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larg Supply Chain Model for Organizational Clothing Industries and the Effects of Its Practices

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ABSTRACT
Among the available paradigms for the supply chain management (SCM), Lean, Agile, Resilient and Green (LARG) are considered as new management paradigms for supply chain to achieve sustainability and competitiveness. The Iranian organizational apparel industry is one of the industries that, despite its historical background, did not achieve its historic status after industrialization and the establishment of industrial factories. In the past two decades the contribution of this sector in national economy has been decreased. The current paper identifies the practices, attributes and performance measurements of LARG SCM in the organizational clothing industry to present a structural equation model for the LARG SCM in two status quo and desirable state, as well as to investigate the effect of LARG practices on performance due to the impact on the supply chain attributes and the design of a dynamo system for simulating the organizational clothing supply chain. Having introduced the theoretical literature and concepts of LARG practices, the main body of the current paper prioritizes LARG organizational clothing supply chain practices through the Advanced Delphi method. Then, having distributed structural equation model questionnaire among organizational clothing experts, status quo and desirable state of LARG supply change structural equation model have been presented. In the end, supply chain performance was simulated by dynamo system simulating, based on the cause and effect graph obtained. This simulation enables managers to examine the impact of different practices and scenarios on the organizational clothing supply chain performance.
Keywords: Lean, Agile, Resilient, Green, LARG (SCM), Structural Equation Modeling (SEM), System Dynamics, Organizational Clothing Industry, Garment Supply Chain

Introduction
Nowadays many companies in a diversity of economic segments have adopted new paradigms of supply chain management (SCM) such as the Lean, Agile, Resilient and Green. The lean supply chain is a paradigm

based on cost reduction and flexibility, focused on processes improvements, through the reduction or elimination of the all “wastes”, i.e., non-value adding operations (Womack, et al., 1991). It embraces all the processes through the product life cycle, starting with the product design to the product selling, from the customer order to the delivery (Anand & Kodali, 2008). In a global economy, with supply chains crossing several countries and continents, from raw materials to final product, those events (even if they happen in a remote place) can create large-scale disruptions (Carigheahed, et al., 2007). It may be worst if the organizations cannot be resilient and robust enough to recover the loosed competitiveness. In actual competitive market, it is necessary that supply chains become more resilient to disruption events (Sheffi & Rice, 2008). The supply chain, as a network, is expected to provide the right products and services on time, with the required specifications, at the right place to the customer (Lambert & Pohlen , 1998). The green supply chain management is an important organizational philosophy to achieve corporate profit and market share objectives by reducing environmental risks and impacts while improving the ecological efficiency of these

organizations and their partners (Carvalho, et al., 2011).The literature shows that almost researches have been focused on the study of individual SCM paradigms or on the integration of only a couple of paradigms in SCM. Few researchers have used the four paradigms mentioned in an integrated model. However, although many researchers have successfully provided LARG SCM model and implemented in cases, this has enabled them to improve their performance and competitiveness, others have not achieved the results that they expected. This has created an interest among researchers to implement LARG SCM model in various cases. The tradeoffs between lean, agile, resilient and green (LARG) management paradigms are actual issues and may help supply chains to become more efficient, streamlined and sustainable (Carvalho, et al., 2011). A general yet important issue is that many of the studied articles have hardly built on previous works. Most authors seem to open a new window and develop their argument, models, factors, parameters, without considering other related works. As a result it is complicated to put them into groups and clearly recognize one group from another. (Maleki, 2013)

This study has been divided into four phases with this first phase devoted to the introduction. The second phase conduct a literature review aimed primarily at the understanding LARG practices, supply chain attributes, performance measurements and their relationships. The purpose of this section is to review a sample of literature in the area of supply chain management, considering the extensive amount of literature on supply chain integration, it appears that it is still in its infancy and it reviews a sample of 36 articles and shows them methodology, identifies the critical LARG practices, main problem and answers to this question "which paradigms are considered together?". In the third phase organizational clothing Supply Chain (SC) and LARG practices related to that are specified and provided Structural Equation Model, also it has been justified that attributes is mediating element in path effect of LARG practices on performance. In final phase the effect of LARG practices on performance in organizational clothing SC was simulated by system dynamics approach.

Review of Literture

- **Lean**

Lean production has emerged in the past decades as one of the most popular topics in business and manufacturing literature and it is the most extended production paradigm currently applied in industry. Lean production is characterized by five principles (value, map the value stream, flow, pull and continuous improvement) and by the importance of reducing wastes (Diest & Panizzolo, 2018). Lean is a work philosophy that defines the means for improvement and optimization of the production system focusing on identifying and eliminating all types of waste and on reducing or minimizing the variability from demand to supply (Shah & Ward, 2007). Companies must adopt lean, both internally and externally, spreading lean principles and practices through the whole SC in order to achieve all the potential benefits of this philosophy. Lean principles are, therefore, applicable to the whole SC, from the provider to the final distributor and the final customer delivery, which is known as Lean Supply Chain Management (LSCM) (Totorella, et al., 2017).). Implementation of the lean concept in supply chain management focuses primarily on arranging the structure of the supply chain and continuous improvement by improving its flow through all participant of the supply chain. The use of lean is not about introducing some methods and tools in some participants of the supply chain but to develop and use comprehensive approach to the optimization of the entire supply chain (Kirishna & Kodali , 2015). At the operational level, the lean paradigm is implemented by using a number of techniques such as Kanban (a visual signal to support flow by "pulling" products through the manufacturing process as required by the customer), 5S (a visual housekeeping technique which devolved control to the shop floor), visual control (method of measuring performance), takt time (i.e. the production rate that equals the rate of sales), Poke yoke (an "error-proofing" technique) and SMED (a changeover reduction technique) (Melton, 2005)

- **Agile**

Konecka (2010) stated that agility is the best way to satisfy more demanding clients. This is due to a lower risk of unsatisfying of the customers, lost orders and too slow responses. The author argues that agile management consists in carrying out the activities connected to strategy of the diversification, to delivering the product that the consumers cannot find elsewhere. Konecka stated that agility is the best way to satisfy more demanding clients. This is due to a lower risk of unsatisfying of the customers, lost orders and too slow responses (Konecka, 2010). The main objective of supply chain agility is to respond for changes in short-term or quickly demand. This is also to handle external disruptions smoothly. The agile supply chain is highly market responsive. It has key characteristics as 1. Virtual integration checks for physical inventories as per extensive demand and supply information sharing among buyers and suppliers. 2. Deep process integration between the partner's shares, extensive demand information enables between buyers and suppliers. 3. The supply chain partners working together may create competing networks with their final customers. These competencies can be defined as agile or lean. 4. Growth in the niche market increasing number of new products, its life and many markets changing situation may affect SCM development. 5. Rapidly changing markets, increasing costs, international competitiveness, and a short development time for new products may create a short agile development life cycle. 6. Change in the customer requirements or customization, increased expectations about quality and a minimum delivery time may develop operational gap. 7. New efficient production facilities, system integration, and introduction of new technology may affect the development of the product or services. 8. Environmental protection, workplace expectations, legal pressure and working style may create change in the development and usage of supply chain value. 9. Based on the changes, new integration of existing processes may affect the agile development of the organization (Collin & Lorez, 2006). Agarwal, Shankar and Tiwari have shown that the deployment of agile SC paradigm depends on the following variables: market sensitiveness, customer satisfaction, quality improvement, delivery speed, data accuracy, new product introduction, centralized and collaborative planning, process integration, use of IT tools, lead-time reduction, service level improvement, cost minimization, customer satisfaction, minimizing uncertainty, quality improvement, trust development, and minimizing resistance to uncertainty (Agarwal, et al., 2008).

- **Resilient**

Resilience is a concept widely used in many fields, such as the engineering, the environmental science and the organizational research (Petit, et al., 2010). This subject has motivated researchers and practitioners to increasingly explore the concept of resilience in the field of supply chain and lead to conceptual frameworks dedicated. However, there is no consensus on the definition of resilience. Some authors like (Tang, 2006), (Zsidisin & Bob, 2008) defined it as the ability of a system to keep functioning despite a major disturbance and recover its operation after a major disturbance. Applied to the supply chain, resilience is the ability to return to a stable state after a disturbance (failure of a supplier, unforeseen increase in demand).

The aim of the resilience strategies has two manifolds 1.To recover the desired values of the states of a system that has been disturbed, within an acceptable time period and at an acceptable cost; and 2. To reduce the effectiveness of the disturbance by changing the level of the effectiveness of a potential threat (Haimes, 2006).

Tang propose the use of robust supply chain strategies to enable a firm to deploy the associated contingency plans efficiently and effectively when facing a disruption, making the supply chain firm become more resilient. This author proposes strategies based on: 1. postponement; 2. strategic stock; 3. flexible supply base; 4. make-and-buy trade-off; 5. economic supply incentives; 6. flexible transportation; 7. revenue management; 8. dynamic assortment planning; 9.silent product rollover (Tang, 2006).

- **Green**

Changes in environmental awareness over the last few years, including legal requirements, pressure from customers, the need for waste management, reuse of materials and packaging, product recovery, and changes in product projects, have influenced supply chain management. Thus, companies are increasingly linking green practices with corporate strategy. Green manufacturing, or more precisely, green supply chain manufacturing, has attracted interest among researchers and practitioners over the past two decades (Dubey, 2015). Srivastava defined GSCM as "integrating environmental thinking into SCM, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life" (Sirvastava, 2007). Environmentally sustainable green supply chain management has emerged as organizational philosophy to achieve corporate profit and market share objectives by reducing environmental risks and impacts while improving ecological efficiency of these organizations and their partners, It had make the industry responsible for postconsumer disposal of products, forcing the implementation of sustainable operations across the supply chain. At the same time, the increased pressure from community and environmentally-conscious consumers forces the manufacturers to effectively integrate environmental concerns into their management practices (Zhu, et al., 2008). Green Supply Chain Management is a new concept, still unfamiliar to many, but with a huge potential in the future. Concern for environment and commercial advantages is going to be a big driver for adoption of the concept, even in face of escalating costs. Extensive and advanced research in this field is vital, as a willingness to embrace it on the part of organizations (Sooda & et al., 2016).

- **Supply Chain Attributes**

Table 1 presents the characterization of lean, agile, resilient and green supply chains in what is concerned to purpose, manufacturing focus, supplier involvement, inventory strategy, lead time, and product design. (Carvalho & Machado, 2011)

Table 1. Lean, agile, resilient and green characterization

	Lean	Agile	Resilient	Green
Purpose	Focus on cost reduction and flexibility, for already available products, through continuous elimination of waste or non-value added activities across the chain	Understands Customer requirements by interfacing with customers and market and being adaptable to future changes	Ability to return to its original state or to a new one, more desirable, after experiencing a disturbance, avoiding the occurrence of failures modes	Focus on sustainable development and on reduction of ecological impact of industrial activity
Manufacturing focus	Maintain high average utilization rate .It uses just in time practices “pulling” the goods through the system based on demand	Has the ability to respond quickly to varying customer needs(mass customization),it deploys excess buffer capacity to respond to market requirements	The emphasis is on flexibility (minimal batch sizes and capacity redundancies) improving supply chain responsiveness. The schedule planning is based On shared information	Focus on efficiency and waste reduction for environmental benefit and developing of remanufacturing capabilities to integrate reusable/remanufa-ctured components
Supplier involvement	Supplier attributes involve low cost and high quality	Supplier attributes involve speed, flexibility, and quality	Flexible sourcing	Green purchasing
Lead time	Shorten lead-time as long as it does not increase cost	Invest aggressively in ways to reduce lead times	Reduce lead time and use Flexible transportation systems	Reduce transportation lead time as long it does not increase carbon dioxide emissions
Inventory Strategy	Generates high turns and minimizes inventory throughout the chain	Make in response to customer demand.	Strategic emergency stock in potential critical points.	Introduce reusable/ remanufactured parts in material inventory/Reduce replenishment frequencies to decrease carbon dioxide emissions
Product design	Maximize performance and minimize cost	Design products to meet individual customer needs	Postponement	Eco-design and life cycle for evaluating ecological risks and impact

- **Performance Measurement**

To develop an efficient and effective supply chain, it is necessary to assess its performance. Performance measures should provide the organization an overview of how they and their supply chain are sustainable and competitive (Gunaseharan & Patel, 2001). In this perspective, it is possible to state that the critical dimensions for each paradigm are: cost for lean; service level for agile; time and cost for resilient. Therefore in that study, cost, service level and lead time were selected as key performance indicators to evaluate the effect of each paradigm in the supply chain performance (Carvalho & Machado, 2011).

According to (Wong 2009), performance measurement is crucial to better supply chain management. It can makes possible the inter-understanding and integration among the supply chain partners, while revealing the effects of strategies and potential opportunities in supply chain management (Carvalho, et al., 2010). Azevedo, Carvalho, & Cruz-Machado provide a set of performance measures classified in: operational, economic and environmental (See Table 2).

Table 2. Supply chain performance measures (Azevedo, et al., 2012)

Measures		Metrics
Operational performance	Quality	Customer reject rate
		In plant defect fallow rate
		Increment products quality
	Customer satisfaction	After-sales service efficiency
		Rates of customer complaints
		Out-of-stock ratio
	Delivery	On time delivery
		Delivery reliability
		Responsiveness to urgent deliveries
	Time	Lead time
		Cycle times
		Delivery lead time
	Inventory levels	Finished goods equivalent units
		Level of safety stocks
		Order-to-ship
Economic performance	Cost	New product flexibility
		Manufacturing cost
		Cost per operating hour
	Efficiency	Overhead expense
		Operating expenses
	Environmental revenues	Revenues from 'green' products
		Recycling revenues
		Cost avoidance from environmental action
	Environmental costs	Cost of scrap/rework
		Fines and penalties
		Costs for purchasing environmentally
		friendly materials
		Disposal costs
		Recycling cost = transport + storage costs
		R & D expenses ratio
Environmental performance	Green image	Number of fairs/symposiums related to environmentally conscious manufacturing the organization participate
	Business wastage	Total flow quantity of scrap
		Percentage of materials remanufactured
		Percentage of materials recycled /re-used
		Hazardous and toxic material output
		Solid and liquid wastes
	Emissions Air emission	Energy consumption
		Greenhouse gas emissions

Larg Scm And Its Practices

LARG supply chain is model of putting together Lean, Agile, Resilience, and Green paradigms in order to build up a supply chain with less waste (non-value-added activities), more responsive to the customer requirements, ,able to overcome disruption conditions and also to reduce environmental impacts. The tradeoffs between lean, agile, resilient, and green supply chain management paradigms (LARG_SCM) must be understood to help companies and supply chains to become more efficient, streamlined, and sustainable (Carvalho & Machado, 2011). SCM performance is improved by implementation of a set of practices in the SC's entities. In the following there are some practices that can belong to one or more paradigms:

- **Lean SCM Practices**

Lean supply chain management practices focus on cost reduction and flexibility, for already available products through continuous elimination of waste or non-value added activities across the chain and following table shows a set of lean practices that are implemented at various levels of the Supply Chain.

Table 3. Lean SCM Practices

LEAN PRACTICES	SOURCE
Just in time	(Anand & Kodali, 2008), (Berry, et al., 2003), (Gurumurthy & Kodali, 2009)
Supplier evaluation and rating	(Anand & Kodali, 2008), (Doolen, 2005)
Outsourcing/ Indigenous production	(Anand & Kodali, 2008)
Set up time reduction	(Doolen, 2005), (Gurumurthy & Kodali, 2009), (Shah & Ward, 2007)
Total Quality Management	(Shah & Ward, 2007), (Mahidhar, 2005), (Berry, et al., 2003)
Work/Parts standardization	(Gurumurthy & Kodali, 2009), (Anand & Kodali, 2008)
Postponement	(Anand & Kodali, 2008)
CRM	(Shah & Ward, 2007)
Customer relationship	(Berry, et al., 2003), (Anand & Kodali, 2008)
Lot-Size Reduction	(Shah & Ward, 2007), (Anand & Kodali, 2008), (Gurumurthy & Kodali, 2009)

- **Agile SCM Practices**

Agile supply chain management practices, Understand customer requirements by interfacing with customers and market and being adaptable to future changes. The following practices refer to agile paradigm that focus at the ability to respond quickly to demand changes.

Table 4: Agile SCM Practice

AGILE PRACTICES	SOURCE
Ability to change quantity and delivery time of order	(Swafford, et al., 2008)
Facilitate rapid decision making	(Lin, et al., 2006)
Speed in improving customer service	(Swafford, et al., 2008)
Speed in improving delivery reliability	(Swafford, et al., 2008)
Centralized and collaborative planning	(Agarwal, et al., 2008)
Use of IT to coordinate/integrate activities in manufacturing	(Agarwal, et al., 2008), (Swafford, et al., 2008)
To reduce development cycle times	(Swafford, et al., 2008)
Integrated supply chain/value stream	(Naylor, et al., 1999)

- **Resilient SCM Practices**

Resilient practices are a set of practices that reflect the entity ability to cope with unexpected disturbances and return to its original state or to a new one, more desirable, after experiencing a disturbance, avoiding the occurrence of failures modes. Some of the resilient practices are presented in Table 5.

Table 5. Resilient SCM Practices

RESILIENT PRACTICES	SOURCE
Creating total supply chain visibility	(Iakovou, et al., 2007)
Make-and-buy trade-off	(Tang, 2006)
Strategic stock	(Christopher & Towill, 2000), (Tang, 2006)
Supply chain risk management culture	(Christopher & Peck, 2004)
Flexible transportation	(Tang, 2006)
Process and knowledge back-up	(Christopher & Peck, 2004)
Sourcing strategies to allow switching of suppliers	(Rice & Caniato, 2003)
Multi-skilled workforce	(Tang, 2006)
Creating total supply chain visibility	(Iakovou, et al., 2007)
Excess of capacity requirements	(Rice & Caniato, 2003)

- **Green SCM Practices**

Green paradigm attributes are reduction of redundant and unnecessary materials, reduction of replenishment frequency, integration of the reverse material and information flow in the supply chain, environmental risk sharing, waste minimization, reduction of transportation lead time, Efficiency of resource consumption. The GSCM practices should aim at the reduction of environment impact. Table 6 shows some green SCM practices:

Table 6. Green SCM Practices

GREEN PRACTICES	SOURCE
Green procurement/sourcing	(Routory, 2009)
Prequalification of suppliers	(Holt & Ghobadian, 2009)
Suppliers' ISO14000 certification	(Zhu, et al., 2008)
Better use of natural resources	(Rao & Holt, 2009)
Environmental Management System	(Zhu, et al., 2008)
Reverse logistics	(Routory, 2009), (Rao & Holt, 2009), (Zhu, et al., 2008)
Filters and controls for emissions and discharges	(González,, et al., 2008)
To plan the vehicles routes to reduce environmental impacts	(Holt & Ghobadian, 2009), (Zhu, et al., 2008)
ISO 14001 certification	(Zhu, et al., 2008)
To decrease inventory levels	(Zhu, et al., 2008)
To reduce energy consumption	(González,, et al., 2008)
To integrate total quality environmental management (TQEM) into planning and operation processes	(Venkat & Mollenkopf, 2012)

Organizational Clothing Supply Chain: Case Study

The textiles and apparel industry has been neglected in terms of supply chain management in organizations that have especial clothing form. Recently, the defensive industry has undergone a great deal of change, particularly with global sourcing. In addition, textiles and clothing supply chain in defense organization characteristics, such as short product lifecycle, high volatility, low predictability, making such issues as quick response of paramount importance.

In the most of available case studies on supply chain the common way is to divide it into supply chain role players (suppliers, manufacturers, distributors, market) then individually conduct case study on each of them. Thereafter, they put together the outcome of each individual case study to reach overall result for the whole supply chain (Maleki, 2013). In contrast, this study considers the supply chain as a whole integrated body.

This study has surveyed an organizational clothing manufacturing company in Iran. This company provides clothing for organizations, it has a complete research and development department with 25 experts who have knowledge about supply chain and paradigms. An organization clothing supply chain should pursue the following strategies:

Legal, wisely and timely purchase with emphasis on suitable price and quality.

Timely distribution and providing favorable services in aim of obtaining customers satisfaction.

Research on the level of new technologies in order to achieving new products and localize them.

Increase Productivity and optimum using of available capacity.

Attention to customer needs.

Mentzer has identified three forms (or degrees) of supply chain intricacy: a "direct supply chain," an "extended supply chain," and an "ultimate supply chain." The difference between these supply chains are illustrated in following Figure:

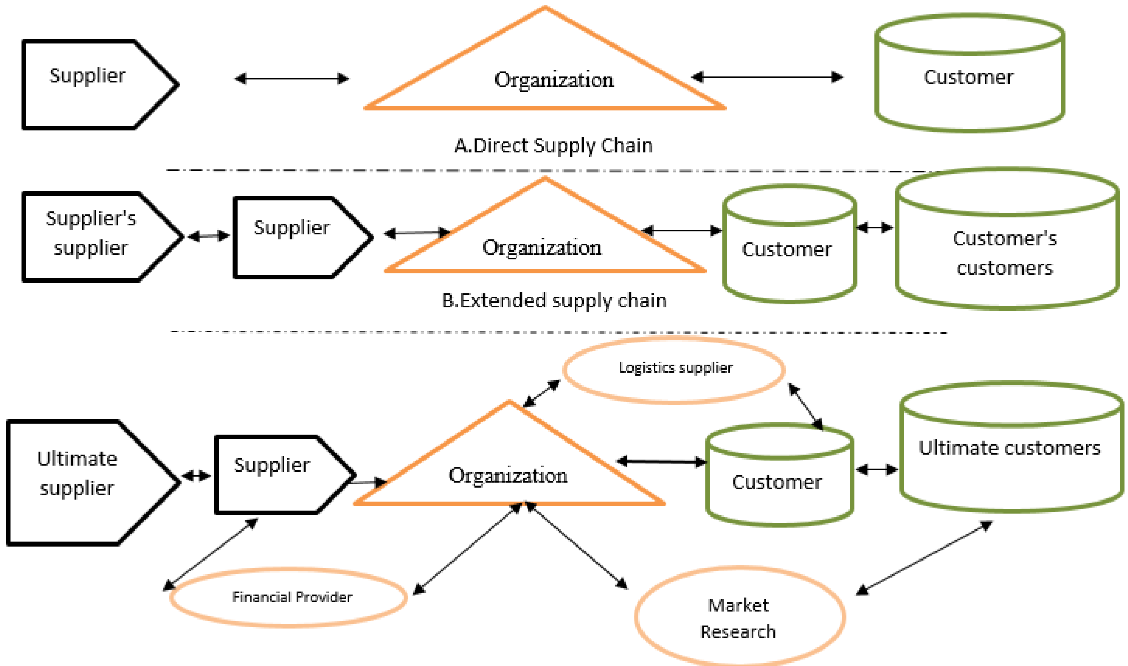

Figure 1. Three forms (or degrees) of supply chain intricacy (Mentzer & Deuill, 2001)

Organizational clothing supply chain is a kind of extended supply chain that shown in figure 1.a. This study has done on an organizational clothing industry and its supply chain in Iran and surveys show that this supply chain is consist of following parts:

- **Distribution**

One of the important part in organizational clothing supply chain is distribution that following activities should be done in that:

Extraction of consumption coefficient based on forecasting demand methods.

Preparation of products requirement by region and province.

Preparation of the annual distribution program and system based on the capacity of the stores and the distribution network.

Continuous monitoring of distribution centers

Planning, preparation and control of the annual and long-term plans and budgets.

In general, the mission of the distribution section in this supply chain is as follows:

Timely and accurately distribution.

More efficient distribution network.

Successful distribution will reduce additional costs to the system and end user.

The relationship between producer and consumer is the two pillars of the distribution network.

- **Supply**

Due to the advent of new technologies and massive changes in global markets, the importance of supply chain management has already been highlighted for this supply chain, somehow that create and maintain its competitive position, it is inevitable to use dynamic and consonant supply chain management. The company's centralized purchasing process eliminates the problems caused by the multiplicity of non-quality items with a variety of features.

The supply of this company is equipped with three arms of purchase, control and sales:

Purchase: This Company has put forward the slogan "More supply, at an affordable and consistent price". Function of purchase unit are 1).Benefit from the manufacturer's database and their leveling, 2)

Notify manufacturers before purchasing.3). High quality, timely and economical purchasing according to the needs of the consumer in a competitive and healthy atmosphere.4) Reduce maintenance and shipping costs.

Quality Control: An organization always strives to improve the comfort, appearance and quality of its items, and tries to ensure consistent control over the products in order to ensure compliance with defined standards. Quality control unit functions are: 1). Accurate and continuous planning for inspection and control of products at pre-production, during production and after production.2). Providing technical specifications of products. 3) Inspector deployment.4) Re-control after delivery of goods.5) Obtaining Consumer Views.

Sale: Sales are completely useless without knowing about the customers and whether they will buy again. With the help of experienced and knowledgeable team, the company has tried to provide a great service to the employees of the organizations by creating free sales centers in Iran. Sales capabilities are: 1).Providing consulting services for garments in all organizations.2). Sewing and restoration services.3). Provision of specialized services in accordance with customer's requirements for continuous monitoring of the production and delivery of goods

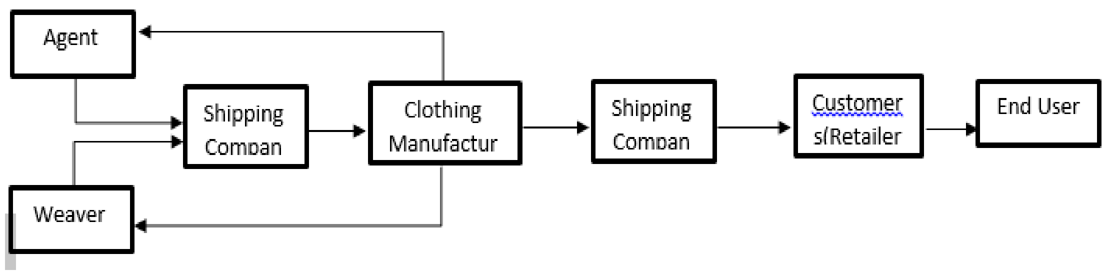

Figure 2. Supply chain for organizational clothing company in Iran

Prioritize Larg Scm's Practtices, Attributes And Performance Measurement For Organizational Clothing Suply Chain According To Expert's Opinion

After identifying the set of practices, attributes and performance measurement in review of literature part, the Delphi process of experts was used as tool to prioritize them by distribution of questionnaires among 25 specialists involved with the organizational clothing supply chain. Average scores were calculated using EXCEL software, and the factors that got the highest scores were used as the main factors for designing the main structural model. Following tables shows practices, attributes and performance measurement and their importance according to Experts vision.

Table 7. Lean practices and their importance in expert's perspective

Rank	Lean Practices	Score
1	Supplier evaluation and rating	4.36
2	Work/Parts standardization	4.28
3	Total Quality Management	4.04
4	CRM	4.00

Table 8. Agile practices and their importance in expert's perspective

Rank	Agile Practices	Score
1	Ability to change quantity and delivery time of order	4.08
1	Speed in improving delivery reliability	4.08
2	Speed in improving customer service	4.00
2	Use of IT to coordinate/integrate activities in manufacturing	4.00

Table 9. Resilient practices and their importance in expert's perspective

Rank	Resilient Practices	Score
1	Strategic stock	4.08
2	Flexible transportation	4.06
3	Supply chain risk management culture	3.84
4	Sourcing strategies to allow switching of suppliers	3.72

Table 10. Green practices and their importance in expert's perspective

Rank	Green Practices	Score
1	Reverse Logistics	4.08
2	To reduce energy consumption	4.04
2	ISO 14001 certification	4.04
3	Better use of natural resources	3.88

Table 11. Organizational Supply Chain Attributes in Expert's Perspective

Rank	Attributes	Score
1	Delivery Speed	4.24
2	Number of Sources	4.08
2	Flexibility Level	4.08
3	Integrity Level	4.00
4	Delay Time of Transportation and Production	3.88

Table 12. Organizational Supply Chain Performance Measurement in Expert's Perspective

Rank	Performance Measurement	Score
1	Delay Time	3.92
2	Quality	3.88
2	Inventory Level	3.88
3	Cost	3.80

Structural Equation Modeling Of Organizational Clothing Larg Supply Chain In Iran Clothing Industry

In this part according to expert's Delphi process results two kind of questionnaire was distributed and finally structural equation model was provided in two desirable and available modes. Following figures are outputs of Smart PLS3 software.

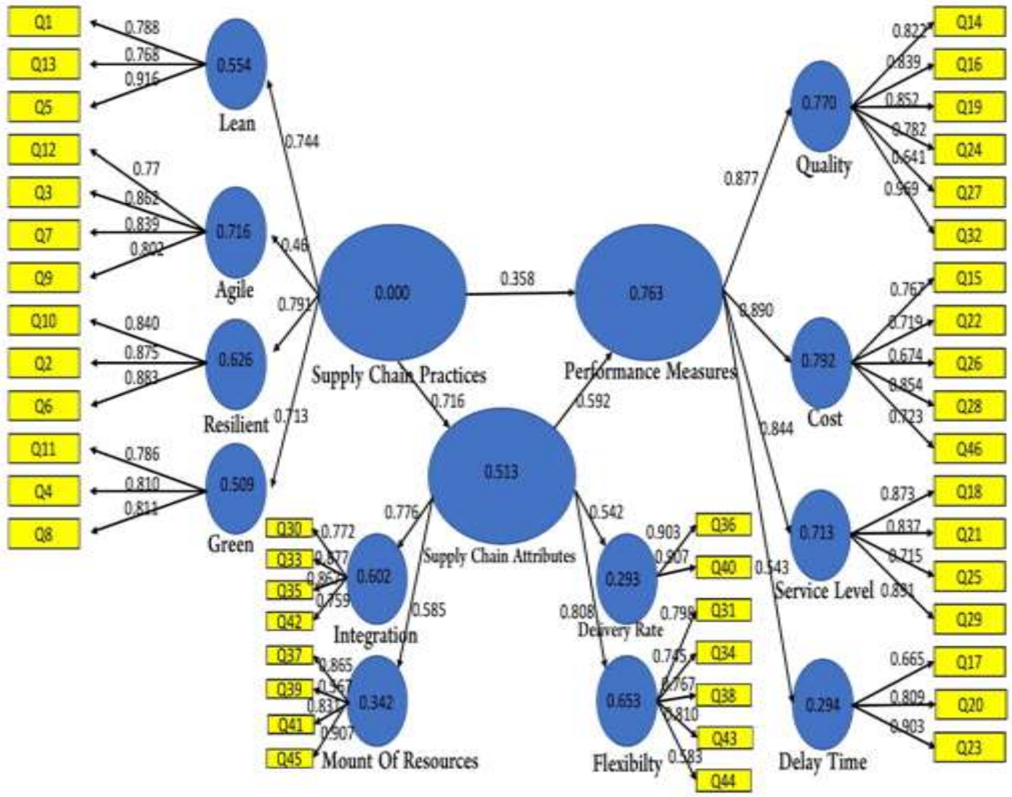

Figure 3. LARG Organizational Clothing Supply Chain Model with Standardized Coefficients of Factor Loading (Desirable Mode)

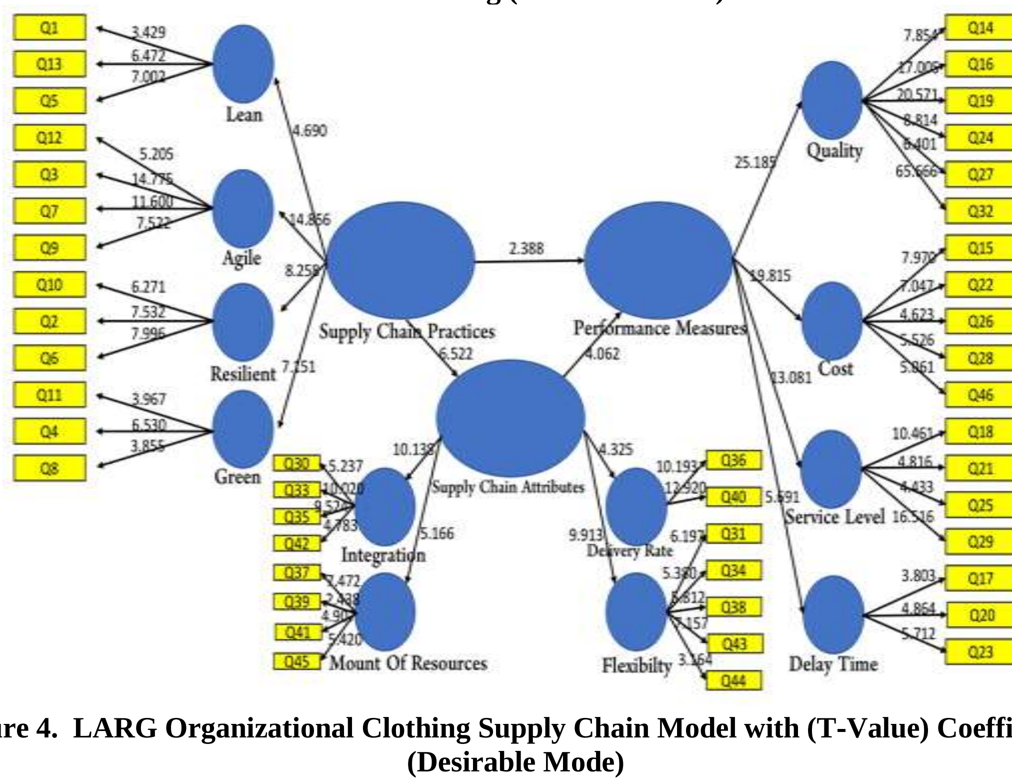

Figure 4. LARG Organizational Clothing Supply Chain Model with (T-Value) Coefficients (Desirable Mode)

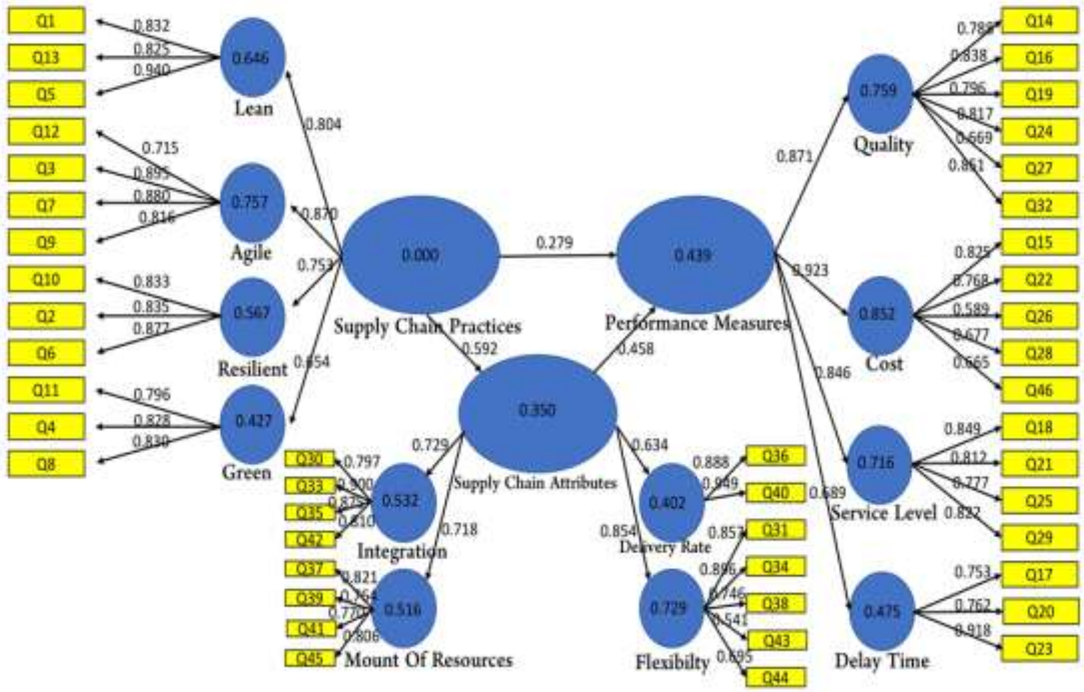

Figure 5. LARG Organizational Clothing Supply Chain Model with Standardized Coefficients of Factor (Available Mode)

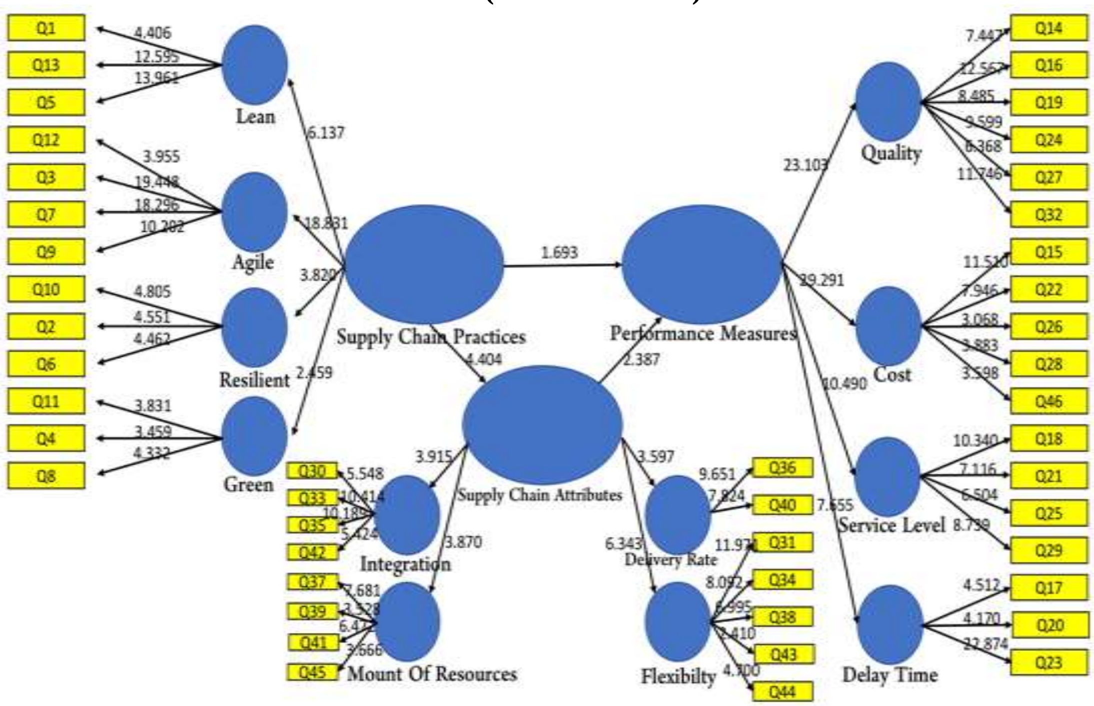

Figure 6. LARG Organizational Clothing Supply Chain Model with (T-Value) Coefficients (Available Mode)

Validity of Structural Equation Of Organizational Clothing Larg Supply Chain

In this section, the validity of the models was expressed in two model:

1: Outer Model

2: Inner Model

In Outer model relationships between the latent and observable variables are considered and measured. The following criteria have been used to check the fit of models:

Convergent Validity

Discriminant Validity (Forner and Larcker)

In Inner model relationships between the endogenous and exogenous latent variables are considered. The criteria for the Inner model test are as follows:

R^2

GOF

- **Convergent Validity**

Convergent validity is shown when the t-values of the Outer Model Loadings are above 1.96. The t-values of the loadings are, in essence, equivalent to t-values in least-squares regressions. Each measurement item is explained by the linear regression of its latent construct and its measurement error. The purpose of convergent validity is to measure the extent of explaining the latent variable by the observable variables which is measured by the average variance extracted (AVE). The minimum acceptable rate for (AVE) is 0.5 (Gefen, 2005).

Table 12. Convergent Validity with (AVE) criteria in Desirable and available mood

Variables	Desirable Mood	Available Mood
Lean Supply Chain Practices	0.683	0.752
Agile Supply Chain Practices	0.673	0.687
Resilient Supply Chain Practices	0.750	0.720
Green Supply Chain Practices	0.644	0.669
Integration	0.673	0.717
Mount of Source	0.645	0.625
Flexibility	0.555	0.573
Delivery Rate	0.819	0.845
Quality	0.680	0.632
Price	0.562	0.503
Service Level	0.692	0.664
Delay Time	0.637	0.663

The (AVE) variables in the above table in two desirable and available mood are greater than the minimum required.

The (AVE) variables in the above table in two desirable and available mood are greater than the minimum required.

(AVE>0.5)

- **Discriminant Validity (Fornell and Larcker)**

Discriminant validity is the extent to which latent variable A discriminates from other latent variables (e.g., B, C, D). Discriminant validity means that a latent variable is able to account for more variance in the observed variables associated with it than a) measurement error or similar external, unmeasured influences; or b) other constructs within the conceptual framework. If this is not the case, then the validity of the individual indicators and of the construct is questionable (Fornell & Larcker, 1998). Shared variance is the amount of variance that a variable (construct) is able to explain in another variable (construct). It is represented by the square of the correlation between any two variables (constructs). For example, if the correlation between two variables x_1 and x_2, is 0.6, then the shared variance between x_1 and x_2, is is 0.36. If independent variables are correlated, they share some of their predictive power over dependent variables Inspection of the correlation matrix between latent constructs can often identify potential shared variance issues. The AVE estimate is the average amount of variation that a latent construct is able to explain in the observed variables to which it is theoretically related. A latent construct A will correlate with observed variables x_1 and x_2, that theoretically relate to A. This correlation is generally referred to as a factor loading. If we square each of these correlations, this gives the amount of variation in each observed variable that the latent construct accounts for when this variance is averaged across all observed variables that relate theoretically to a latent construct, we generate the AVE. As can be seen square root of AVE latent variables are located on main diameter in following tables:

Table 13. Discriminant Validity (Fornell and Larcker) in Available mood

Variables	Lean Practices	Agile Practices	Resilient Practices Practices	Green Practices	Integration	Flexibility	Mount of source	Delivery Rate	Quality	Price	Service level	Delay Time
	E_1	E_2	E_3	E_4	M_1	M_2	M_3	M_4	S_1	S_2	S_3	S_4
$\boldsymbol{E_1}$	0.87											
$\boldsymbol{E_2}$	0.70	0.83										
$\boldsymbol{E_3}$	0.32	0.43	0.85									
$\boldsymbol{E_4}$	0.20	0.30	0.70	0.82								
$\boldsymbol{M_1}$	0.35	0.36	0.16	0.26	0.85							
$\boldsymbol{M_2}$	0.64	0.53	0.31	0.14	0.50	0.76						
$\boldsymbol{M_3}$	0.54	0.44	0.18	0.24	0.26	0.48	0.79					
$\boldsymbol{M_4}$	0.28	0.25	-0.01	-0.01	0.33	0.44	0.37	0.92				
$\boldsymbol{S_1}$	0.38	0.20	0.37	0.50	0.34	0.33	0.36	0.38	0.80			
$\boldsymbol{S_2}$	0.49	0.42	0.32	0.43	0.60	0.47	0.49	0.49	0.61	0.71		
$\boldsymbol{S_3}$	0.66	0.46	0.22	0.27	0.32	0.43	0.57	0.37	0.56	0.79	0.82	
$\boldsymbol{S_4}$	0.22	0.07	0.19	0.18	0.22	0.11	0.38	0.01	0.52	0.56	0.48	0.81

Table 14. Discriminant Validity (Fornell and Larcker) in Desirable mood

Variables	Lean Practices	Agile Practices	Resilient Practices Practices	Green Practices	Integration	Flexibility	Mount of source	Delivery Rate	Quality	Price	Service level	Delay Time
	E_1	E_2	E_3	E_4	M_1	M_2	M_3	M_4	S_1	S_2	S_3	S_4
E_1	0.83											
E_2	0.62	0.82										
E_3	0.28	0.46	0.87									
E_4	0.25	0.31	0.65	0.80								
M_1	0.58	0.48	0.34	0.27	0.82							
M_2	0.66	0.51	0.17	0.17	0.50	0.75						
M_3	0.34	0.34	0.40	0.64	0.22	0.27	0.80					
M_4	0.29	0.31	0.16	0.18	0.27	0.35	0.15	0.91				
S_1	0.52	0.57	0.48	0.46	0.57	0.58	0.36	0.59	0.83			
S_2	0.52	0.49	0.37	0.40	0.65	0.54	0.31	0.48	0.69	0.75		
S_3	0.63	0.55	0.62	0.54	0.64	0.45	0.42	0.18	0.55	0.66	0.83	
S_4	0.22	0.33	0.53	0.45	0.19	0.14	0.64	0.29	0.41	0.30	0.38	0.80

7.3: R^2

Residual Sum of Squares (RSS)

It is the sum of the squared difference between the experimental response y and the response calculated by the regression model:

RSS= $\sum_{i=1}^{n}(y_i - \hat{y}_i)^2$

If *RSS* is equal to zero the model is perfect, i.e. for all the *n* samples, the calculated responses coincide with the experimental responses. Obviously, *RSS* also depends on the measure unit use for the response. In practice, for the same model, if you multiply the experimental response for 10, *RSS* is 100 times greater, being a squared quantity.

Total Sum of Squares (TSS)

It is the *total* variance that a regression model can explain and is used as a reference quantity to calculate standardized quality parameters. Also denoted as SSY, it is the sum of the squared differences between the experimental responses and the average experimental response:

TSS=SSY= $\sum_{i=1}^{n}(y_i - \bar{y}_i)^2$

TSS is assumed as a theoretical reference model where for each experimental response a constant value is calculated as the average experimental response. As for RSS, also TSS depends on the measure unit used for the response.

Derived regression parameters for evaluating the goodness of fit

From the previous definitions of RSS and TSS, the following quantities are usually defined:

TSS = MSS + RSS

Where TSS and RSS are the quantities defined above and MSS is the **Model Sum of Squares**. All these three quantities are sums of squares and then are always positive quantities:

TSS ≥ 0 ; MSS ≥0 ;RSS ≥0

The coefficient of determination $R^2$and the multiple correlation coefficient R are defined as:

R^2= 1- RSS/TSS=1- $\frac{\sum_{i=1}^{n}(y_i - \hat{y}_i)^2}{\sum_{i=1}^{n}(y_i - \bar{y}_i)^2}$

0 ≤ R ≤ 1

R^2 is relates to endogenous latent variables represents effect of an exogenous variable on endogenous variable. 0.19, 0.33 and 0.67 are considered as a criterion for weak, moderate and strong values.

Table 15. R^2 Coefficients and main Endogenous variables

Endogenous Variables (Dependent)	Available Mood	Desirable Mood
Performance measurement	0.439	0.783
Supply Chain Attributes	0.350	0.513

Quantity of R^2 for performance measurement in desirable mood represents this concept that supply chain attributes variables and supply chain practices in totally could predict 78.8 % of performance measurement's alterations and other alterations are relate to another variables that haven't presented in model. Also quantity of R^2 for performance measurement in available mood represents this concept that supply chain attributes variables and supply chain practices in totally could predict 43.9% of performance measurement's alterations.

- **Goodness of Fit (GOF)**

Jörg Henseler, Marko Sarsted (2012) discuss a recent development in partial least squares (PLS) path modeling, namely goodness-of-fit indices. In order to illustrate the behavior of the goodness-of-fit index (GoF) and the relative goodness-of-fit index (GoFrel), they estimate PLS path models with simulated data, and contrast their values with fit indices commonly used in covariance-based structural equation modeling. The simulation shows that GoF can be useful to assess how well a PLS path model can explain different sets of data (Henseler & Sarstedt, 2012). In fact, the more the GOF gets closer to 1, the more general model is confirmed with greater power.

GOF=$\sqrt{\overline{Communality} \times \overline{R^2}}$

Table 16. The results of the general fitting of the desired and available status models with the GOF criteria

Status	Communality	R^2	GOF
Available	0.670	0.583	0.62
Desirable	0.668	0.582	0.62

Based on the results of the above table, the proposed model is valid and can be entered into the statistical hypothesis testing phase.

Statistical Hypothesis Testing

After verifying the model in the outer and inner models, the general hypothesis was discussed. T-statistic and Beta- Coefficient (Path-Coefficient) were used to examine hypothesis. Positive Beta-Coefficient (Path-Coefficient) represents direct relationship between endogenous and exogenous latent variables. vis-à-vis, Negative Beta-Coefficient (Path-Coefficient) represents inverse relationship between endogenous and exogenous latent variables.

- **Hypothesis**

The first hypothesis: Supply chain practices have significantly associate on performance measurement.

The second hypothesis: Supply chain practices have significantly associate on supply chain attributes.

The third hypothesis: Supply chain attributes have significantly associate on performance measurement.

The fourth hypothesis: Supply chain attributes have mediator role between practices and performance measurement.

✓THE FIRST HYPOTHESIS

Table 17. Results of first hypothesis analysis

Status	**First Hypothesis**	**Path Coefficient**	**T-statistic**	**Result**
Desirable	Practices → performance measurement	0.358	2.388	Confirm
Available	Practices → performance measurement	0.279	1.693	Reject

Because the calculated T-statistic is equal to 2.388 and greater than 1.96, effect of practices on performance measurement with path coefficient of 0.358 and probability of 95% is significant. 0.358 coefficient path between variables has this concept that by increasing a standard deviation unit in supply chain practices, performance measurement will increase 0.358 of standard deviation.

✓THE SECOND HYPOTHESIS

Table 18. Results of second hypothesis analysis

Status	**Second Hypothesis**	**Path Coefficient**	**T-statistic**	**Result**
Desirable	Practices → Attributes	0.716	6.522	Confirm
Available	Practices → Attributes	0.592	4.404	Confirm

In desirable status because the calculated T-statistic is equal to 6.522 and greater than 1.96, effect of practices on supply chain attributes with path coefficient of 0.716 and probability of 95% is significant. 0.716 coefficient path between variables has this concept that by increasing a standard deviation unit in supply chain practices, supply chain attributes will increase 0.716 of standard deviation.

✓THE THIRD HYPOTHESIS

Table 19. Results of third hypothesis analysis

Status	**Third Hypothesis**	**Path Coefficient**	**T-statistic**	**Result**
Desirable	Attributes → Performance measurement	0.592	4.062	Confirm
Available	Attributes → Performance measurement	0.458	2.387	Confirm

In desirable status because the calculated T-statistic is equal to 4.062 and greater than 1.96, effect of supply chain attributes on supply chain performance measurement with path coefficient of 0.592 and probability of 95% is significant. 0.592 coefficient path between variables has this concept that by increasing a standard deviation unit in supply chain attributes, supply chain performance measurement will increase 0.592 of standard deviation.

✓THE FOURTH HYPOTHESIS

"Supply chain attributes have mediator role between practices and performance measurement"

Table 20. Study the fourth hypothesis based on available status

Path	**Path Coefficient**	**T-statistic**	**Result**
Supply Chain Practices → Supply Chain Attributes	0.592	4.404	Confirm
Supply Chain Attribute → Performance Measurement	0.458	2.387	Confirm
Supply Chain Practices → Performance Measurement	0.279	1.693	Reject

Effect of supply chain practices on supply chain attributes with path coefficient 0.592 and t-statistic 4.404 was accepted, also effect of supply chain attributes on supply chain performance measurement with path coefficient 0.458 and t-statistic 2.387 was accepted. According to the test of these two paths in the form of a model, **it can be inferred that supply chain attributes have mediator role between practices and performance measurement**. Direct effect of supply chain practices on performance measurement was rejected because of t-statistic (1.693 ≤1.96).

Cause and Effect Diagram And Simulate Inventory Senario By System Dynamics

System dynamics is the theory of system structures, a theory that deals with the study of the causal interactions between the components which constitute the structure of a complex system. It is a modeling methodology for understanding and representing complex systems and analyzing their dynamic behavior (Forester, 1961). System dynamics has two interesting aspects: systemic study of the concept of feedback and dynamic study of system behavior. It shows how the structure of a feedback system and the loops that it contains are responsible for its dynamic behavior. It is a method that focuses on the interactions between structural components, and behavior that is founded on the concept of feedback. Forrester (1961) developed four steps to create a system dynamics model. The first step is the articulation of the problem: defining the purpose of modeling and identifying the entities, interactions and behaviors to highlight. The second step is to describe the causal relationships between these entities, by building the causal (or influence) diagram. Causal diagrams represent major feedback mechanisms, which reinforce (positive feedback loop) or counteract (negative feedback loop) a given change in a system variable (Sterman, 2000). The third step corresponds to the introduction of stock variables and flow in the system by building a stock-flow diagram. This diagram is a quantitative model and introduces the time dimension by considering the rate of change in the level of variables (stock variables and flow) over time. This model consists of three types of element: stock (or level) elements (also called state variables); flow elements; and auxiliary variables and constants (Garcia, 2006). The fourth step is to formulate simulation models.

- **Causal Diagram**

To provide the necessary understanding of lean, agile, resilient and green paradigms divergences and commitments an overlap of the diagrams with the relationships between the different supply chain practices and the supply chain paradigms was developed by Carvalho and V.Machado (Carvalho & Machado, 2011). Figure 7 integrates the paradigms practices and supply chain performance relationships and it is specifically related to the organizational clothing industries supply chain . From the causal diagram, it is possible to verify that some supply chain attributes are positively affected by all paradigms.

✓**Stock Variables**: Supply Chain Performance
✓**Rate Variables**: Service Level Rate, Cost, Quality, Delay Time

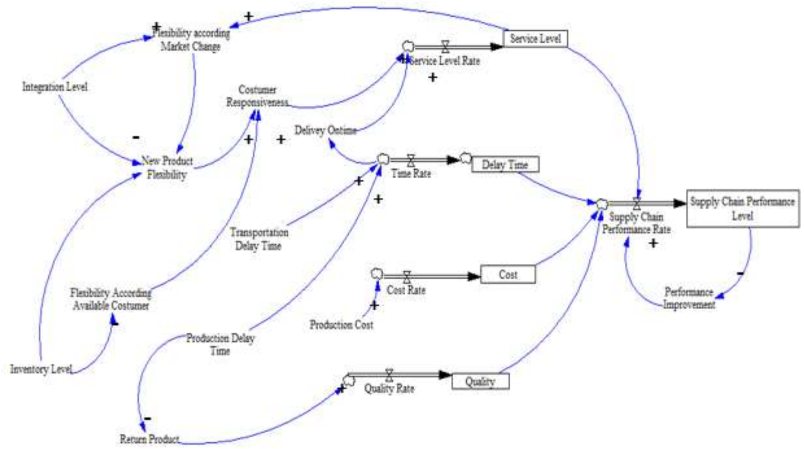

Figure7. Dynamics Model Relationship between Supply Chain Attributes and Performance Measurements

- **Scenario analysis**

For improving the defined metrics in organizational clothing supply chain performance measurement some scenarios are presented. Possibility of results evaluation are provided by Implementation of these scenarios in supply chain. In this part scenario of performance are simulated:

✓**Change in inventory level of the organization**

In this case, three hypotheses are considered for the inventory level variables that are the most effective variables in the organizational clothing supply chain performance measurement. In the first case, a high level of 0.9 is considered for this variable that shown in figure 8 by curve number 1. Due to the very large amount of inventory variables performance level of the LARG supply chain is decreasing. In the second case average level of 0.5 is considered for the inventory level variable. In the third case low level of 0.5 is considered for the inventory level variable that shown in following figure the curve number 3 is upper than two other scenario. It can be concluded that by reducing the level of inventory in the clothing organizational supply chain, the level of performance can be improved.

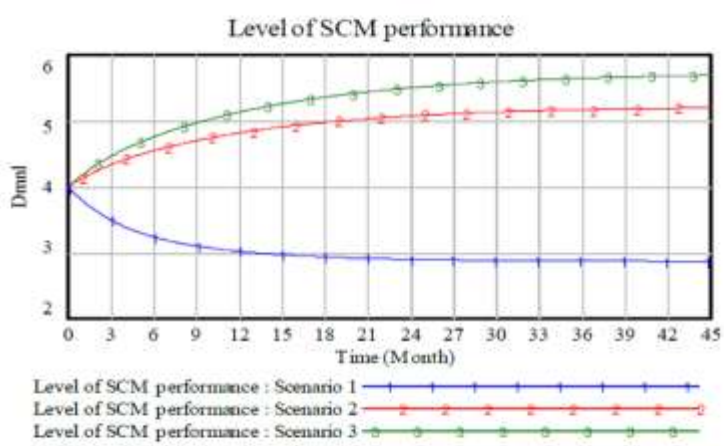

Figure 8. The behavior of the supply chain performance level with different inventory levels

Conclusion

In this study at first a comprehensive literature about LARG supply chain management and its paradigms, in addition a comprehensive definition of the clothing and organizational clothing supply chain was presented. Experts Delphi method was applied for Prioritizing LARG practices, attributes and performance measurements by distribution of the questionnaire. In second phase structural model of organizational clothing LARG supply chain management was provided that shown agile practices with factor load (0.846) is the most important variable in Iran organizational clothing industry, after that Resilient practices with factor load of (0.791) is the most important variable which is due to United State sanctions against the Iran economy. Afterwards a hypothesis was accepted that the Attributes in the LARG supply chain are mediating between practices and performance measurement.

Finally a scenario related to supply chain performance was simulated by system dynamics. Iranian Organizational clothing supply chain performance was most affected by resilient practices with correlation coefficient (0.645) and it was least affected by green practices with correlation coefficient (0.396) which the main reason for these results is to counter US sanctions.

References

[1] Henseler, J. & Sarstedt, M., 2012. Goodness-of-fit indices for partial least squares. Springer, pp. 566-589.

[2] Agarwal, A., Shankar, S. & Tiwari, M., 2008. Modeling the metrics of lean, agile and leagile supply chain. European Journal of Operational research, Volume 173, pp. 211-215.

[3] Anand, G. & Kodali, R., 2008. A conceptual framework for lean supply chain and its implementation. International Journal of Value Chain Management, Volume 2, pp. 313-357.

[4] Azevedo, s., Carvalho, H. & Cruz Machado, V., 2012. LARG supply chain management practices. E-Management, E-business,E-education, E-learnig, Volume 2, pp. 1-17.

[5] Berry, w., Christien , T., Brun, D. & Ward, D., 2003. Lean manufacturing A Mapping of Competitive Priorities, Initiatives, Practices, and Operational Performance in Danish Manufacturers. International Journal of Operations & Production Management, Volume 23(10), pp. 1163-1183.

[6] Carigheahed, C., Rugntusonatham, w. & Blackhurb, J., 2007. The severity of supply chian disruption. Decision Sience, Volume 38, pp. 131-151.

[7] Carvalho, H., Azevedo, S. & C-Machado, V., 2010. Supply chain performance management: lean and green. International journal of Buisness performance and supply chain management, Volume 2, pp. 304-324.

[8] Carvalho, H., Duarte, S. & Machado, V., 2011. Lean,Agile,Resilient and Green: Divergencies and Synergies. International journal of lean 6 sigma, pp. 151-179.

[9] Carvalho, H. & Machado, V.-C., 2011. Integrating Lean, Agile, Resilience and Green paradigms in supply chain management. In: supply chain management. Lisbon, Portugal: Reseachgate, pp. 28-48.

[10] Christopher , M. & Towill, D., 2000. Supply chain migration from lean and functional to agile and customized. International journal of supply chain management, Volume 5, pp. 206-213.

[11] Christopher, M. & Peck, H., 2004. Building the resilient supply chain. International journal of logistics Management, Volume 4, pp. 1-14.

[12] Collin, J. & Lorez, D., 2006. Plan for supply chain agility. International journal physical distribution and logistic management, pp. 418-430.

[13] Diest, M. & Panizzolo, R., 2018. On the Relationship between Lean Practices and Enviromental performance. s.l., Earth and Environmental Science 151 (2018) 012034.

[14] Doolen, T., 2005. A review of lean assessment in organisations: An exploratory study of lean practices by electronics manufacturers. Journal of Manufacturing Systems, pp. 55-67.

[15] Dubey, R. G. A. P. T., 2015. Green supply chain management enabler. Mixed methods research. Sustain. Prod. Consum., pp. 72-88.

[16] Forester, j., 1961. Industrial Dynamics. MIT Press, p. 464.

[17] Fornell, C. & Larcker, D., 1998. Evaluation sturactural equation. Mark res, Volume 18, pp. 39-50.

[18] Garcia, J., 2006. Theory and practical exercise of system dynamics. Barcelona, Spain: s.n.

[19] Gefen, D., 2005. Practical Guid to validity PLS-Graph. Comunication for information systems, Volume 16.

[20] González,, P., Sarkis , J. & Adenso-Díaz, B., 2008. Environmental management system certification and its influence on corporate practices: Evidence from the automotive industry. International Journal of Operations & Production Management, pp. 1021-1041.

[21] Gunaseharan, A. & Patel, C., 2001. Performance and measure and metrics in a supply chain enviroment. International journal of opration and production management, Volume 21, pp. 71-87.

[22] Gurumurthy & Kodali, R., 2009. Application of benchmarking for assessing the lean manufacturing implementation. Benchmarking An International Journal, pp. 247-308.
[23] Haimes, Y., 2006. The definition of vulnerabilites in measuring Risk to infrastructure. Risk Analysis, Volume 26, pp. 293-296.
[24] Holt, D. & Ghobadian, A., 2009. An empirical study of green supply chain management practices amongst UK manufacturers. Journal of Manufacturing Technology Management, pp. 933-953.
[25] Iakovou, E., Valchos, D. & Xanthopoulous, A., 2007. An analtical methodological framework for the optimal design of resilience supply chain. International journal of logistics economics and globalization, Volume 1, pp. 1-20.
[26] Kirishna, N. v. & Kodali , R., 2015. A critical review of lean supply chain management frameworks: proposed framework. Internation Journal of Planning and Control.
[27] Konecka, S., 2010. Lean and agile supply chain management concept in the aspect of risk management. s.l., s.n.
[28] Lambert, D. & Pohlen , L., 1998. Supply chain metrics. International journal of logistics management, Volume 12, pp. 1-19.
[29] Lin, C., Chin , H. & Chu, P., 2006. Agility index in the supply chain. International journal of production Economics, pp. 285-292.
[30] Mahidhar, V., 2005. Designing the Lean Enterprise Performance Measurement System. Engineering Systems Division, Massachusetts Institute of Technology.
[31] Maleki, M. a. C.-M., 2013. An empirical review on supply chain integration. Management and Production Engineering Review, Volume 4(1), pp. 85-96.
[32] Maleki, M. S. E. a. C.-M. V., 2013. Development of supply chain integration model through application of analytic network process and Bayesian network.. International Journal of Integrated Supply Management, Volume 8(1/2/3), pp. 67-89.
[33] Melton, T., 2005. The benefits of lean manufacturing what lean thinking has to offer the process industries. Chemical Engineering Research and Design, Volume 83, pp. 662-673.
[34] Mentzer , J. & Deuill, 2001. Deffining supply chain management. Journal of bussiness management, pp. 1-25.
[35] Naylor, B., Naim, M. & Berry , D., 1999. Leagility: Integrating the lean and agile manufacturing paradigms in the total supply chain. International Journal of Production Economics, Volume 62, pp. 107-118.
[36] Petit, T., Fiksel, J. & Croxton , K., 2010. Ensuring supply chain resilience: Development of a conceptualframework. Journal of Business Logistics, Volume 31(1), pp. 01-21.
[37] Rao, P. & Holt, D., 2009. Do green supply chains lead to competitiveness and economic Performance?. International Journal of Operations & Production Management, 45(16), pp. 3699-3722.
[38] Rice, B. & Caniato, 2003. Building a secure and resilient supply network. Supply chain management review, Volume 17, pp. 22-30.
[39] Routory, S., 2009. Antecedente and drivers for green supply chain management implentation in manufacturing Enviroment.. ICFAI journal of supply chain management, Volume 6, pp. 20-35.
[40] Sarkis , J., 2003. A strategic decision frame work for green supply chain management. Journal of cleaner production, Volume 11, pp. 397-490.
[41] Shah , R. & Ward, P., 2007. Defining and developing measures of lean production. International Journal of Operation Management, Volume 25, pp. 785-805.
[42] Sheffi, Y. & Rice, B., 2008. A supply chain view of the resilient enterprise.. Sloan Management Review, 47(1), pp. 41-48.
[43] Sirvastava, s., 2007. Green supply chain management. International journal of management, pp. 53-80.
[44] Sooda, S. & et al., 2016. Implementation of green supply chain management in india. The electricity journal, pp. 43-65.
[45] Sterman, J., 2000. Bussiness Dynamics. NY,USA: Mc.Graw hills.
[46] Swafford, M., Gosh, S. & Murthy, N., 2008. Acheiving supply chain agility through out IT integraion. International journal of production Economics, Volume 116, pp. 288-299.
[47] Tang, C., 2006. Robust strategy for mitigating supply chain disruption. International journal of logistics research and aplication, Volume 9, p. 33.
[48] Totorella, G., Miorando, R. & Marodin, G., 2017. Lean supply chain management: Emprical research on performance, contexts and practices. International Journal of Economy.
[49] Venkat, O. & Mollenkopf, 2012. "Green, lean, and global supply chain". International Journal of Physical Distribution & Logistics Management, Volume 4, pp. 14-41.
[50] Womack, J., Johns, D. & Roos, D., 1991. The story of lean production. s.l.:Harper Perenial.
[51] Zhu, Q., Sarkis, J. & Lai, K., 2008. Confirmation of measurment model for Green supply chain management implementation. International Journal of production Economics, Volume 111, pp. 261-273.
[52] Zsidisin, G. & Bob, R., 2008. Supply chain risk,. International Series In Operations Research &Management Science, 124(springer).