DEMOGRAPHIC ANALYSIS OF SUPPLY CHAIN TECHNOLOGY ADOPTION IN APPAREL INDUSTRY

Article Particulars

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Abstract

Supply Chain Technology (SCT) has evolved into an advanced science today with multiple technologies like Cloud computing, advanced analytics, Radio frequency Identification (RFID), Geographical Information System (GIS) and so on. SCT has helped in increasing reliability, responsiveness, agility and market share for companies at the same time reducing costs throughout the supply chain. The Global Apparel Value chain includes raw material networks, component networks, production networks, export networks and marketing networks. With such complex apparel value chain it is imperative to leverage the right Supply chain Technologies to efficiently and effectively control operations. This paper analyses the SCT adoption in Apparel operations using the data collected from Apparel cluster in Bangalore, Tumkur and Doddaballapur. A Regression analysis is made with predictors like Age of the company, Number of employees, Revenue of the company, Role in supply chain, Type of Ownership and sales break up.
Keywords: Supply chain Technology, Apparel Industry, Supply chain and Technology adoption.

Introduction

India is one of the few countries that own the complete supply chain in close proximity from diverse fibres to a large market. It is capable of delivering packaged products to customers comprising a variety of fibres, diverse count sizes, cloths of different weight and weave, and a panoply of finishes. This permits the supply chain to mix and match variety in different segments to deliver new products and applications. This advantage is further accentuated by cost based advantages and diverse traditions in textiles.

The Indian domestic market for all textile and apparel products is estimated at $26 bn and growing. While the market is very competitive at the low end of the value chain, the mid or higher ranges are overpriced, hence usage of right Supply Chain Technologies help apparel companies to stay competitive and sustain. Supply Chain Technologies (SCT) works best when quality data is gathered from both the supply side (where the goods are coming from) and the demand side (sales, returns, customer buying trends) of the equation. Once the data is collected—most often through the use of supply chain software—it's then analyzed and used for accurate forecasting, planning, and production. SCT allow companies to gain control of the day-to-day operations of the supply chain, and that momentum carries over to the financial side of the equation with increased sales and profits.

Supply Chain Technology in Apparel Industry in India

Indian textiles and apparel have a history of fine craftsmanship and global appeal. Cotton, silk and denim from India are highly popular abroad and with the upsurge in Indian design talent, Indian apparel too has found success in the fashion centres of the world. The Indian textile and apparel industry is one of the largest in the world with an enormous raw material and manufacturing base. India has the second largest textile manufacturing capacity globally. Apparel Industry in India is fiercely competitive and are among the nimble, efficient apparel suppliers of the world. Apparel exports add significantly to the GDP of the country. Post Liberalization India has surged in technology adoption and innovation. India has a vast pool of talented and technically trained manpower. Indian apparel industry is at the forefront of technology adoption in supply chain technology.

Supply chain technology is a subset of various technologies which help in quickly moving goods through the supply chain efficiently. Velocity, Traceablility, flexibility and lean inventory are the hallmark of Best In Class Supply Chains. SCT helps in these areas and ensures the long term sustainance of the company. Current supply chains have problems of inefficiencies, inexcusable rigidity, and failure to recognize the growing demands of consumers.

Study of Supply Chain Technology Used by Apparel Industry in Bangalore

A survey of 531 Apparel companies was conducted in Bangalore, Tumkur and Doddaballapur. The questionnaire was tested with a pilot batch and after suitable modification was administered to other respondents. More than 1200 apparel companies were approached and 543 respondents agreed to take the survey. Only 531 completely valid and verified questionnaires were taken for analysis.

Objectives of Study

- To examine the Supply Chain Technologies being adopted by Apparel Industry.
- To analyze the influence of company demographics on SCT adoption
- To analyze the role of SCT in improving the efficiency and effectiveness of Apparel operations.

This study attempts to answer such research questions. This research is conducted to fill the knowledge gap in the context of the influence of individual and organizational factors on the usage of SCT in Apparel Industry.

Literature Review, Research Gap and Justification for Research

Not many studies had been carried out on SCT adoption in Apparel Industry. Liu, Z., Prajogo, D., & Oke, A. (2016) found that there is a positive relationship between SCT utilization and firm performance and this increases when the level of information sharing between supply chain partners increases. Sanil, et.al. (2016) found apparel companies are having certain difficulties with respect to the resistance to change and implementation of latest technologies. Rizzi, A. (2016) have prepared a framework that offers a comprehensive and well-structured overview of the cost- and the revenue-related potentials of RFID implementations. Khan, H. U. (2013) found adoption of suitable supply chain technologies in service organizations can have timely and accurate information availability for their decision making process. Zhou, W., (2016) has integrated both the transaction cost and resource-dependence models in understanding the influence of buyer–seller relationships on e-supply chain integration.

Ngai, E. W. T., Peng, S., Alexander, P., & Moon, K. K. (2014) have identified gaps in extending the use of the decision support and artificial intelligent systems in the industry But there is no specific empirical study on SCT in Indian Apparel Industry. This study will close the research gap in the study of SCT and its effect on Apparel Industry in Bangalore which accounted for nearly one fifth of Apparel sales by appropriate technologies and strategies and to improve the profits. The beneficiaries of this study would be Apparel business organizations operating in India.

Individual and Organizational Factors Influencing Supply Chain Technology Adoption

In today's competitive retail environment apparel companies cannot afford to be inefficient. There are more competitors out there from other SAARC countries and China than ever before. SCT will help apparel industry stay competitive and enlarge their footprint.

A. Research Methodology

Research Design: Descriptive Research,

Sampling Technique: Convenience sampling, Apparel companies willing to take the survey are included.

Sample Area: Apparel companies in Bangalore *Sample Size*: 531,

Data Collection: Primary Data, *Software used for compilation of Data*: MS Excel, SPSS.

Data Collection: The data collected is Primary data. A Questionnaire was prepared to collect the data. Primary data was collected from 531 respondents through a closed ended questionnaire. Convenience sampling was used to collect the answers for the questions of the questionnaire.

Result and Discussion

The following are the results of the study.

Table: 1. Supply Chain Technology usage in Apparel Industry

Sl. No	Supply Chain Technologies	No (Not Used)	Yes (Using)	SD
1	Bar code Technology - (Tags, scanners, Hardware & Software)	106	425	0.400
2	QR Code Technology - "	379	152	0.452
3	Radio Frequency Identification (RFID) Technology	366	165	0.463
4	Geo-Tagging	526	5	0.097
5	Virtual Reality Supply Chain Technology	526	5	0.097
6	Vendor Managed Inventory (VMI) (DatAlliance, PathGuide.)	485	46	0.282
7	Internet of Things (IOT) Technology/Auto-Identification & Tracking	531	0	0.000
8	Demand Forecasting Management (DFM)	415	116	0.414
9	Transportation Management System (TMS)	501	30	0.231
10	Warehouse Management System (WMS)	443	88	0.372
11	Supply Chain Operating Networks (Ariba, Oracle isupplier,..)	509	22	0.199
12	Customer Relationship Management (CRM) Technologies	340	191	0.480
13	Mobile Applications (Easy Stock, Scandit,..)	485	46	0.282
14	ERP Technologies (SAP, Oracle, Baan,..)	279	252	0.500

The above table shows that Bar Code technology is being used almost universally by all apparel companies mainly because of good proliferation in all areas, But technologies like RFID have a bright future with positive opinion from the respondents. New technologies like geo-tagging, virtual reality and Internet of Things are yet to find any response.

Table: 2. Correlation Analysis for Demographic Variables and Adoption of Supply Chain Technology in Current Operation

Demographic variable	SCT Usage
Age	0.638**
Number of company employees	0.720**
Total revenue of company in recent year in Lakh	0.849
Role in apparel supply chain	0.034
Company Ownership type	0.746**

Correlation Analysis of Companies Demographic variables and usage of SCT shows a positive correlation with respect to age of company, number of employees , revenue of the company and ownership type. There is no correlation between the company's role in supply chain and SCT usage.

Regression Analysis

Table: 3. Supply chain technology and Demographic variable

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
.876	.767	.765	1.73	.767	288.662	6	525	.000

A Predictors: (Constant), Age, number of company employee, Revenue company in recent year in Lakhs, role in apparel supply chain, type company ownership, company current sales breakup.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	5180.310	6	863.385	288.662	.000
Residual	1570.267	525	2.991		
Total	6750.577	531			

A) Predictors: (Constant), Age, number of company employee, Revenue company in recent year in Lakhs, Role in apparel supply chain, Type company ownership, Company current sales breakup.

B) Dependent Variable: Supply chain technology Coefficients

Variable	Unstandardized Coefficients	Std. Error	Standardized Coefficients	t	Sig.
	B		Beta		
(Constant)	10.286	.473		21.752	.000
Age	-.603	.235	-.153	-2.571	.010
Number of company employee	.495	.092	.194	5.360	.000
Revenue company in recent year in Lakhs	2.590	.170	.840	15.266	.000
Role in apparel supply chain	.111	.105	.037	1.059	.290
Type company ownership	.402	.221	.139	1.817	.070
Company current sales breakup	-.291	.199	-.134	-1.466	.143

A) Dependent Variable: Supply chain technology Usage

The Regression Analysis with Predictors as Age, number of company employees, Revenue of Company in recent year, Role in apparel supply chain, Type of company ownership, Company current sales breakup and Dependent Variable as Supply chain technology usage shows the highest significance at 0.143 for company sales breakup that is the exporting companies.

Findings

- Most of the Apparel companies were dependent on decade old technologies like Bar code and outdated technologies, except for export oriented companies.
- A majority of the respondents were aware of the latest technologies but were reluctant to make investments without external pressure from customers or competitors.
- Majority of respondents' intention to upgrade was high.

Limitations

First, the findings are based on the sample of 531 respondents. The sample size is considered small to represent the population. Second, the data generated from this study are based on self-administrated survey, consisting of only apparel companies in and around Bangalore. Additionally, data accuracy would depend on the respondents' willingness and honesty in answering all the questions honestly. However, to avoid respondents' biasness and clear understanding, clear explanations were given to respondents.

Conclusion

The study concludes that Supply chain technology is here to stay and will continuously evolve and integrate with the Apparel supply chain providing more and more value to customers, management and employees. SCT is being integrated with payment gateways, RFID, CRM, Inventory management, Loyalty management and a host of others, making it a important part of Apparel operations. SCT in Apparel is still in its infancy today and has a great potential in the future. SCT is being integrated with other systems like accounting systems, Customer Relationship Management systems and inventory management systems. This brings in a whole lot of higher efficiencies in Apparel operations. Customer service is taken to new level with greater transparency, faster service and better communication. The study concluded that Apparel Industry want latest technologies and are ready to adapt to the new realities of business where speed, transparency and multi-channel competition is here to stay. Companies want full integration with other systems to increase their sales and give better service to the customers. For all this, the right SCT tools play a very important role

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