

Two of above studies has described the competitive advantage of value procurement for the organizations in terms of improve quality, reduce wastage, improve efficiency and effectiveness, increase profit, brand reputation and etc.

Most of the above studies classifies under the ways of building supplier relationship through strategic point of view. Two articles are described about the applicability of AHP model to supplier selection process and problem evaluation. The article written by Deloitte describes a process consisting 5 key steps which can be taken to build successful strategic relationships .All of these articles emphasizes the importance of move away from traditional supplier-buyer relationships to long term collaborative supplier relationship to improve value appropriation.

Table 1: Impact of/on procurement 4.0

Study	Impact of/on Procurement 4.0				
	Competitive advantage for the buyer organization	Ways of building Strategic Relationships	Impact of Procurement 4.0 On aspects of Strategic Supplier Relationships	Causes and issues of relationships of Procurement 4.0	Impacts of Supplier in
(Cox, 2001)	*		*		
(Holger Schiele, 2006)		*			
(Chan, 2010)		*			
(S. Gary Teng, 2005)		*			
(Deloitte, 2015)		*	*		
(Fred Lemke, 2003)	*	*			
(Fischer, 2017)	*	*			
(Paul R. Schapper, 2006)	*				
(Dimitri*, 2013)	*				
(Keith R. Molenaar, 2010)				*	
(Gary Gereffi, 2003)		*			
(Kashiwagi, 2011)			*		
(Michael Essig, 2001)				*	

4.2 Considerations in Procurement 4.0 Strategies

Procurement 4.0 concept is included with competitiveness, collaboration, digital and agile method. Competitiveness means competing value chains from tier 1 to n-tier visibility. Collaborative means co-creation which leverage supplier innovations from buyer centricity to supplier centricity. Digital means digital transformation that deploy advanced technologies from spend transparency to holistic and intelligence platforms. Agile means the leadership that actively shapes an agile organization from hierarchy to autonomy.

Procurement 4.0 framework focuses on technology, competition, suppliers, globalization, shareholder expectations and megatrends which are called as trends or drivers. Procurement 4.0 framework is included with six main areas. Firstly, new procurement value proposition, procurement as service provider to key suppliers and customers monetization of field application data with suppliers. Secondly digital category and service procurement, new categories (ex – software, hardware, new services) innovative contracting of services, technologies, markets and

suppliers. Thirdly digital supply chain and supplier management, supplier risk management and key performance indicators. Fourthly innovative procurement data utilization, big data analytics field application data analysis to improve design and performance. Fifthly digital processes and tools, digital tools and interfaces procurement IT architecture. Sixthly organization and capabilities, digital skills and talents experts for new categories.

Making Strategies to maintain strategic supplier relationship for procurement 4.0 in the Sri Lanka Apparel Industry is significantly more competitive and challengeable to these companies. Reasons for procurement 4.0, Value procured area, Supplier selection strategy / model, Supply chain drivers and priorities were identified in the studied articles and considered for further analysis. (Refer to the Table 2).

Nowadays governments are more focusing on applying procurement4.0 approach when purchasing goods and services, compared to the approach that select suppliers based on cost. It is a traditional “low-bid” approach. The best value procurement model allows selecting the best combination of quality, cost and other considerations rather than choosing a lower cost supplier.

Success of apparel industry has lied on providing right quantity of quality outputs to the relevant customers on the specified time. Thus having right quantity of quality of raw material is important to keep smooth flow of the apparel productions. Most of the raw material required for the Sri Lanka apparel export industry is imported from foreign leading companies. Therefore, building a long term collaborative relationships are required to all apparel companies to obtain significant competitive advantage. Careful considerations and analysis is required to proper supplier selection and continuing strategic relationships to improve the value appropriate to the apparel industry with the aim of reducing the defects percentage. Supplier selection strategies and model were identified in 8 articles.

Table 2: Considerations in procurement 4.0 strategies

Study	Reasons for Procurement 4.0	Value Procured area	Supplier Selection Strategy/models	Supply Drives Priorities	Chain and
(Andreas, 2016)	*				
(Barnes, 1999)	*				
(Bienhaus, 2017)	*				
(Chang, 2013)	*				
(Cox, 2001)			*		
(Holger Schiele, 2006)			*		
(Chan, 2010)			*		
(S. Gary Teng, 2005)			*		
(Deloitte, 2015)			*	*	
(Fred Lemke, 2003)			*		
(Fischer, 2017)			*		
(Paul R. Schapper, 2006)		*		*	
(Dimitri*, 2013)		*			
(Keith R. Molenaar, 2010)		*			
(Gary Gereffi, 2003)		*		*	
(Kashiwagi, 2011)		*	*		
(Michael Essig, 2001)		*		*	

4.3 Selection and Retention of Strategic Supplier Relationships

For any company that are interested in building strategic supplier relationships, it is important in to choose the right suppliers to add values to the supply chain. An efficient and effective supply chain drives companies to the successful by allowing them to keep smooth functioning of every operation.

Factors related to Supplier selection and retention which are identified through the articles are mentioned in the table.3.

Some of these studies have examined what is the Apparel companies' criteria to select their suppliers, how the performance measurement of the supplier is done and how they make decisions to keep the strategic suppliers as key business partners to keep sustainability of the company.

Table 3: Selection and Retention of Strategic Suppliers

Study	Selection and Retention of Strategic Suppliers		
	Supplier selection criteria	Supplier performance measures	Decision of retaining Suppliers
(Cox, 2001)	*		
Innovative supplier		*	
(Chan, 2010)	*		
(S. Gary Teng, 2005)	*		
(Deloitte, 2015)	*	*	*
(Fred Lemke, 2003)		*	
(Fischer, 2017)		*	
(Paul R. Schapper, 2006)		*	
(Dimitri*, 2013)		*	
(Keith R. Molenaar, 2010)	*		
(Gary Gereffi, 2003)		*	
(Kashiwagi, 2011)	*	*	
(Michael Essig, 2001)		*	

(Chan, 2010) Has highlighted the applicability of AHP model to the supplier selection process and problem evaluation with addressing the most relevant issues in searching suppliers. The article written by Deloitte has covered above three areas through introducing a set of core complementary processes which focus on supplier segmentation, SRM governance, supplier performance management, and supplier development with aim of drive more value out of the supplier relationships.

4.4 Other Factors

The role of IT and the introduction of new models/frameworks are discussed under the title other factors (Refer to the Table 4).

Table 4: Other Factors

Study	Other Factors	
	Role of IT procurement in process	Introduction of a model/Framework
(Chan, 2010)		*
(S. Gary Teng, 2005)	*	*
(Chandrasekar Subramaniam, 2002)	*	

AHP-based model was formulated to select the best supplier (Chan, 2010). The system was implemented with the aid of the commercial software package Expert Choice. Based on the results from the AHP model, benefits of implementing quick response in apparel supply chains can also be verified.

Web-enabled business-to-business (B2B) e-commerce enhancement in inter organizational coordination, results in saving transaction cost and having competitive sourcing opportunities for the buyer organization while eliminating the uncertainty in existing information technology, such as EDI. The introduced framework is proposed to quantify and measure the value of B2B e-commerce systems and identify the factors that determine it. (Chandrasekar Subramaniam, 2002)

4.5 Models/Frameworks

Models and frameworks presented in the selected articles are further discussed in this section (Refer to the Table 5).

Table 5: Models/Frameworks

Study	Model/Framework	Uses/Advantages
(Chan, 2010)	Develop a decision support model by using AHP to solve the supplier selection problem in the apparel industry	The model presented here addressed the most relevant issues in searching suppliers the apparel industry. With the use of the model, supplier selection will be much easier and effective for buyers.
(S. Gary Teng, 2005)	The development of a simple, flexible, and easy to use evaluation model that includes the consideration of five main clusters to reflect the performance of a global supplier in a textile/apparel supply chain.	Textile/apparel companies can use this model to find capable suppliers as their partners in the supply chain. With minor modifications, this model also can help companies in most industries for enhancing their supply chain operations with capable suppliers.
(Deloitte, 2015)	Developed a framework for the Supplier Relationship Management approach	To build successful strategic relationship with supplier To drive more value out of them through supplier development
(Chandrasekar Subramaniam, 2002)	A framework based on a multistage impact model of information technology on enterprise processes	To identify the impact on a set of intermediate variables which lead to improve in performance measures by enabling B2B operations using certain features or capabilities. Ultimately the effectiveness of the procurement process achievement which is the B2B goal of the enterprise is identified improving the performance variables.
(Su, 2013)	An empirical investigation of a theory-based model integrating the resource-based view and the relational view of strategic management.	The study contributes to the literature by developing a research model based on a multi-theoretical perspective and conducting a large-scale empirical survey in the textile and apparel industry and analyzing the model by structural equation modeling.

The model (S. Gary Teng, 2005) discusses the supplier performance level under five clusters namely; delivery, flexibility, cost, quality and reliability. The delivery cluster consists of four factors that include geographic location, freight terms, trade restrictions, and total order cycle time. Evaluating supplier's flexibility is according to five factors including capacity, inventory availability, information-sharing, negotiability, and product customization. The three factors considered in the evaluation of cost cluster are the supplier's selling price, internal cost, and the cost for ordering and invoicing. The quality cluster includes four factors that consist of continuous improvement, certifications, customer service, and percentage of on-time deliveries. The last cluster for supplier performance evaluation is the reliability of a supplier's operations to fulfill supply chain activities. Four factors, the feeling of trust, the country's political situation, the currency exchange situation, and the warranty, influence the reliability of a supplier. All the factors and clusters considered in this model gather the most important issues that must be addressed for effective sourcing and partner collaboration in the supply chain for this industry. With the use of this model, sourcing and supplier evaluation and selection will be much easier and effective for buyers in textile and apparel industry.

For future studies, more supplier alternatives which encompass both domestic and international aspects can be added to the current research (Chan, 2010). This may include ethical issues as it is increasingly important to know whether or not the chosen suppliers have complied with ethical guidelines set by the buying firm. Moreover, all the criteria were determined from the literature that means they are all secondary data. Therefore, the next stage of the study is to conduct surveys with the experts from the industry (purchasing manager, sales manager, product manager, quality manager, and production manager) in order to verify or to refine the model. Questionnaire which is based on the proposed AHP model can be designed for the survey and then weighting for each criterion can be found from the survey results.

(Deloitte, 2015) Study has introduced a framework for the SRM approach which is developed by Deloitte for their client – Global consumer Business Company. It includes the followings elements:

- Agreement on SRM strategy
- Definition of supplier segmentation process and tools
- Establishment of a governance model and definition of roles and responsibilities, for both internally and externally
- Improvements and guidance to the performance management process and measures
- Supplier development processes and responsibilities including measures for underperforming suppliers, business development initiatives and management of Innovation opportunities
- Deployment of SRM within the organization and implementation planning

From the buying enterprise's point of view, the use of a Web-based system affects four major categories of B2B operations: search, order processing, monitoring and control, and coordination. The effects of a Web-based B2B procurement system are introduced in three main layers: impact on intermediate measures, impact on performance measures and impact on enterprise B2B goal. Impact on Intermediate Measures consists lower transaction costs, inventory holding costs and price for products purchased. Impact on performance measures consists higher process quality, lower total procurement costs, increased user satisfaction and increased responsiveness of the system. The enterprise B2B goal is the effectiveness of the procurement process. (Chandrasekar Subramaniam, 2002)

The model (Su, 2013) which is based on four main key concepts or variables is integrating the structural and measurement models and each variable is divided into several items in order to measure each variable in the survey. The concept of strategic sourcing includes strategic orientation, relationship development with key suppliers, and top management support. The four items of buyer-supplier relationship include buyer-supplier loyalty, frequent face-to-face communications with key suppliers, high corporate level communication on important issues with key suppliers, and the buyer's influence on key supplier's responsiveness. The three items of supplier evaluation include formal supplier certification program, formal system to track the performance of the suppliers, and formal program for evaluating and recognizing suppliers. The three items measuring sourcing performance includes focusing on contributions of sourcing to the overall success of the firm and to the firm's bottom-line profit, and sourcing's value creating outcomes.

5. Conclusion

Emerging trends in Supply Chain Managements (SCM) has drawing the attention of business to building up strong collaborative and long term supplier base in order to enhance the competitive advantage within industry. Therefore, there is a growing interest in carrying out research in SCM field for exploring new dimensions to reach the operations excellence through effective supply base. This article is expected to provide current state of the knowledge of these concepts relating the apparel export industry which make significant contribution to our National Income. Based on the review, classification and analysis of the articles, knowledge gap can be discovered for further investigation.

Considering the selected studies, it could be seen that most of the research that describes models/frameworks which can be appropriate for developing strategic supplier relationships from perspectives. Most of those models has been developed for selection and evaluation of supplier development. Also most of these studies are concentrated on cost reduction through value procurement strategies to efficient and effective flow of operation. However, this paper expected to introduce the new model for illustrate the new approach for supplier – buyer relationship to increase value percentage as well as to reduce the defects percentage with the integration of procurement 4.0. This framework describes how the pillars of procurement 4.0; i.e. designing competitive value chains, leveraging supplier innovation through collaboration, deploying digital transformation and creating agile organization can be integrated to build strategic relationship with suppliers in the procurement process to enhance the overall performance and organizational

efficiency that simultaneously lead improving customer experience and supplier performance of apparel industry while suggesting collaborative information systems and joint improvement research and development efforts to be implemented.

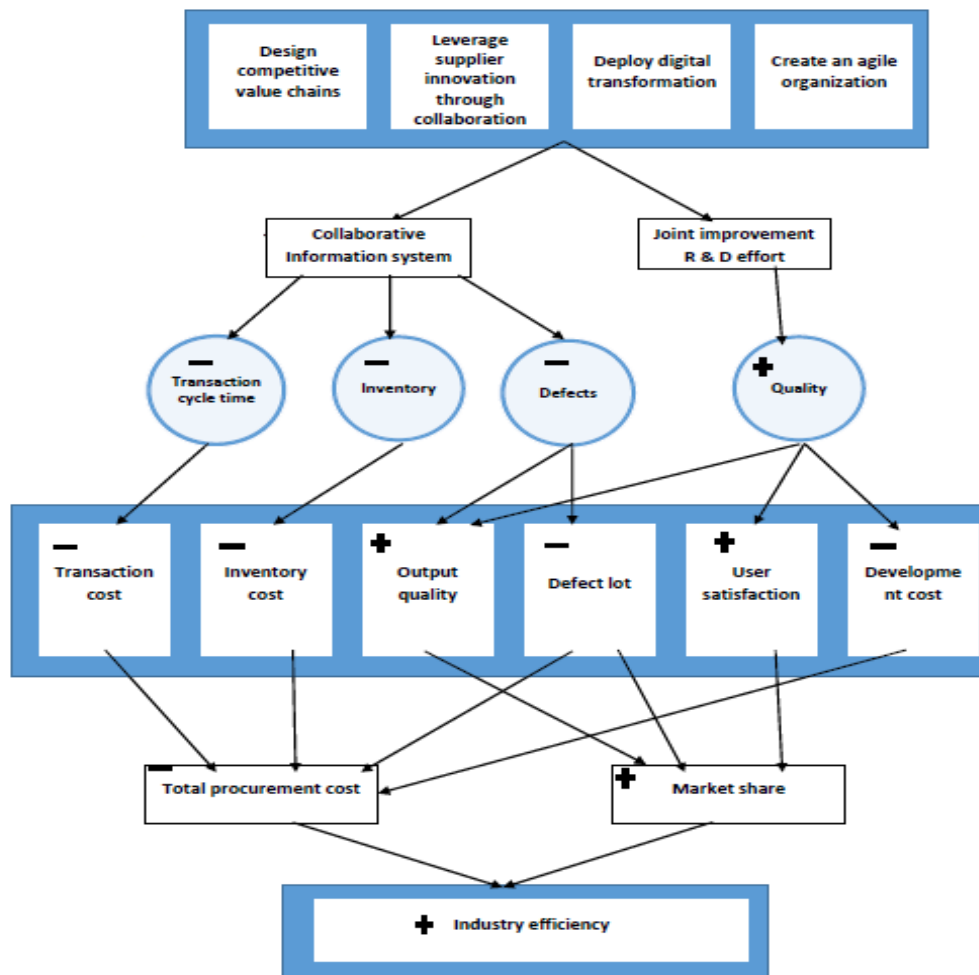


Figure 1. Conceptual model

New communication and information technologies such as EDI (Electronic data Interchange) can be used to enhance inter organizational coordination result in reducing transaction cycle time, inventory and defects. The reduction in transaction cycle time will result to reduce the labor time used in the process and the labor cost component of the transaction cost. Cost incurred due to use of information technologies are several magnitudes lower than those involved in manual processing and coordination. The lower incident of errors in a new system will reduce the need for labor for error resolution, thereby reducing transaction costs with less lead time for acquiring products, organizations can store less in inventory and increase inventory turns, leading to lower inventory costs. A business unit always try to deliver a defect free product which will fully meet customer expectations to the customer and to minimize order rejection. In the apparel industry manufacturers keep a huge defect lot in order to increase the output quality. This type of system which is accessible to both supplier and the manufacturer will forecast business demand effectively, require minimum effort, resolve complaints faster and reduce defect lot. Further suppliers gradually increase the volume of business may be enabled with the close and strategic relationships.

With the evolution of new technology and involvement of procurement 4.0 both incremental and radical changes can be found in apparel industry. Improved materials such as synthetic fabrics would be an incremental change and fabric developed using nanotechnology would be a radical change. In order to achieve organizational goals organizations

must concern about the adaptation for the changes. R & D investments may provide benefits after a certain period while increasing the operating cost in the short run would be an issue in this situation. A joint improvement driven by mutual interdependence can be suggested to overcome these confounding problems where the cost and expert knowledge can be collaboratively contributed. Further innovative solutions or technology enhancements can be conducted to reduce defects in the material where the supplier and buyer separately incurred then can be shared. This will increase output quality and user satisfaction while reducing development cost.

Success of apparel industry has lied on providing right quantity of quality outputs to the relevant customer on the specific time at a reasonable price. This framework will support that by reducing transaction cycle time, transaction cost, inventory cost, defect lot and development cost while increasing output quality and user satisfaction. These will reduce total procurement cost and increase market share that keep smooth flow of apparel production. In the long run, the efficiency of apparel industry is expected to be improved.

In future researches can be conducted to collect data for a comprehensive measurement of value gained by strategic relationship building with suppliers in apparel industry and can be extended for empirical verification of the framework. Therefore, further research is needed to identify new trends in the apparel industry and innovation to improve the process, strategies and operations.

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