

## Information Technology in Supply Chain Management – A Demographic Perspective

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### ABSTRACT

*In the recent years, emphasis on cutting costs and streamlining expenses has made most of the Companies to look into improving their bottom lines with more effective Supply Chains. The Supply Chain Management philosophy and associated SCM practices are a result of successful management of the Supply Chain for competitive advantage. Supply Chain is the network of organizations that are involved through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the end-user. In general, SCM is the managing of the Supply Chain as a single entity. Information Technology can support the internal operations and also collaboration between the components of a Supply Chain. Using high speed data networks and databases, companies can share data to better manage the Supply Chain as a whole and their own individual positions within the Supply Chain. Information Technology (IT) integrated with an efficient supply chain allows for more productive decisions that ensure the company success. The 21<sup>st</sup> century market is electronically connected and dynamic in nature forcing the companies to restructure their supply chains in a more flexible and responsive way to meet the changing market requirements. Interestingly the competition among the companies is shifted from products & services to their Supply Chains. The thrust today is in designing successful Supply Chains that itself ensures the company's to be successful. The focus of this paper is on FMCG industry and to understand the impact of information technology on its SCM practices in becoming more efficient and competitive in the delivering of goods to the customer from the Demographic perspective.*

**Keywords** - Supply Chain Management, FMCG, Information Technology, data networks, data bases, electronically

### Introduction

A review of literature dealing with Supply Chain Management (SCM) yields discussion and description of the expanding role of SCM matching the Supply Chain to market and environmental circumstances and efforts to analyze the effects of variability in the Supply Chain, describing the attempts to implement SCM Strategies. With the shifting of the focus of today's companies on reducing the costs and streamlining expenses, companies look to improve their bottom lines with more effective Supply Chains. The Supply Chains that add the most value for customers with the lowest cost in the chain make up the winning network of individual companies. As such, research and implementation of SCM principles to improve the Supply Chain are of key importance to any global company today. Even though the Supply Chain concept predates the internet, only through the use of web-based software and communication, can it truly reach its full potential? Supply Chains enabled with Information Technology can enhance the ability of Supply Chain Management. The pace of exchange of data within the Supply Chain and its running can be accelerated with the usage of Information Technology in the design and functioning of the Supply Chains. Hence SCM &IT are two areas of research, which have attracted a lot of attention in academic and practitioner's camps over the last decades.

Electronic Data Interchange (EDI) refers to consumer to consumer exchange of business documents in a standard format. EDI describes both the capability and practice of communicating information b/n two organizations electronically instead of traditional form of mail, courier, fax etc. Through the use of EDI, Supply Chain partners can overcome distortions and exaggeration in supply and demand information by improving technologies to facilitate real-time sharing of actual demand and supply information.

Fast Moving Consumers Goods (FMCG) usually refers to Non-durable products that include soft drinks, toiletries, grocery items etc. The Indian FMCG sector is estimated at US \$ 40billion including tobacco. It has been growing consistently over the few years including the period of economic slowdown. Most FMCG products (Non-durables) are daily use products and therefore their consumption has been largely unaffected in the economic slowdown period also. The FMCG sector is also one of the largest employers in the country and is responsible for the livelihood of millions of people.

### Review of literature

“The Supply Chain is a set of firms that pass materials forward” (La londe and Masters, 1994). “A Supply Chain is the network of organizations that are involved, through upstream and downstream

linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate customer”(Christopher,1992). The concept of Supply Chain Management has been extensively elaborated in the state of the art review article by Mentzer et al(2001).They noticed that it was Forrester(1958) who first used the term Supply Chain Management. It was Cooper et al(1997) who has pointed out that Supply Chain Management has raised to prominence. Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services and information that add value for customers and stakeholders” ( Lambert, Cooper and Pagh,1998).

Information Technology is a term that encompasses all forms of technology utilized to create, capture, manipulate, communicate , exchange, present and use information in its various forms(business data, voice conversations, still images, motion pictures) .while looking upon the literature on Information Technology, they offer two extreme views on the phenomenon. These are the techie view and the humie view (Dertouzos, 1987). A combined view is employed here since Information Technology forms the basic structure of the SCM while human interactions form another pertinent part of the Supply Chain. This means that technologies are for the people and used by the people. Fletcher and Wright (1996) report a study into the relationship between strategic use of Information Technology and the strategic context within which such use is made. They found a good degree of integration of marketing and Information Technology groupings within the strategic planning process.

### **Objective of the study**

The main objective of this study is to analyze and measure the impact of Functional Responsibility on the usage of EDI and other implementation issues related to Information Technology with the Supply Chain Partners in select companies in FMCG industry in Bangalore.

### **Scope of the study**

The study mainly focused on integration of Information Technology with Supply Chain Management in FMCG industry in Bangalore city.

### **Data Sources**

The data sources required for the study include both Primary and Secondary. The Primary data sources are the respondents in FMCG industry in Bangalore city. The secondary data sources are relevant websites, journals, business magazines, dissertations etc for theoretical support.

### **Research Design**

The Research Design is a framework that determines the collection and analysis of data. It details the procedures that are needed to carry out the study and the nature of the information that is to be collected is thoroughly defined ( Malhotra & Birks ,2003) .Descriptive Research design is adopted in this study where in the objectives are clearly established followed by questionnaire design and analysis.

### **Sampling Frame**

Sampling Frame comprised of Suppliers, Manufacturers, and Distributors in FMCG Industry in Bangalore City. Bangalore is the fastest growing city in Karnataka where in the population is heterogeneous with diverse, cultural, religious and economic background. it has been a very good marketing centre for targeting various groups of customers that led to the growth of FMCG Industry.

### **Sampling**

Convenience Sampling Method was selected in this study and 200 respondents comprising of Manufacturers, Distributors and Suppliers in FMCG Industry in Bangalore were included.

### **Questionnaire**

Questionnaire used in this study consists of open ended, closed ended, multiple choice and dichotomous questions. Statements used in this study were combination of both positive and negative statements related to impact of Information Technology on Supply Chain Management, scale ranging from strongly disagree to strongly agree. For designing the questionnaire, the researcher used nominal, interval and likert 5 point scale.

**Analysis and Discussion**

**Profile of Respondents**

FMCG industry	
Manufacturers	<b>66</b>
Distributors	<b>73</b>
Suppliers	<b>61</b>
<b>Total</b>	<b>200</b>

**Impact of Functional responsibility on IT links with Customers and Suppliers**

Functional responsibility	Low	Medium	High	Total	$\chi^2$	significance
Sales	6	9	0	15	42.373 **	0.000
distribution	29	6	5	40		
Purchase	16	12	14	42		
Sales admin	21	13	11	45		
IT admin	15	13	10	38		
Logistics	20	0	0	20		
Total	107	53	40	200		

\* $\chi^2 < 0.05$ , \*\* $\chi^2 < 0.01$

Chi square test was applied to find the association that exists between functional responsibility and IT links with customers and suppliers. The researcher included sales (15) Distribution (40), purchase (42), Sales admin (45), IT admin (38) and logistics (20). The result showed that functional responsibility has a significant association with IT links with Customers and Suppliers.

**Impact of Functional responsibility on Priority for redesigning IT**

Functional responsibility	Low	Medium	High	Total	$\chi^2$	Significance
Sales	14	1	0	15	48.087**	0.000
distribution	38	1	1	40		
purchase	34	3	5	42		
Sales admin	34	6	5	45		
IT admin	15	13	10	38		
Logistics	20	0	0	20		
Total	155	24	21	200		

\* $\chi^2 < 0.05$ , \*\*  $\chi^2 < 0.01$

Chi square test was applied to find the association that exists between functional responsibility and priority for redesigning IT. The result showed that functional responsibility has significant association with priority for redesigning IT.

**Impact of Functional responsibility on use of IT with customers**

Functional responsibility	Low	Medium	High	Total	$\chi^2$	Significance
Sales	1	14	0	15	54.635**	0.007
distribution	17	11	12	40		
purchase	16	12	14	42		
Sales admin	20	14	11	45		
IT admin	15	13	10	38		
Logistics	20	0	0	20		
Total	89	64	47	200		

\* $\chi^2 < 0.05$ , \*\*  $\chi^2 < 0.01$

Chi square test was applied to find the association that exists between functional responsibility and use of IT with customers. The functional responsibility is classified into sales, distribution, purchase, sales administration, IT administration and logistics. The result showed that functional responsibility has significant association with use of IT with customers

**Impact of Functional responsibility on use of IT with suppliers**

Functional responsibility	Low	Medium	High	Total	$\chi^2$	Significance
Sales	13	1	1	15	42.514**	0.000
distribution	12	11	17	40		
purchase	23	6	13	42		
Sales admin	17	13	15	45		
IT admin	15	13	10	38		
Logistics	20	0	0	20		
Total	100	44	56	200		

\* $\chi^2 < 0.05$ , \*\*  $\chi^2 < 0.01$

Chi square test was applied to find the association that exists between functional responsibility and use of IT with suppliers.. The functional responsibility is classified into sales, distribution, purchase, sales administration, IT administration and logistics. The result showed that functional responsibility has significant association with use of IT with suppliers.

**Impact of Functional responsibility on Business Impact**

Functional responsibility	Low	Medium	High	Total	$\chi^2$	Significance
Sales	1	14	0	15	55.710	0.000
distribution	17	11	12	40		
purchase	24	8	10	42		
Sales admin	20	14	11	45		
IT admin	15	13	10	38		
Logistics	20	0	0	20		
Total	97	60	43	200		

\* $\chi^2 < 0.05$ , \*\*  $\chi^2 < 0.01$

Chi square test was applied to find the association that exists between functional responsibility and business impact.. The functional responsibility is classified into sales, distribution, purchase, sales administration, IT administration and logistics. The result showed that functional responsibility has significant association with business impact.

**Impact of Functional responsibility on company experience with customers**

Functional responsibility	Low	Medium	High	Total	$\chi^2$	Significance
Sales	1	14	-	15	58.999**	0.000
distribution	25	7	8	40		
purchase	16	12	14	42		
Sales admin	20	14	11	45		
IT admin	15	13	10	38		
Logistics	20	0	0	20		
Total	97	60	43	200		

\* $\chi^2 < 0.05$ , \*\*  $\chi^2 < 0.01$

Chi square test was applied to find the association that exists between functional responsibility on company experience with customers. The functional responsibility is classified into sales, distribution, purchase, sales administration, IT administration and logistics. The result showed that functional responsibility has significant association with company experience with customers.

**Impact of Functional responsibility on company experience with suppliers**

Functional responsibility	Low	Medium	High	Total	$\chi^2$	Significance
Sales	9	6	0	15	30.946**	0.001
distribution	17	11	12	40		
purchase	16	12	14	42		
Sales admin	21	13	11	45		
IT admin	15	13	10	38		
Logistics	20	0	0	20		
Total	98	55	47	200		

\* $\chi^2 < 0.05$ , \*\*  $\chi^2 < 0.01$

Chi square test was applied to find the association that exists between functional responsibility on company experience with suppliers the functional responsibility is classified into sales, distribution, purchase, sales administration, IT administration and logistics. The result showed that functional responsibility has significant association with company experience with suppliers.

**Impact of Functional responsibility on IT in FMCG Industry**

		N	Mean	Std.Deviation	F value	Significance
IT links with customers and suppliers	sales	15	1.60	0.507	6.271**	0.000
	distribution	40	1.40	0.709		
	purchase	42	1.95	0.854		
	Sales admin	45	1.78	0.823		
	IT admin	38	1.87	0.811		
	logistics	20	1.00	0.000		
	Total	200	1.670	0.791		
Priority for redesigning IT	sales	15	1.07	0.258	9.447**	0.000
	distribution	40	1.08	0.350		
	Purchase	42	1.31	0.680		
	Sales admin	45	1.36	0.679		
	IT admin	38	1.87	0.811		
	Logistics	20	1.00	0.000		
	Total	200	1.33	0.658		

		N	Mean	Std.Deviation	F value	Significance
IT applications for customers	sales	15	14.07	1.223	8.561**	0.000
	distribution	40	23.43	11.304		
	purchase	42	37.12	14.517		
	Sales admin	45	31.56	18.548		
	IT admin	38	34.89	17.396		
	logistics	20	24.65	10.028		
	Total	<b>200</b>	<b>29.73</b>	<b>16.030</b>		
IT applications for suppliers.	sales	<b>15</b>	<b>13.80</b>	<b>1.521</b>	<b>14.862**</b>	<b>0.000</b>
	distribution	<b>40</b>	<b>18.95</b>	<b>11.163</b>		
	Purchase	<b>42</b>	<b>37.05</b>	<b>14.640</b>		
	Sales admin	<b>45</b>	<b>39.60</b>	<b>19.181</b>		
	IT admin	<b>38</b>	<b>34.89</b>	<b>17.396</b>		
	Logistics	<b>20</b>	<b>24.65</b>	<b>10.028</b>		
Total	<b>200</b>	<b>30.61</b>	<b>17.283</b>			
No of years of usage of IT by the company & business impact	sales	<b>15</b>	<b>18.73</b>	<b>4.847</b>	<b>2.983**</b>	<b>0.021</b>
	distribution	<b>39</b>	<b>27.77</b>	<b>9.759</b>		
	purchase	<b>40</b>	<b>24.13</b>	<b>15.419</b>		
	Sales admin	<b>43</b>	<b>22.95</b>	<b>11.506</b>		
	IT admin	<b>34</b>	<b>20.15</b>	<b>6.827</b>		
	logistics	<b>0</b>	<b>-</b>	<b>-</b>		
Total	<b>171</b>	<b>23.40</b>	<b>11.139</b>			
No of years of usage of IT by the company with customers	sales	<b>15</b>	<b>9.87</b>	<b>0.352</b>	<b>4.349**</b>	<b>0.002</b>
	distribution	<b>39</b>	<b>20.36</b>	<b>13.025</b>		
	Purchase	<b>40</b>	<b>24.13</b>	<b>15.419</b>		
	Sales admin	<b>43</b>	<b>22.72</b>	<b>11.738</b>		
	IT admin	<b>34</b>	<b>20.15</b>	<b>6.827</b>		
	Logistics	<b>0</b>	<b>-</b>	<b>-</b>		
Total						
No of years of usage of IT by the company with suppliers	sales	<b>15</b>	<b>18.73</b>	<b>4.847</b>	<b>4.713</b>	<b>0.584</b>
	distribution	<b>39</b>	<b>21.31</b>	<b>5.832</b>		
	purchase	<b>40</b>	<b>22.13</b>	<b>14.188</b>		
	Sales admin	<b>43</b>	<b>22.95</b>	<b>11.506</b>		
	IT admin	<b>34</b>	<b>20.15</b>	<b>6.827</b>		
	logistics	<b>0</b>	<b>-</b>	<b>-</b>		
Total	<b>171</b>	<b>21.46</b>	<b>9.957</b>			

Note: \*Significant at 5% level (p value < 0.05 , \*\* Significant at 1% level(p value< 0.01)



ANOVA test was applied to find the significant difference between functional responsibility and IT in FMCG Industry. The results show that IT links with customers & suppliers, Priority for redesigning IT, IT applications for customers & suppliers, No of years of usage of IT by the company and business impact, No of years of usage of IT by the company with customers and suppliers are associated with functional responsibility.

**Functional responsibility Vs Impact of IT in FMCG industry**

Functional responsibility		
IT links with customers and suppliers	Pearson Correlation	0.194(**)
	Significance(2-tailed)	0.006
	N	200
Priority for redesigning IT	Pearson Correlation	0.213(**)
	Significance( 2-tailed)	0.002
	N	200
use of IT with customers	Pearson Correlation	-0.212(**)
	Significance(2-tailed)	0.003
	N	200
Use of IT with suppliers	Pearson Correlation	-0.116
	Significance( 2-tailed)	0.102
	N	200
No. of years of usage of IT by the company & business impact	Pearson Correlation	-0.184(**)
	Significance(2-tailed)	0.009
	N	200
No of years of usage of IT by the Company with customers	Pearson Correlation	-0.132
	Significance (2-tailed)	0.036
	N	200
No. of years of usage of IT by the Company with suppliers	Pearson Correlation	-0.123
	Significance(2-tailed)	0.084
	N	200

Correlation test was applied to find the relationship between functional responsibility and impact of IT in FMCG industry. The results show that IT links with customers and suppliers, priority for redesigning IT, use of IT with customers and number of years of usage of IT by the company & business impact is related with functional responsibility. Use of IT with suppliers, number of years of usage of IT by the company with customers and number of years of usage of IT by the company with suppliers are not related with functional responsibility.

**Findings**

- The Primary use of Information Technology in purchasing is to check the prices online before the order is placed. Information Technology is also used in communicating with vendors and making purchase from vendor catalogues. The use of Information Technology has eased out face-to-face negotiations.
- It is observed that company demographic factor i.e., functional responsibility is associated with the use of Information Technology with customers and suppliers.
- Information Technology implementation issues like advocating the development of electronic information links with customers or suppliers , redesigning the information systems when implementing a new Information Technology tool like EDI with customers or suppliers were considered to find the association with functional responsibility using Chi Square test.
- To find the relation between the Functional Responsibility and Information Technology implementation issues, correlation test was applied, where in the results showed that there is an association between them.
- ANOVA test is applied to find the association between Functional Responsibility and IT implementation. The respondent’s priority is high for purchases, sales administration, distribution and IT implementation.
- The priority is high for the distributor of FMCG products in case of IT links with customers and suppliers, IT usage with customers and suppliers and company experience with customers and suppliers.
- The respondents perceived high priority for the manufacturers of raw materials in case of priority for redesigning IT and priority for simplifying existing process before IT implementation.

- The respondent's priority was high for the manufacturer of FMCG products in case of Business Impact.
- It is revealed from the study that the Information Technology integration with Supply Chain Management has shown impact mainly on Procurement, Logistics, Vendor Relationship Management and Customer Relationship Management (CRM).
- The advances in Information Technology like internet, Electronic Data Interchange, Enterprise Resource Planning, e-business and many more have enabled the companies to rapidly exchange products information, funds and utilize collaborative methods to optimize Supply Chain Operation.

### **Suggestions**

- The success of any company is mainly based on updating of technology. Information Technology can support internal operations and also encourage collaboration between companies in a supply chain. The companies have to analyze the demographic factors for implementing IT.
- Successful implementation of IT as an enabler of SCM depends upon the support of top management and overall organizational structure. The nature of skills available within an organization influences the success of IT in Supply Chain.
- The companies have to analyze the requirements of functional departments, accordingly plan the implementation of IT. Strategic Planning of IT in SCM includes organizational issues such as organizational structure, support from top management, business processes, strategic alliances and information technology that influence the overall performance of IT-enabled SCM.

### **Conclusion**

Based on the results obtained from the study, it can be concluded that IT is significantly affecting the Supply Chain Management and is based on the company demographic factors. Information technology is redefining the way of managing the Supply Chains. It's time for the companies to embrace information technology and accept the IT tools for effective Supply Chain Management.

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