices from external supply chain partners. The construction and development of the supply chain needs the external resources for the company. Lack of corporate finance is amplified by strong connections to the outside world. The consequence of this research is that where companies are looking for joining a major challenge, such as a new business environment, they must create inter-firm networking resources, which will increase the chances of access to external resources from partner sides. As an example, it can be indicated that the supply chain today is intensely driven by advanced information technology (for example, firm resource planning) that may not be available for small businesses. To access rare resources, corporations need to cooperate with those companies that have access to critical resources, because by means of this procedure companies can learn how to integrate their supply chain activities. In fact, by networking with other channels, company members will not only have access to critical resource, but also help other members to have at their side similar / compatible systems that are working to help them to integrate. Dysfunctional competition dramatically leads to supply chain

integration. In an effort to protect themselves from opportunistic behavior from illegal advocates and failure to comply with market rules that are widespread in underdeveloped communities like Iran, companies in that community can survive in line with creating solidarity to strengthen their relationships with members of their own value chain. For example, by stopping major distributors in their domestic supply chain processes a company may be able to prevent rival entry into its target market. In an unofficial business environment, where market rules are implementing hardly, supply chain infrastructure is hard to work, while dysfunctional competition is widespread, so that consumers try to use heterogeneous goods and services, these companies have been carefully selected by means of integrating internal processes with partners, and in order to reduce the negative effects of market inefficiencies in their domestic activities will be away from challenges. By creating channel partners, a company can create the best practices and discipline in the integration chain, thus reduce vulnerabilities and potential losses resulting from market inefficiencies. As the current research indicates, due to the increasing dysfunction competition among the companies in Shiraz industrial estate, increased perceptions of companies from dysfunctions enables these companies to create more integrated supply chains, so that progressively competition forms may vary between supply chains, not between individual companies. The findings of this research indicate that the increase in customer value created is directed by supply chain integration. The current study illustrates that companies that have been integrated in their supply chain consider their market better for their customers in line with creating more value. As it was mentioned, the eventual goal of the supply chain is to increase customer satisfaction and value. From the supply chain point of view, the created value is the difference between the value of a product or service and the supply chain in creating value. Centralized internal corporations can create an incremental value for their customers, because at each supply chain stage, the members tend to optimize their benefits and ultimately the customer, relative to when processes and flows in the supply chain are aligned, must pay a higher price for a product or service. In a specific case of companies in Shiraz industrial park, the economy points out that for a mass market failure,

one can argue that supply chain integration can further help members overcome the system inefficiencies, thus leads to maximizing customer value. In addition, the findings of this study indicate that greater integration in the supply chain is associated with improved operational efficiency. By means of the supply chain integration, companies with the resources and authorities with other chain members use inactive resources, in reducing costs and losses. Conversely, lack of integration in the supply chain can lead to the emergence of costs such as warehouses, return order costs, and high inventory costs. By means of supply chain integrating, market demand is well anticipated and companies are able to plan and decide in line with material requirements, operational activities, and distribution requirements. The findings illustrate that, when companies systematically integrate their supply chain, operating efficiency is maximized. So, we are convinced that better supply chain integration should help the present businesses in the Shiraz industrial estates to minimize operational costs while maximizing value for customers. The findings in this study have important consequences for supply chain managers in the businesses existing in the Shiraz industrial city. First, the findings of this study indicate that the company's ability to succeed in integrating its supply chain is booming through the expansion of its inter-firm networking resources as well as the nature of competitive behavior on the market. Precisely, the results indicate that supply chain integration improvement is directed by the ability of managers to use their network skills and to manage relationships with other partners. Hence, organizations that have so many resources will have a better chance of improving integrated efforts. Network resources are skills and competencies that are completely added. Correspondingly, for companies that need these resources to strengthen their supply chain integration, key corporations continuously educate staff to acquire skills as well as network-related skills and relationships, and create and monitor these skills systematically. Increasing dysfunctional activities and more competitive activities makes the companies get better results in line with survival by making more relationships with members. Though, the ability to identify core business partners that are the company's operations complement is crucial for survival in an environment where the performance impairment is increasing. For that

reason, an important lesson for supply chain leaders is identifying the nature and dynamics of inefficient competitive forces in the environment, and then they create an alliance with supply chain partners to cope with any inadequate negative disruption in market performance. The company's ability to manage cultural differences between cultural organizations and its ability to match the objectives and benefits with main business partners, is gaining dominance in the market. For those companies that are in challenging organizational environments, there is a need for skills in the formation and management of an integrated supply chain system in order to enhance customer value creation and maximize operational efficiency.

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