



## INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE AND MANAGEMENT

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## SUPPLY CHAIN INTEGRATION AND COLLABORATION USING E- BUSINESS MODEL IN TEXTILE GARMENT INDUSTRY

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### ABSTRACT

Information technology has been used increasingly to enhance the global competitiveness in various industries through the widespread application of cost effective e-Supply chain management (e-SCM). The advent of the Internet and electronic communication has enabled companies to be more responsive to their customers. Successful supply chain management requires a change from managing individual functions to integrating activities into the key supply chain process. The textile and garment industry stands out as one of the globalised industries in the world today that differs from buyer driven supply chains led by multinational companies. The garment industry is a supply driven commodity chain led by a combination of many stakeholders. Each plays an important role in a network of Supply chains which spans from fibres to yarn, to fabrics, to accessories, to garments, to trading and to marketing.

The supply chain of textile industry involves product design and development, material sourcing and product manufacturing, product distribution and retailing of products. The product design stage should involve customers in order to define and fulfill their requirements. The Supply chain that operates fluidly and benefits the entire value chain by speeding up communication between customers and their suppliers, improving service quality, and reducing costs. In this article, the authors aimed to address the issues and future directions to how well manage the supply chain in textile garment industry. The purpose of the study is to gain an understanding of the development of e-supply chain. This study specifically examines the issues arising from current supply chain practices and the coping strategies used to deal with the issues. The research is focused on survey method to collect participants' responses to two major questions as described in this paper and hypotheses are tested empirically and concluded with suggestions and recommendations managerial and research implications

### KEY WORDS

e-business, e-Supply chain management (e-SCM), Information Communication Technologies (ICT), Supply chain Collaboration (SCC), Textile garment Supply chain.

### 1. INTRODUCTION

The textile-garment Industry is a traditional industry, which lies upstream of Textile distribution and downstream from the clothing sector. The textile and clothing chain embraces several different sets of activities, occupations and roles. Information technology has dramatically and irreversibly altered the nature of supply chains. Successful information enriched e-supply chains must view their information as strategic asset and ensure that it flows with minimum delay and distortion. There are gains by moving from the traditional approach to modern collaborative and partnership approaches (Cox et al and Harland et al, 2001). They suggested that collaborative approaches in supply chain cover long term agreement, improved management capabilities, marketing advantage, improved technological capabilities lie between IT Services providers and the value chain partners and thus financial stability, lower inventories, secured supply, lower design cost, on-time delivery, improved quality, faster Product development and reduced total cost and increased profitability for all parties is achieved. Hugos (2002) reported that many companies employing SCM have continuously faced problems with its realization, although numerous solutions to these problems have been offered. These include the sharing of information with parties along the supply chain as well as the utilization of advancements in Information Technology (IT). In fact, the importance of in-depth knowledge of different e-business models and the Internet as tools of transforming SCM has been suggested. The below figure 1 is the frame work of e-SCM in textile garment industry.

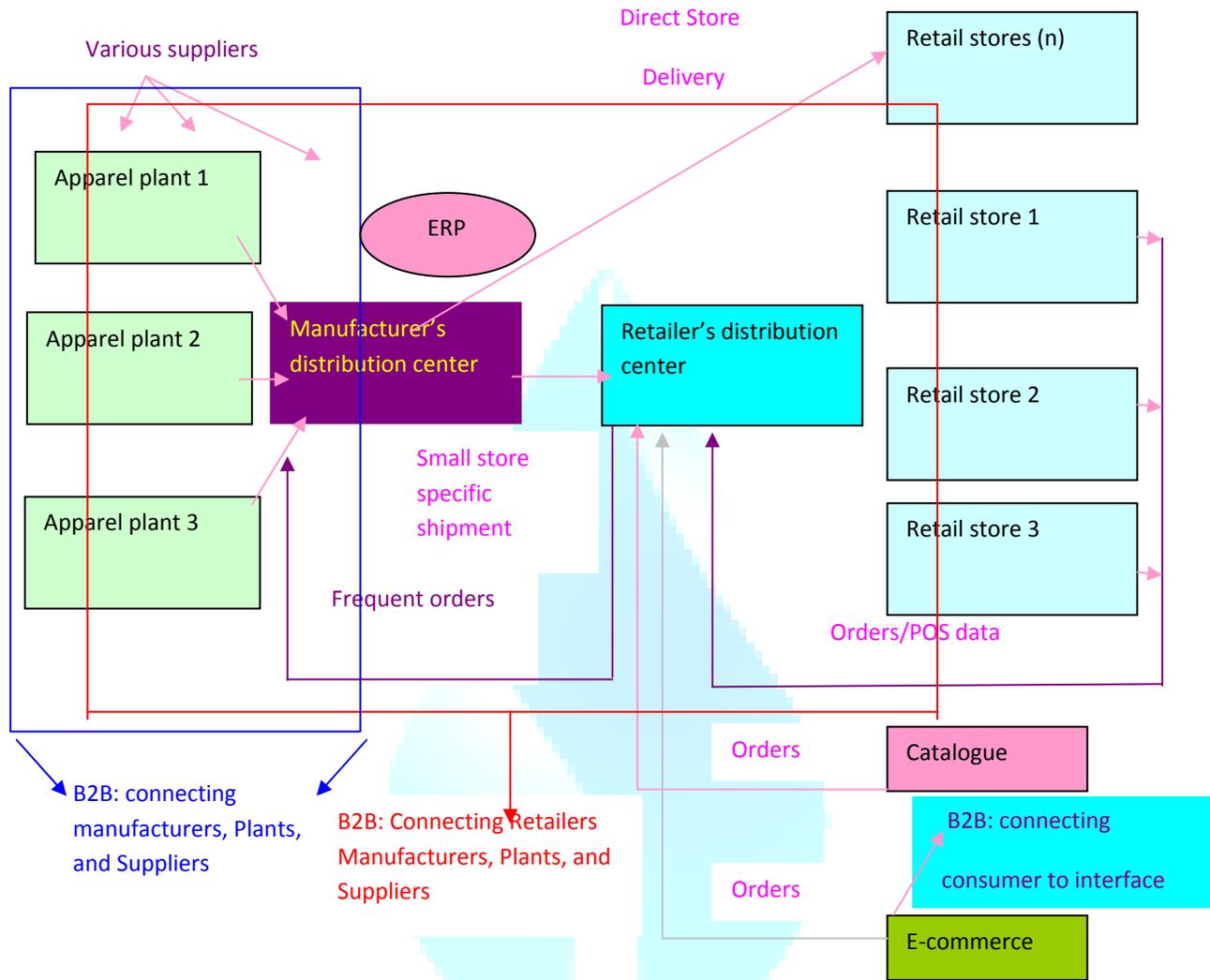


Figure 1: e-SCM Framework for Textile Garment industry  
Source: Author

The explosion of supply chain data created by information technology has created significant pressure on researchers to invent “e-business model. In this study, Four groups of key group success factors have mutually reinforced and accelerated each other’s growth in the intense pace of innovation in IT. The first group of assessment factors focuses on a growing awareness and intelligent technologies such as Extranet, EDI, ERP, EPOS, and Internet technologies to harvest customer insights. The second group includes the collaborative e-business models. The third group includes the cost competitive factors such as Price, Quality, Delivery performance, Service support and Information sharing with optimal Inventory levels. The fourth group includes the integration and coordination among the supply chain partners.

Third party logistics (3PL) are source of high complexity and high cost in the provision of customer service in the e-SCM system of Indian textile clothing industry. Efficient and effective collaboration is critical for the success of the soft goods supply chain. The recent explosion of e-SCM technologies is providing the platform for easier communication and collaboration among the entities in the chain from fiber supplier to retail store. For a successful e-supply chain collaborative effort, partner selection, knowledge of e-business, Information sharing is essential issues requiring resolution. Successful resolution of such issues involves the simultaneous consideration of a number of possibly conflicting criteria including both quantitative factors such as cost, inventory and lead-time and vague qualitative factors such as “quality”, “reliability” and “reputation”. Therefore it is significant to consider this research as to conceptualize e-SCM model which is significant to support collaborative efforts in the operations of textile garment companies across multiple tiers of the industry supply chain with the use of Internet technologies.

## 2. STATEMENT OF THE PROBLEM

### 2.1 PROBLEM DISCUSSION

This research attempted to investigate the interaction of supply chain and logistics with the Information Technology that could enable the network partners to make strategies to address the several business issues with regard to reducing demand error, lead-time, inventory, cost, and various supply chain risks from supply chain integration and collaboration.

As described in literature review, there is a gap in investigating the important issues that must be considered by Indian Textile and Garment companies seeking to transform their SCM and proceed into e-SCM. Organizations must have extensive knowledge of the processes of SCM as well as of the different types of e-business models. In addition, businesses must learn to identify the key success factors that contribute to a sound e-business model encompassing logistics outsourcing and strategic alliances and make use of them accordingly. Companies should be aware of the major shifts in business focus influenced by SCM and pay particular attention to the emphasis upon collaboration, customer focus, and customization of products/services. e-Business must create networks with other firms in ways allowing both sides to benefit as much as possible. As the digital era is constantly witnessing massive changes, e-business, especially over the Internet, should be considered increasingly otherwise it is difficult to sustain. Afuah and Tucci (2003).

The basic problem at suppliers through retailers in the supply chain is the difficulty in estimating the demand for textile-garment products as these vary widely on year-to-year basis and have limited shelf life and they cease to be of any value once the particular "Fashion Fad" is over. For regular goods, though the variation in styling is limited and shelf life of them is higher than fashion goods. It is relatively less risky in estimating demand but still greatly affected by seasons and colour of the fabric.

This product market structure is characterized by high over stocking (inventory) and under stocking cost. Overstocking cost is reflected in huge discounts offered by these companies to clear non-moving inventory. Under stocking is reflected in high cost of lost sales and the corresponding effect on customer satisfaction and brand loyalty.

Further the supply chain of garment exporters is characterized by high lead times and uncertainty due to lack of information flow about the final demand of the products (Faced by the foreign buyer). Supply chain collaborative activities are distributed across continents where the sourcing, manufacturing and final sales happen in different countries. This implies that within the supply network of textile garment industry suffers great volatility- bullwhip effect in SCM. Both integration and collaboration between the supply chain members and e-business models development are especially critical in e-SCM (Thomassey, Happiette and Castelain, 2005). This provides a fertile ground for this study.

Globalization has accelerated the application of e-supply chain management as a mechanism to enhance corporate performance. At the same time this rapid economic development has also accelerated the destruction of environmental and social conditions in these areas, and this has resulted in a lot of media and public attention. So, this study is designed to explore how the e-SCM can be helpful for supply chain integration and collaboration. This research may help textile-garment businesses to implement growth strategies, leverage technology and thrive through the power of collaboration.

There are no similar systematic studies conducted in India on the viability of e-SCM model in textile and garment industry subjected to many key successful factors of e-supply chain management. Thus the benefits of adopting the e-SCM models on many fronts of the business are not known when actually adopted by textile garment industry. Therefore the research question is set as to understand how Information Communication Technologies (ICT) are internet enabled, have helped Textile Garment manufacturers to adopt new e-SCM model for supply chain integration and collaboration. The study redefines by broadening the scope of e-supply chain management with EPOS implementation at the distribution level.

Based on the findings of the pilot study certain factors that influenced the performance of e-SCM and logistics management were identified. These included the competitive factors and key success factors under which the study was carried out and few additional factors such as "e-business model" and "supply chain integration factors, collaboration factors"

There is lack of clarity and inadequacy about the interaction of ICT technologies and organizations that need to focus to achieve better results. organizations use automated processes to support partnerships, integration and collaboration and it usually utilizes ICT and web-based technologies securely acquiring, distributing, and managing information. In fact, the more flexible an organization becomes, the more likely it is to effectively and efficiently responds to customers' needs and wants.

### 2.1.2. PURPOSE

The purpose of the study is to gain an understanding of the development of e-supply chain and logistics management of Indian textile garment manufacturing. This study specifically examines the issues arising from current supply chain practices and the coping strategies used to deal with the issues. The research is focused on participants' responses to two major questions: 1) How an e-SCM model can help Indian textile garment industry to gain competitive advantage, 2) How Information Technology could enable the network partners of supply chain and logistics management to make strategies to address the business issues

ICT and Electronic commerce application started in early 1970s, in the developed countries. However, the extent of the applications was limited to large corporations, financial institutions and few daring small businesses with such innovation as electronic fund transfers (EFT). Electronic commerce (EC), being a new field, is just developing its scientific foundations in Indian textile and garment industry and it is an interdisciplinary. The major disciplines of EC and ICT are marketing, computer sciences, consumer behavior, finance and economics. The simple framework of e-supply chain management, which provides an insight to the development of e-SCM model, is shown in figure below.

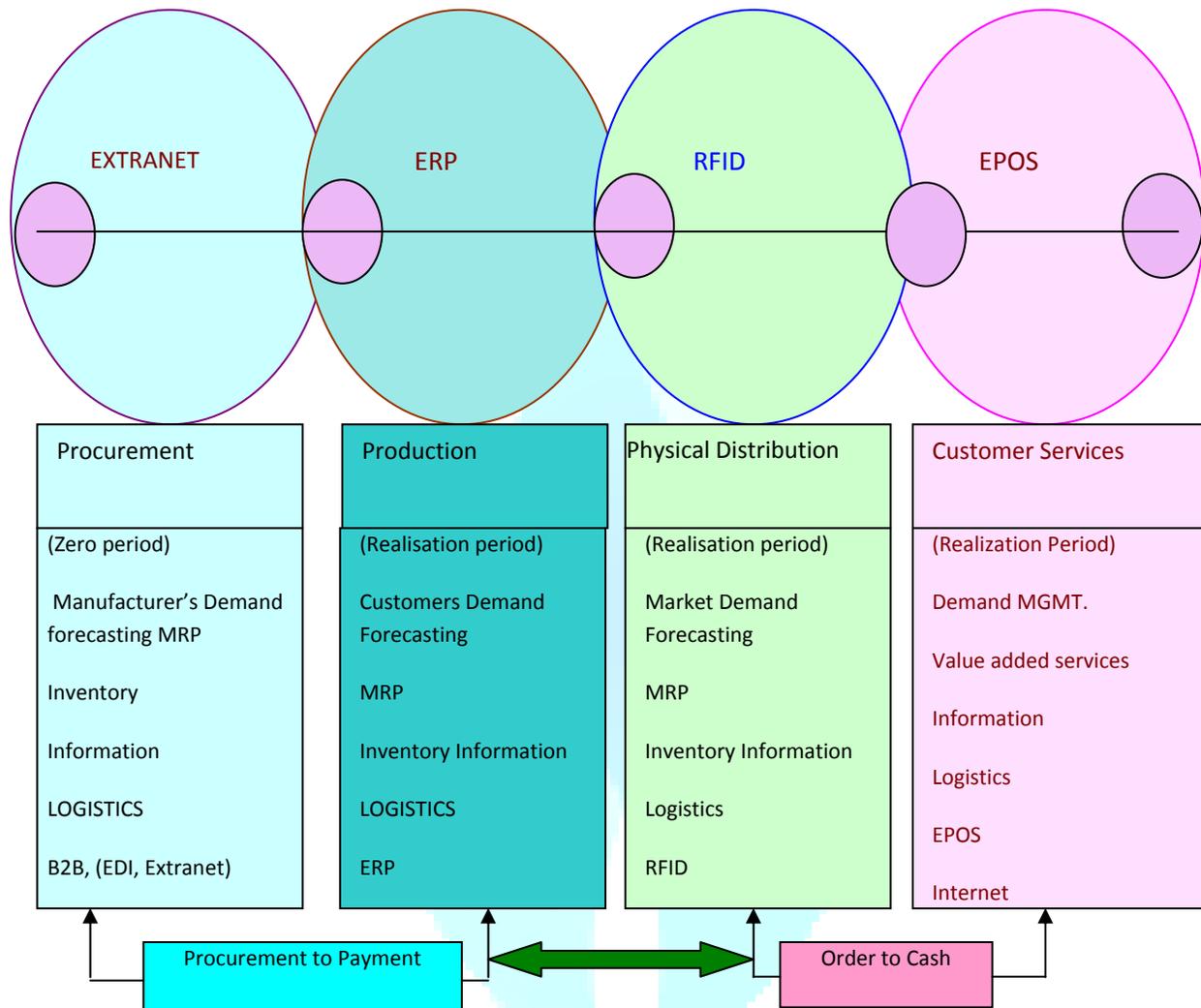


Figure 1.3: Framework of e-Supply chain management–Process and Technology Integration

Source: Author

The purpose, approach, methodology, analysis, and interpretation of the study need to be compatible to achieve a coherent account of this paper emphasizing e-SCM and logistics development and strategies for operational efficiency. These pieces are all interrelated aspects of the study and are now further outlined with following study objectives and hypotheses.

**2.2. OBJECTIVES**

- To understand the conceptual e-supply chain model for Textile-garment industry for supply chain collaborative strategies.
- To investigate how the Information Technology helped textile-garment industry for their operational efficiency.
- To evaluate the effect of electronic point of sales technology on textile-garment firms
- To analyze the level of integration and collaboration for development of e-business models.

**2.3. HYPOTHESES**

- H1: A greater integration among the stakeholders facilitates implementation of e-business.
- H2: Collaboration in the textile and garment industry has got higher potential for e- business investment
- H3: Point of Sales (POS) are highly effective for reducing the demand uncertainty (Bull whip)

**3. SURVEY OF LITERATURE**

**3.1 SUPPLY CHAIN**

**Turban et al. (2004)** According to him the supply chain of a business refers to the flow of materials, information, payments, and services from raw material suppliers, via factories and warehouses, to the end customers. A supply chain also includes the organizations and processes that create and deliver products, information, and services to the end customers. To manage the supply chain activities, organizations utilize SCM in order to plan, organize, and coordinate. Today the concept of SCM refers to a total systems approach to managing the entire supply chain. (Turban et al., 2004) As argued by Kumar (2001) and Vakharia (2002), SCM is usually supported by IT.

### 3.2 e-SUPPLY CHAIN

**Morgan Stanley, (2001).** According to studies conducted by Morgan Stanley, the topic of supply chain management was recently found to be the number one priority of chief information officers. In fact, when IT is employed and a supply chain is managed electronically, often with Web based software, it is referred to as an e-supply chain. The advent of e-commerce and increased pressure from stakeholders has created a more demanding landscape.

The term supply chain integration represents the synthesis of all process and activities in the complete manufacturing and distribution cycle—this includes everything from product design, material and component ordering, manufacturing and assembly, and warehousing and distribution, until the finished product reaches the end customers (Svensson, 2003; Morgan and Monczka, 2003; Croxton, Garcia Dastugue, Lambert, and Rogers, 2001). This implies that conventional operational procedures are no longer suitable for the new business models. Supply chain organizations need to re-evaluate the totality of everything they do if they want to remain competitive (Fawcett and Magnan, 2001). New and e-business designs have to be carried out to match the new business model (Porter and VanDerLinde, (1995). The role of ICT technologies and type of information sharing and e-business models are important to transform the current supply chain practices.

**Stewart (1995)** according to him the supply-chain consists of the logistical and informational elements extending from the demands of the marketplace at one end to the specific product/service delivery to the customer at the other. The integrated supply-chain structure seeks to minimize non-value added activities and their associated structures. This drives investment cost, operating cost and time out of the supply-chain process.

### 3.3. Supply chain collaboration and Information sharing.

**Lee, Padmanabhan and Whang (1997)** in their study the benefit from collaboration is best illustrated by common phenomena observed when no collaboration and information sharing takes place in the supply chain. This often results in the distortion of information as it moves upstream through a supply chain from the customer to the raw materials supplier. Time delays in ordering and shipping materials – and failure of decision makers to consider these time delays – cause order variability to increase as one moves upstream in a supply chain. This phenomenon, called the “bullwhip effect”, is extensively documented based on industry data and manufacturing supply chain simulation models.

**Mentzer et al. (2000)** they set the baseline for research in supply chain collaboration by suggesting the following definition of collaboration based on the consensus view of research participants.

“Collaboration means that companies involved are working together to meet one common objective. Collaboration is characterized by the sharing of information, knowledge, risk and profits.”

**Donald Bowersox et al. (2000)** they reported that Collaboration allows companies either by verbal or contractual agreements with third party logistics services provider (3PL) to mutually determine how to synchronize product flows, reduce inefficiencies, or share the mutual value created. Collaboration coordinates the dependency of transferring physical goods from one place to another. It is a “higher” level coordination activity than information sharing and workflow coordination due to added complexity of managing products. It includes tasks such as joint planning, forecasting and running replenishment operations

**Fred Kuglin and Rosenbaum (2001)** identified the six-step process defines the collaborative process with each supplier as presented below:

1. The supplier generates a statistical forecast and new product introduction information and sends it to the retailer.
2. The retailer reviews the demand forecast and exceptions. At this point, the retailer can see new product introductions and supply-demand mismatches.
3. The retailer modifies or updates the forecasts and sends them back to the supplier. Here the retailer indicates, for example, where higher than anticipated demand due to promotions are expected.
4. The seller sends back the supply-plan information and offers alternatives for exceptions. The supplier has completed the demand/supply matching process and is able to report what it is able to produce and deliver.
5. The retailer reviews the supply-plan and looks for exceptions.
6. The retailer sends back the updated demand information. If there are items that cannot be supplied, the retailer has the option to update the demand information and order substitute products. These steps helped to understand the importance of e- business model and frameworks.

### 3.4 e- Business Models

**Shin et al. (1998)** they reported that the explosive transformation of consumer demand is driving complexity and cost into the supply chain at exactly the same time retailers and their consumer package partners need to invest more in meeting consumer needs. On one hand, these executives are faced with a consumer base that is demanding more. On the other hand outdated supply chain models that already have trouble keeping up hinder them. To meet these challenges, industry leaders are beginning to build specialized supply chain models that are fast, responsive, low cost-all with a laser focus on meeting consumer demands. But as many are discovering, that’s often easier said than done. Initiatives such as Global Data Synchronization, Collaborative Planning Forecasting and Replenishment (CPFR) and Radio Frequency Identification (RFID) compete for attention and cloud the central question which investments will deliver the most tactical benefit—and position us for a long-term competitive advantage and ROI.

**Mecker S.S. (1999)** reported that the leading ERP software is SAP R/3, but companies such as Oracle, J.D. Edwards, Computer Associates and others develop highly successful systems as well. In contrast, SCM software is specifically designed to improve decision-making along the supply chain. The data collected on the use of ERP software can be used as input data for analysis done with SCM software, hence their complementary nature. In addition to IT systems, knowledge of e-business models, e-commerce and the opportunities made available by the

Internet can help organizations to transform and improve their SCM. In fact, e-commerce is emerging as an excellent tool for providing solutions to problems along the supply chain. Today, many activities along the chain can be conducted as part of an EC initiative.

**POIRIER, C. et al. (2000)**, reported that the spinning industry, knitting and weaving mills, and apparel industry can share sales information through EPOS system. It eventually leads to low prices for consumers by decreasing inventory and maintaining proper level of production across the whole supply chain. To integrate SCM effectively, we need to utilize and incorporate QR technologies such as EDI (electronic data interchange), EPOS (electronic point of sales), EOS (electronic order system), CAD (computer-aided design) and CAM (computer-aided manufacturing). Among them, EPOS is one of the most fundamental and valuable information technologies to promote SCM in a practical sense.

### 3.5 LOGISTICS IN SCM

Logistics is an integral part of supply chain management. In recent years there has been a surge of academic interest and publications in the area of third party logistics (3PL). This can be partly explained by the growing trend of outsourcing logistics activities in a wide variety of industrial sectors (Transport Intelligence, 2004). The continuing wave of consolidation within the 3PL industry has also resulted in the emergence of large companies that have the capabilities to offer sophisticated logistics solutions on a continental or even global scale. Such logistics service providers (LSPs) strive to assume a more strategic role within the supply chain of clients, expanding their scale and scope of operations. Despite the growing interest in 3PL, the literature on this area appears to be disjointed. Based on an extensive literature review, these points out opportunities for further research.

## 4. RESEARCH DESIGN

Research Design envisaged collection of structured data from textile garment manufacturing organizations in Bangalore, which have the practices of supply chain and logistic management. The data thus collected was to be used to test the research hypotheses by an appropriate statistical analysis.

### 4.1 PILOT STUDY

Pilot study was under taken to serve as a preparatory to the main study. With open ended questions. The discussion was held with the supply chain managers in large-scale textile garment companies and the study revealed the difficulties in obtaining data in Indian condition on certain aspects such as manufacturing lead times details of competitors and rejection / rework details, logistic details, inventory details and IT architecture. Most of the supply chain managers expressed their inability to provide the information in detail. However, supply chain manager were comfortable in providing their perceptions on various matters of e-SCM, as they would not be parting with confidential data. Additionally the role of supply chain managers has been viewed as one of the staff functions to create a conducive environment for pestering improvement. The open ended questions used in pilot study are not shown in this paper. On the basis of responses to the questions used in pilot study and the gap in literature, the Interview schedule (instrument for data collection) was prepared for the main study.

### 4.2 SAMPLING DESIGN

The check sampling method was chosen on account of its aptness in exploratory studies. In this method, the sample was chosen based on non-probability and specific criteria. Sample is selected by contacting Apparel Export Promotion Council (AEPC). The list of textile-garment manufacturing units operating in Bangalore in the state of Karnataka, India was obtained since it was a difficult task to estimate the number of existing textile garment manufacturing units. Although it was roughly estimated to about 2500 units by the year 2008. All these units are not independent but operating in a group therefore sample textile garment manufacturers and exporting units were chosen based on non probability and specific criteria.

Considering the specific criteria such as large, medium and small scale organizations and combination of so many other factors viz., numbers of employees, level of integration in the business, turnover, e-business facilities for transactions and finally, the convenience to access the sample units are selected.

The interviews and discussions were clearly focused on the supply chain issues and related problems in sample textile garment units located in Bangalore as discussed in the statement of the problem

Out of 60 sample units 22 are the large-scale textile garment manufacturers which are vertically integrated and have made substantial investment on e- business technology and their turnover exceeds US\$1000 million per year and workforce including administrative staff is more than 1000 employees and these companies are all located in different location of the city limits but are all convenient to access. Remaining 26 sample units are medium scale organizations which are partially integrated and their turnover is around US\$ 500 to 750 million per year and number of employees 300 to 600. Remaining 12 sample units are small scale units which are having less than 300 employees. In small scale companies e-Business initiatives are moderate and the turnover is around US\$ 250 million.

### 4.3 DESCRIPTIVE STUDY

The Descriptive study involved collecting the data for carrying out the Hypotheses Testing. A structured interview schedule was developed to collect data on key success factors, identified on the basis of gap in the literature and from the insight provided by pilot study and finally about the experiences of representative sample personnel (respondents) (supply chain managers and production managers and purchasing managers) involved in the survey.

### 4.4 PRIMARY DATA

Primary data was collected through well administered, pre-tested Interview schedule the respondents were consulted by person with the prior appointment. The data is collected for all the five sections of interview schedule covering different areas such as basic information about textile garment companies, Information Communication Technology (ICT), Enterprises Resources Planning (ERP) benefits, EPOS utilization, Cost competitiveness, Collaborative management of Textile garments manufacturers and exporters.

### 4.5 SECONDARY DATA

The secondary data is collected from the sources like published books/ journals/ annual reports of the textile garment companies which are published in the company's websites.

#### 4.6 IDENTIFICATION OF GROUPS OF KEY SUCCESS FACTORS (KSF)

In this study, four groups of key success factors have mutually reinforced and accelerated each other's growth in the intense pace of innovation in Information Technology (IT) and the data is collected on all the four groups, to conceptualize the e-SCM model. The first group of assessment factors focuses on a growing awareness and utilization of intelligent technologies such as Extranet, EDI, ERP, EPOS, and Web technologies to share information and to harvest customer insights.

The Second group includes the collaborative e-business model covering the various types of information such as supply planning Information, demand planning information, production planning information, inventory planning information and human resource planning information.

The third group includes the cost competitive factors such as product price, product quality, delivery performance, Management support, service support and information sharing with optimal inventory levels.

The fourth group includes the integration strategies and collaboration strategies among the supply chain partners for cost competitiveness.

#### 4.7 ANALYTICAL TECHNIQUES EMPLOYED

The analysis is carried out in a two phases. The first phase included the analysis of basic information of the textile-garment industry in the study region as a whole relating to size and scale of operation, workforce and type of market focused and Usage of Information Communication Technology. Statistical values such as percentage, mean and standard deviation are calculated for the required parameters.

In second phase all the four hypotheses are tested using Z-test and t-test to identify the significant difference with respect to the e-SCM factors such as Collaboration and IT implementation.

### 5. DATA ANALYSIS, FINDINGS AND SUGGESTIONS- I PHASE OF ANALYSIS

(Table: 1 Basic information of Indian textile garment industry)

Basic information	No. of respondents	Respondents (%)
Multi plant business	17	28
Single plant	43	72
Domestic & International market focus	41	68
Purely international market focus	19	32
Supply chain managers as respondents	27	45
Production managers as respondents	9	15
Purchasing managers as respondents	24	40
Presence of SCM policy	55	92
Absence of SCM policy	5	8
ERP implemented	11	18
ERP not implemented	49	82
Plan to implement with in 2years now	17	35
Plan to implement after 3 years	32	65
Top level management is highly committed and supportive for implementation of ERP	45	76

Source: field survey

It is found that 28 percent of the textile garment manufacturers and exporters are possessing multi-plant business in Bangalore remaining 72 percent of the industry are possessing single plant business.

It is interpreted that small scale companies are much located in Bangalore and around Bangalore than that of large scale textile garment manufacturing and exporters. The textile garment industry consists of large number of single plant businesses than that of multi plant business. Multi plant business firms will have complex organizational structure. The decision making process is slow in case of multi plant firms. The revenue and profit will be more for such multi plant firms when compared to the single plant firms.

While conducting in the interview, 45 percent of the supply chain managers are consulted for collecting the data. Remaining 40 percent and 15 percent are purchase managers and production managers respectively. The large-scale organizations have designated their executive as Supply chain manager, but in medium and small-scale sample units there are no such designated supply chain managers instead they are designated as Purchase manager or Production manager. Their responsibility lies in coordinating with supply chain activities.

There are a total of 68 percent of the sample textile garment units are focusing on both domestic and export markets. The remaining 32 percent of the sample garment units are focusing only on export markets they are called as Export Oriented Units (EOU).

The risk level is highest for export oriented units in terms of transportation, demand planning, logistics, inventory management, overseas risk such as foreign exchange risk when compared to domestically served companies. The companies serving both the markets have limited these above said risk by focusing more on domestic markets and their market share is usually high.

There are only 18 percent of the sample textile garments manufacturers who have implemented the customized Enterprise Resource Planning (ERP) software in their manufacturing plants to integrate internally and externally. Remaining 82 percent of the sample units have not implemented

Among 82 percent of the non-implemented sample textile garment manufacturers, 28 percent are having plan to implement ERP with in next two years. Remaining 72 percent said that they would have to plan after minimum period of three years. They quoted the reason that the year 2007 and 2008 witnessed the global financial crunch, because of that they are delaying the ERP implementation. The ERP family actually consists of Enterprise Planning, Supervisory Control, Supply-Chain Management, Execution Systems, Maintenance Management, Planning, Scheduling, Warehouse Management and Decision Support. Some have not implemented yet because today available ERP packages may not be

so compatible with other web based technologies. Therefore some of the software packages need to be evolved to fit into the requirement of customer. Middleware and distributed technologies are yet to see their final destination. The textile garment companies are unconvinced about IT investment because of recession started in the early 2007. And many felt that Business Process Re-Engineering (BPR) the firm is an alternative to the implementation of ERP.

It is found that 76 percent of the textile garment manufacturers are having highly committed and supportive management for ERP implementation. And 24 percent of the sample units are not keen and supportive on ERP implementation immediately.

The project team needs to make many decisions, and make them very quickly, which have significant impact on the organization. They need authority to execute this responsibility, just as you want your best managers to actively participate on the project team. Supply chain managers of the textile garment companies should be given more authority. This puts a premium on effective leadership and team-building skills. Senior management should recognize this issue and provide the necessary support on a continuing basis. In the industry lot of potentiality is there for ERP implementation. Over period of time after realizing the benefits from ERP implementation made by early adopters, other organizations may support to implement ERP.

**5.1 Utilization Level and Satisfaction from EPOS**

The Tables 1 and 2 below show that the level of utilization and satisfaction on the effect of EPOS by the introduced period, the firms that have introduced the EPOS system for a longer period (more than three years) are more satisfied with the increase in turnover of merchandise (p<.05), analysis and management on price analysis (p<.001) and the effective personnel arrangement and operations (p<.01).

**Table: 1. Utilization level of EPOS system**

Level	Utilization level of EPOS	Introduced period		t-Value
		Under 3 years	Over 3 years	
1 <sup>st</sup>	Check on over-stocked and out-of stock items	4.30	4.75	-1.45
	Remove rarely demanded merchandise	3.44	3.71	-0.76
	Identify store where specific brand sells well	4.44	4.46	-0.05
	Identify sales trend by items	4.18	4.56	-0.96
	Adjust inventories among stores	3.70	4.39	-1.79*
	Identify fast/slow merchandise	4.18	4.26	-0.31
2 <sup>nd</sup>	Check optimal level of inventory	3.90	4.21	-1.05
	Price analysis	4.0	3.37	1.88*
	Analysis on weekly sales trend	4.45	4.53	-0.31
	Merchandise planning	3.50	3.86	-0.82
3 <sup>rd</sup>	Automatic ordering and inventory management	2.90	2.84	0.13
4 <sup>th</sup>	Analysis on trend of customers	2.70	2.42	0.54

Source: field survey \*p<.05; (1- Never satisfied, 5-Always satisfied)

**Table: 2. Degree of satisfaction from EPOS implementation.**

Effect of EPOS	Introduced period		t-Value
	Under 3 years	Over 3 years	
<b>Effect in apparel merchandising</b>			
Quick evaluation on new merchandise	4.36	4.31	0.18
Improved logistics in warehousing and delivering	4.09	3.96	0.42
Increases in turnover of merchandise	3.33	4.13	-2.02*
Merchandise development based on the needs of customers and checking out-of-stock items.	3.66	4.03	-1.09
Analysis and management on price analysis	3.16	4.17	-3.58 <sup>†</sup>
Increased accuracy in production planning due to accurate sales information	3.33	3.78	-1.30
Maintaining optimal level of inventory	3.16	3.60	-1.24
Identify purchasing trends of customer and making loyal customers	3.50	3.69	-0.76
Reduce market survey expenses	2.63	3.00	-1.02
Build proper advertisement strategy through casual analysis	3.11	2.66	1.17
<b>Effect in store operation</b>			
Speedy information on current sales statistics	4.50	4.39	0.31
Automatic checking on inventory stocks	4.00	4.30	-1.15
Improved merchandise display layout throughout differentiation of popular and unpopular merchandise.	3.83	4.17	-1.21
Effective personnel arrangement and operations	2.66	3.43	-2.66**

\*p<.05; \*\*p<.01; <sup>†</sup>p <.0001

Source: field survey

**5.1.1 SIZE OF THE FIRM**

**Number of employees in company:**

Table.3 below shows that firms with more than 1000 employees effectively utilize the POS system at the third level, automatic ordering and inventory management (p<.05). When investigating the satisfaction on the effect of the POS system by the number of employees, firms with more than 1000 employees are more satisfied with the POS system in gaining speedy information on the current sales statistics (p<.05).

Table 3. Utilization level of EPOS system by firm size.

Level	Utilization Level of EPOS	Number of Workforce			Annual Sales		
		<1000	>1000	t-Value	<1000mn USD	>1000mn USD	t-value
1 <sup>st</sup>	Check on over-stocked and out-of stock items	4.68	4.57	0.49	4.73	4.52	0.99
	Remove rarely demanded merchandise	3.78	3.65	0.41	3.77	3.63	0.46
	Identify store where specific brand sells well	4.26	4.60	-1.21	4.27	4.63	-1.34
	Identify sales trend by items	4.64	4.37	1.05	4.45	4.50	-0.19
	Adjust inventories among stores	4.26	4.23	0.13	4.22	4.26	-0.14
	Identify fast/slow merchandise	4.41	4.18	0.96	4.20	4.33	-0.57
	Average	4.28	4.28	0.02	4.25	4.30	-0.32
2 <sup>nd</sup>	Check optimal level of inventory	4.26	4.4	0.57	4.16	4.17	-0.02
	Price analysis	3.50	3.70	-0.65	3.42	3.79	-1.24
	Analysis on weekly sales trend	4.47	4.48	-0.04	4.55	4.41	0.59
	Merchandise planning	3.94	3.76	0.45	3.73	3.91	-0.48
	Average	4.00	3.97	0.16	3.89	4.04	-0.83
3 <sup>rd</sup>	Automatic ordering and inventory management	2.21	3.16	-2.41*	2.26	3.17	-2.31*
4 <sup>th</sup>	Analysis on trend of customers	2.20	2.69	-1.53	2.22	2.73	-1.67

Source: field survey \*p<.05 (1-Never Satisfied,2-hardly ever,3-sometimes,4-Often,5-Always satisfied)

5.1.2 ANNUAL SALES

Firms with more than 1000 million USD in sales are also well utilizing the POS system in automatic ordering and inventory management (p<.05) (see Table 3). When investigating the satisfaction on the effect of the POS system according to annual sales, the firms that have more than 1000 million USD in sales are more satisfied with the POS system in merchandise development based on the needs of customers and checking out-of-stock items (p<.05), reduction of market survey expenses (p<.05), building the proper advertisement strategy through the causal analysis (p<.001), improved logistics in warehousing and delivering (p<.01), quick evaluation on new merchandise (p<.05), and speedy information on the current sales statistics (p<.05) (see Table 4).

Table 4. Degree of Satisfaction of EPOS system by firm size

Effect of EPOS	Number of Workforce			Annual Sales		
	<1000	>1000	t-Value	<1000mn USD	>1000mnUSD	t-value
<b>Effect in merchandise planning</b>						
Quick evaluation on new merchandise	4.37	4.29	0.31	4.10	4.50	-1.68*
Improved logistics in warehousing and delivering	3.81	4.11	-1.16	3.63	4.29	-2.84**
Increase in turnover of merchandise	3.93	3.94	-0.02	3.77	4.14	-1.12
Merchandise development based on needs of customers and checking out-of-stock items	3.94	3.92	0.04	3.55	4.25	-2.38
Analysis and management of price analysis	4.06	3.70	1.37	4.05	3.64	1.57
Increased accuracy in production planning due to accurate sales information	3.66	3.70	-0.14	3.55	3.85	-1.15
Maintaining optimal level of inventory.	3.60	3.52	0.25	3.38	3.78	-1.49
Identifying purchasing trends of customer and making loyal customers	3.46	3.58	-0.50	3.66	3.35	1.30
Reducing market survey expenses.	2.85	2.92	-0.21	2.61	3.13	-1.74*
Building proper advertisement strategy	2.46	2.92	-1.39	2.18	3.18	-3.58***
<b>Effect in store operation</b>						
Speedy information on current sales statistics	4.13	4.58	-1.88*	4.16	4.64	-1.97*
Automatic checking on inventory stocks	4.20	4.23	-0.16	4.11	4.35	-1.14
Improved merchandise display layout through differentiation of popular and unpopular merchandise	4.06	4.11	-0.24	4.05	4.14	-0.41
Effective personnel arrange and operations	3.26	3.23	-0.12	3.27	3.21	0.26

Source: field survey \*p<.05; \*\*p<.01;\*\*\*p<.001 (1- Never satisfied 2- hardly ever,3-sometimes,4- often,5- always satisfied)

5.1.3 USER DEPARTMENT

Merchandising departments are utilizing the POS system in identifying sales trend by items (p<.05), early identification of fast/slow merchandise (p<.05), merchandise planning (order quantity, merchandise portfolio, size and color analysis) (p<.01) is better in the merchandising department than the sales (distribution) department (see Table 5).

Table 5. Utilization level of EPOS at user department

Level	Utilization level of EPOS	User department	t-Value

		Merchandising	Sales	
1 <sup>st</sup>	Check on over-stocked and out-of stock items	4.68	4.55	0.60
	Remove rarely demanded merchandise	3.61	3.78	-0.56
	Identify store where specific brand sells well	4.47	4.47	0.00
	Identify sales trend by items	4.70	4.20	2.05*
	Adjust inventories among stores	4.19	4.30	-0.41
	Identify fast/slow merchandise	4.45	4.05	1.82*
2 <sup>nd</sup>	Check optimal level of inventory	4.04	4.30	-1.00
	Price analysis	3.78	3.45	1.11
	Analysis on weekly sales trend	4.50	4.45	0.22
	Merchandise planning	4.29	3.26	3.07**
3 <sup>rd</sup>	Automatic ordering and inventory management	2.85	2.77	0.17
4 <sup>th</sup>	Analysis on trend of customers	2.47	2.55	-0.23

Source: field survey \*p<.05; \*\*p<.01 (1- Never satisfied 2- hardly ever, 3-sometimes, 4- often,5- always satisfied)

As for the satisfaction on the effect of the EPOS system according to user departments, the merchandising department is more satisfied with reducing market survey expenses (p<.05), and the quick evaluation on new merchandise (p<.05) (see the below table.6)

**Table 6. Degree of satisfaction from EPOS implementation in user department**

Effect of EPOS	User department		t-Value
	Merchandising	Sales	
<b>Effect in apparel merchandising</b>			
Quick evaluation on new merchandise	4.50	4.10	1.68*
Improved logistics in warehousing and delivering	4.04	3.95	0.37
Increase in turnover of merchandise	4.07	3.83	0.72
Merchandise development based on the needs of customers and checking out-of-stock items.	4.37	3.40	3.55
Analysis and management on price analysis	3.85	3.88	-0.11
Increased accuracy in production planning due to accurate sales information	3.78	3.61	0.65
Maintaining optimal level of inventory	3.57	3.55	0.05
Identify purchasing trends of customer and making loyal customers	3.42	3.61	-0.75
Reduce market survey expenses	3.14	2.63	1.70*
Build proper advertisement strategy through casual analysis	2.95	2.52	1.35
<b>Effect in store operation</b>			
Speedy information on current sales statistics	4.28	4.44	-0.62
Automatic checking on inventory stocks	4.21	4.22	-0.03
Improved merchandise display layout throughout differentiation of popular and unpopular merchandise.	4.00	4.16	-0.79
Effective personnel arrangement and operations	3.14	3.33	-0.79

Source: field survey, \*p<.05 (1- Never satisfied 2- hardly ever,3-sometimes,4- often,5- always satisfied)

From the above table 5, it is found that sample textile garment units utilize the Electronic Point of sales Data maximally for checking on overstock and out of stock items and followed by for identifying retail store where specific brand sells well. Sample units also use EPOS much for merchandise planning and to adjust inventories among stores but minimally used for automatic ordering and inventory management and for analyzing weekly sales trend. It is interpreted that EPOS data is real time data that can be shared among stakeholders such as retailers and manufacturers and other intermediaries to ensure the increase of supply chain profit by synchronizing demand with supply along the aggregate planning of supply chain. It is thus effective and efficient in managing the flow of merchandise information.

From table 1 and 2, the Textile garment firms that have introduced the EPOS system for a longer period (more than 3 years) better utilize the EPOS system for adjusting imbalanced inventories among the stores at the first level and for price analysis at the second level than those introduced for a shorter period. On the satisfaction on the effects of the EPOS system, longer-introduced firms are significantly more satisfied with the increased turnover of merchandise, analysis and management on price zone, and the effective personnel arrangement and operation.

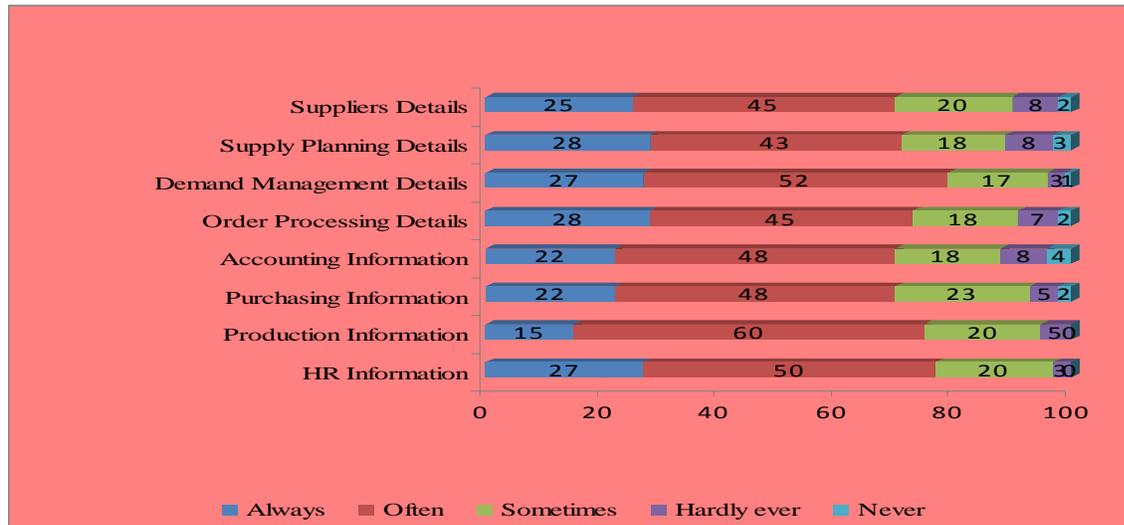
When reviewing the utilization levels of the EPOS system according to the size of company, the bigger firms, both in terms of the number of employees and the volume of annual sales, significantly better utilize the EPOS system for automatic ordering and inventory management at the third level. Concerning the effects on merchandise planning, the bigger firms in terms of annual sales are significantly more satisfied with proper advertisement strategy, improved logistics in warehousing and delivering, merchandise development based on the needs of customers, reduction in the market survey expenses, and the quick evaluation on new merchandise. As to store operations, the bigger firms in both the number of employees and annual sales terms showed more satisfaction with the provision of speedy information on the current sales statistics.

For the user department, the merchandising departments are better utilizing the EPOS system to identify sales trend by items and fast/slow merchandise, and for merchandise portfolio planning than the sales department. Also, the merchandising departments are more satisfied with the effects on reducing market survey expenses and quick evaluation on new merchandise. Therefore, the merchandising department seems to be more sensitively coping with the response and flow of consumers on the new merchandise and adjusting the direction of merchandise portfolio through the sales analysis. As a whole, the firms that have introduced the EPOS system utilize it very well at the first and second levels, but not at the third or fourth levels. Also, firms showed high satisfaction on most of the effects of the EPOS system.

It is found that 40 percent of the sample textile garment manufacturers have adopted Electronic Point of Sales (EPOS) in their vertically integrated apparel retail stores. Remaining 70 percent are not yet adopted the EPOS. This EPOS system places an important role as a base in each stage of Quick Response (QR) technology to manage sales electronically by scanning source-marked items. Therefore the prerequisite condition for EPOS implementation is of the standard barcode in the whole of textile garment industry.

Most of the supply chain managers opined that EPOS system data is used by many of their user departments for effective and efficient production and merchandise planning. The sales on a daily or weekly basis using the EPOS sales data, and can execute EOS in order to replenish the store inventory automatically.

Chart. 1. Type and level of information sharing across the multi-plants of the firm.



Source: field survey

It is found that demand management information is utilized much in e-supply chain (79%), followed by human resource information with 77 percent usage, and others are production information with 75 percent, order-processing details with 73 percent. Remaining are not much shared across organization which are less than 70 percent such as suppliers details and etc.

It is interpreted that information is an important driver that textile-garment companies have used to become both more efficient and more responsive. Here the key decision is made to invest more on most valuable information system in reducing the cost and improving responsiveness with in supply chain. It depends on Supply chain structure and market segments served. Textile garment companies serve overseas segments that require customized apparels that carry a premium price tag. These companies invest more on information system allowing them to respond more quickly to their customer.

Effectively integrating the information and material flows within the demand and supply process is what Supply Chain Management is all about. In most companies, however, two major and very interdependent issues must be simultaneously addressed. The first deals with delivering products with customer-acceptable quality, with very short lead times, at a customer-acceptable cost - while keeping inventories throughout the supply chain at a minimum. The second issue, which tends to be less understood and accepted, is the need for high quality, relevant and timely information that is provided when it needs to be known. For many customers and manufacturers, business processes and support systems will not measure up to the task of quickly providing planning and execution information from the marketplace to production and onto vendors so that the customer’s objectives are consistently met. The fact is, most information supplied is excessive, often late and frequently inaccurate.

**5.2 II PHASE OF ANALYSIS- HYPOTHESIS TESTING**

The hypotheses generated in respect of the factors and the variable that influence on e- business model are tested using decision rule adopted for accepting the research hypothesis or to reject the null hypothesis. In the present study the qualitative characteristics of the items are collaboration and Integration which are facilitating the e-business model for competitive advantage. Sampling theory helps in making generalization about the industry from specific conditions of the industry. The statistics of the attributes are obtained in the form of two groups. One group consisting of items where in attribute is highly scored( successful organization) and the other group consisting of items where an attribute is low scored (unsuccessful organization). By evaluating scale statement of hypothesis, here the data from the bottom 25 percent of the distribution (low total score group) and the top 25 percent (high total score group) are taken into consideration. The remaining 50 percent of the middle of the distribution is not considered for this analysis.

Taking the null hypotheses (Ho): that the means of high score group and low score group on accepting hypothesis is equal.

$$H_0: \bar{X}_H = \bar{X}_L \quad \text{..... Eq. 1}$$

$$H_a: \bar{X}_H \neq \bar{X}_L \quad \text{..... Eq. 2}$$

Assuming, sample follows the normal distribution. It can work out the test statistics Z-statistics as under:

**5.2.1. Z-TEST**

$$z = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\sum (X_H - \bar{X}_H)^2 + \sum (X_L - \bar{X}_L)^2}{n_1 + n_2 - 2}}} \times \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \quad \text{---Eq. 3}$$

Z-test is used to prove the hypothesis where sample size is 60 textile garment companies' respondents. This Z-test formula is used to prove the first, second and fourth hypothesis of the present study.

Where  $\bar{X}_H$  = Mean responses of High scored group  
 $\bar{X}_L$  = Mean responses low scored group  
 n1 & n2 = Sample sizes in each group

**5.2.3. t-Test**

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{(n_1 - 1)\sigma_{s_1}^2 + (n_2 - 1)\sigma_{s_2}^2}{n_1 + n_2 - 2}}} \times \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \quad \text{---- Eq. 4}$$

Where  $\bar{X}_1$  = is sample mean response for large scale companies (>1000 employees)  
 $\bar{X}_2$  = is sample mean response of small scale companies (<1000 employees)  
 n<sub>1</sub> = Sample size of large scale companies  
 n<sub>2</sub> = Sample size of small scale companies.

$\sigma_{s_1} \sigma_{s_2}$  : Are the standard deviations for large and small-scale firms  
 @ 5 % level of significance

This t-test is used to prove the third hypothesis of the present study H3 as the sample is less than 30 in the first group.

**5.3. SUMMARY OF EMPIRICAL FINDINGS**

**Table: 7. Results of Hypothesis testing**

Hypothesis	Tests	Criterion/table value	Calculated	Result
Hypothesis 1	Z-test	1.96	0.73	Accept Ho/Reject Ha
Hypothesis 2	Z-test	1.96	1.06	Accept Ho/Reject Ha
Hypothesis 3	t-test	1.75	0.086	Accept Ho/Reject Ha

Source: field survey

**Analysis and Interpretation:** From the above summarized table it is found that the hypothesis H1, H2 and H3 are having no significant difference at 5% level of significance between high total score group and low total score group of sample of 60 textile garment units in Bangalore city. Therefore the hypothetical statements H1, H2 and H3 are not the good discriminator between the two different groups. Large scale organization having more than 1000 employees and small scale organization having less than 1000 employees are not differed significantly that means both the groups accepted the statement favorably that " that "Point of Sales (EPOS) are highly effective for reducing the demand uncertainty (Bull whip)"

**6. DISCUSSION OF FINDINGS**

**HYPOTHESIS 1**

The calculated values are compared with the criterion, 1.96. It is found that calculated value is less than the criterion at 5 % level of significance and decided to accept the null hypothesis that means there is no significant difference between the groups in accepting the statement that "A greater integration among the stakeholders facilitates implementation of e-business.". D' Amours *et al*, (1999) in their study, several modern practices (e-business market exchanges, e-collaborative market places and reduction of risk and digital business design.) these have been shown into be closely related to effective and efficient supply chain performances to gain competitive advantage. Since digital business design is expected to have significant influence on modern business practice as it is still in infancy stage in the industry,

**HYPOTHESIS 2**

The calculated values are compared with the criterion, 1.96. It is found that calculated value is less than the criterion at 5 % level of significance and decided to accept the null hypothesis that means there is no significant difference between the groups in accepting the statement that "Collaboration in the textile and garment industry has got higher potential for e- business investment". (Lee and Billington, 1992, 1993; Christopher, 1992b) emphasized the importance of system-wide collaboration of both physical and information flows: information is considered as a vital means to provide all the actors with the appropriate feedback and to drive their behaviour.

**HYPOTHESIS 3**

The calculated values are compared with the criterion 1.75. It is found that calculated value (0.086) is less than the criterion value at 5 % level of significance therefore null hypothesis is accepted that means, there is no significant difference between the large scale organizations which are having more than 1000 employees and small scale organizations which are having less than 1000 employees. Both the groups have favorably accepted the hypothesis (H3) that "Point of Sales (EPOS) are highly effective for reducing the demand uncertainty (Bull whip)". Morgan Stanley, (2001). According to studies conducted by Morgan Stanley, the topic of supply chain management was recently found to be the number one priority of chief information officers. In fact, when IT is employed and a supply chain is managed electronically, often with Web based software, it is referred to as an e-supply chain. The advent of e-commerce and increased pressure from stakeholders has created a more demanding landscape. Web became a key medium for information sharing that provided both domestic and global textile-garment companies with a low-cost medium to convey product and service information.

## 7. CONCLUSIONS

Limited examples of active collaboration across two or three tiers of the supply network currently exist. Limited examples of very successful ERP or e-business implementation in the industry to reduce cost. The differences between successful and unsuccessful organizations are even more pronounced by examining greater details in terms their difference or to support for the second hypothesis. The result shows that there is no significant difference between the groups as above said in accepting the statement that "Collaboration in the textile and garment industry has got higher potential for e- business investment".

On-line connections (POS or EPOS .) support the inter-company transfer of data and other business documents in a standard format, thus reducing data entry operations and order processing time. The study emphasized on how sharing of information, enabled by e-business applications that can radically improve business processes and consequently the performance both of a single company and supply chain as a whole.

## 8. MANAGERIAL AND RESEARCH IMPLICATIONS

1. The findings of the study have implications for the practicing executives engaged in transformation of current supply chain practices to the modern practices of e-SCM and transition to be well understood.
2. This study offers practitioners several managerial insights about the role of information technology and supply chain collaboration and integration among the network actors of today supply chain. First collaboration and Information Technology play different roles in managing supply chains. To improve supply chain performance and to gain competitive advantage executives often chose to adopt the best e- business model in their supply chain to share information and to collaborate. Some small scale companies however differed from large scale organization to implement the e- business model because of limited resources. Findings of this study reinforce the importance of information technology and collaboration in supply chain network.
3. Effective and efficient supply chain collaboration and coordination increases as level of information sharing increases. As efficient supply chain emphasize cost of operation is primary and thus it tends to standardize the operations. Where as responsive supply chains emphasize cost as secondary element but the services capabilities are primary and thus firms tend expand the buffering and facilities, this situation makes the firms to leverage between efficiency and responsiveness. From the study it is suggested that firms can standardize the collaborative and coordination efforts of supply chain can be made standardized where value is highest. Therefore the companies in textile and garment industry, In particular the small medium enterprises (SME) need to think on IT investment or ICT to collaborate and to share information as part of growth strategy.
4. e-SCM model adoption require a strong commitment and support from strategic network partners of supply chain organizations to realize the early benefits
5. There are three main challenges that policy-makers face with the advent of RFID. From a technical standpoint, the optimal realization of an "Internet of things" hinges upon technical interoperability and the creation of effective global standards. Once this is achieved, the governance of the system must be assured in a balanced and equitable fashion.

## 9. RECOMMENDATIONS

- **Invest on Consortium Exchanges**  
SMEs' should understand importance of investment on consortium exchanges in order to achieve operational efficiency from procurement, inventory turnover and it has a capability to ensure a visibility
- **Capitalize Customer Feed Back and Turn it into Innovation**  
Allowing customers to track their orders and find errors "anytime anywhere" ordering over the internet. By accessing from information from ERP, customers were permitted to originate, configure, price and place their orders.
- **Embed Value in Product**  
It is recommended to tag information along with the products and do not absorb the cost of functions that consumers are willing to do for free. Therefore textile garment firms need to create e-tail strategies that match the lifestyle realities of market segments
- **Implement CPFR and POS and VMI Technologies**  
Management, across Textile garment industry, will need to embrace and speed up the implementation of CPFR
- **Transformation is needed**  
Management across all Textile garment industry will need to embrace collaboration with customers and suppliers in the planning and replenishment process. The existence of a "company of silos" becomes apparent and, most importantly, a new clarity of needs and goals emerges for Supply Chain Management. There is a need to transform from dysfunctional and un-synchronized decision-making - which results in disintegrated and very costly supply activities - to a supply chain that performs in such a way that it is one of the company's competitive advantages.
- **Identify Key Success Factors**  
Effectively integrating the information and material flows within the demand and supply process is what e-Supply Chain Management with the identification of key success factors; issues can be resolved with the strategic focus.

### 10. LIMITATIONS

- The study of the finishing end the Cutting, Making and Trimming (CMT) operations of the textile garment production may not bring out much in terms of contributing to make the product value (apparel) cleaner in its supply chain. Accurate classification of sample units was difficult task.
- The study is not fully integrated backward and forward, from cotton cultivation to the customer-end, and allowed to hang in the finishing end of the supply chain process.
- A limited analysis of forward and backward linkages was used to have a holistic understanding of the supply chain processes in selected study region.
- The study doesn't cover the coding or functionality of any components of information Technology (IT) architecture. But, the study considers this as suitable and holistic launch pad for all concerned and interested to understand the growing importance of Information technology and its effect on textile-garment industry's e- business models.

### 11. SUGGESTIONS TO FURTHER STUDY

- Future research could make several extension of the study using statistical analysis. This study is limited to textile garment companies and results delivered are based on the data collected from the textile garment companies. However this study would help the future research by providing insights of e-business frameworks and models.
- The recession and tragic events of many, dramatically slowed down the implementation of collaborative commerce (c-commerce) and e-SCM during 2008-09, these tools continue to be seen as tomorrow's sources of competitive advantage. While it is true that there was a lot of hype, a lot of promises that could not be fulfilled, a lot of misunderstanding about costs and the level of commitment involved, and a lot of confusion about how to effectively use the range of e-market tools available.
- Despite an extensive literature reviews about IT and SCM and in-depth interviews with supply chain managers, making this study scientific was not able do and scientific studies on the acceptance and implementation of e-business models are scarce, there isn't a well-developed, meaningful scale to measure the constructs used in e-business related studies. But this supply chain management is a collection of end supplier to end customer, so it was critical to cover issues from their different perspective. Therefore it offers a tremendous research potential.

### 12. CONTRIBUTIONS OF THE STUDY

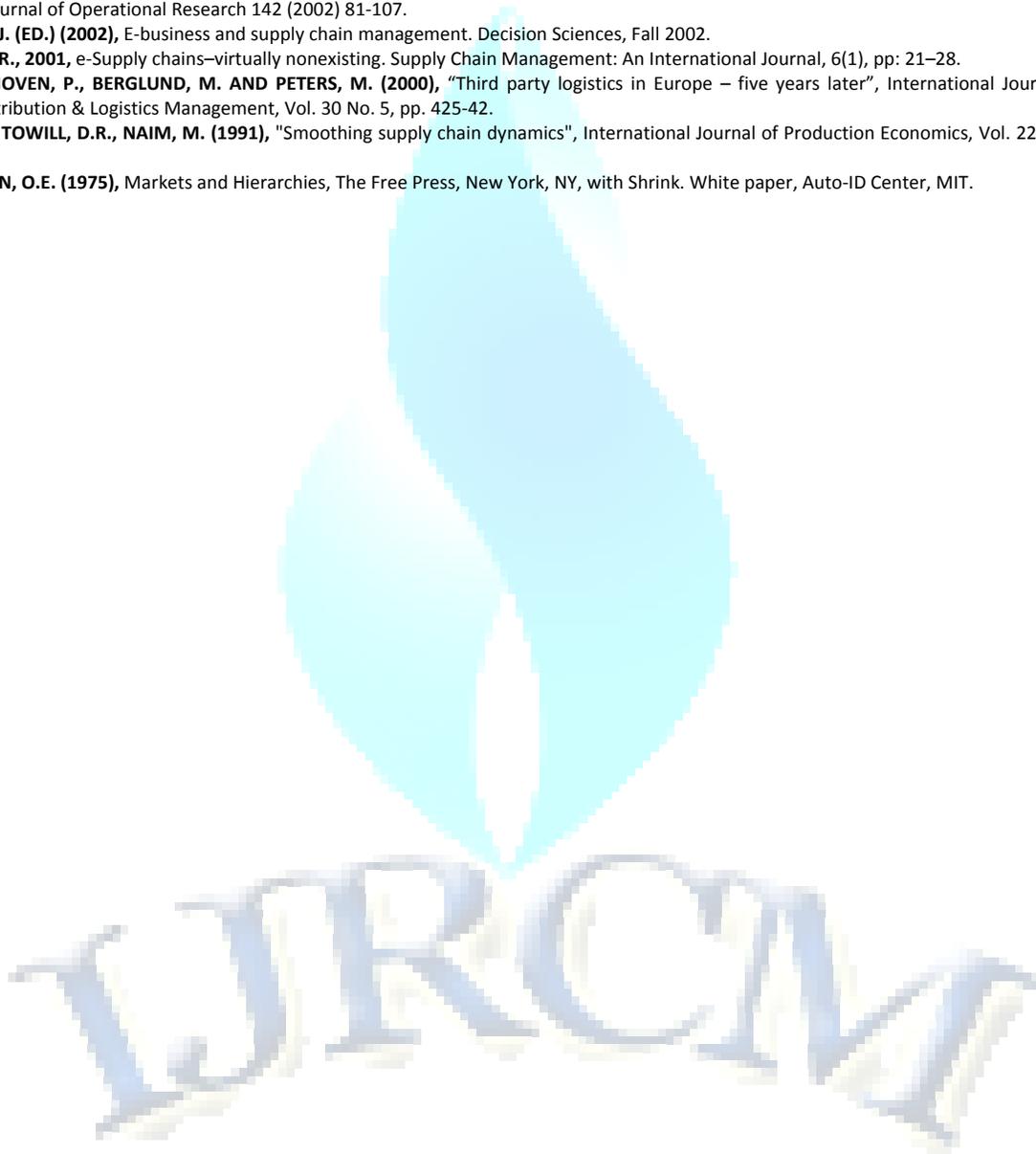
This study has made contributions to the literature in few areas of supply chain management including the integration, collaboration and e-SCM model and logistics. The empirical nature of this investigation offers a more in-depth understanding of the meaning of e-supply chain and logistics management and contributes knowledge to the Indian textile garment industry. This study is one of the very few studies on development of conceptual e-SCM model in textile garment manufacturing organizations in India. Few studies in the past have examined the e-Supply experiences at a broad organizational level, whereas this study has studied of details of e-SCM model subjected to key success factors within individual organizations and in the network emphasizing on information sharing collaboration, integration and technology adoption and finally the consideration of risk factors of supply chain management and explored the various strategies accomplished for operational efficiency.

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