A STUDY ON THE APPLICATION OF NEW TOOLS OF SUPPLY CHAIN MANAGEMENT AMONG SUPPLIERS AND TRANSPORTERS OF CORPORATE RETAILERS IN KERALA

Biju M. K.*

Dr. FAISAL U.**

Abstract: *Many of the leading corporate retailers are have their presence in the state of Kerala. The success of a large retail lies in the proper management of its supply chain. It is the proper communication and collaboration among the stages which work together to satisfy a request from the customer. This study is aimed at understanding the level of usage of new tools of supply chain management among the suppliers and transporters in these chains in Kerala. The opinions on the necessity of these tools among those who do not use them also were collected. The study was descriptive using primary data collected through administering two questionnaires. Multi stage sampling was used to collect the samples with sizes of 28 and 25 for suppliers and transporters respectively. The hypotheses were tested using statistical tests. It is found that the usage of new tools is very low among the suppliers and transporters. Majority of them currently use bar coding now. They feel that most of these tools are highly necessary and need to be implemented.*

Keywords: *Collaboration, Corporate Retail Chains, Likert Scale, Supply Chain Management, New tools in supply chain management.*

*Research Scholar, Department of Management Studies, Kannur University, Kerala

**Associate Professor, Department of Management Studies, Kannur University, Kerala

INTRODUCTION

Globalization has been a much discussed and hyped phenomenon in India. The free economy that India has adopted through the liberalisation process naturally culminated in the opening up of the new markets. This ushered in new challenges and Indian companies are facing higher level of competition in the market place, not only from other local players but also from multi nationals, who are better organised and have considerable hands on experience in fighting competition in more matured markets. The firms are in search of competitive edges which make them survive and lead in the market. One of the best ways is to improve their supply chain.

Supply Chain Management (SCM) is the management of upstream and downstream relationships with and customers to deliver superior customer value at less cost to the supply chain as a whole. A supply chain is dynamic and involves the constant flow of information, product and funds between different stages (Sunil Chopra et al, 2004). A supply chain is the process of moving goods from the customer order through the raw materials stage, supply, production and distribution of products to the customer. All organisations have supply chains of varying degrees, depending upon the size of the organisation and the type of product manufactured. The supply chain is source of improving operations and profitability of (Hicks D.A., 1997).

Corporate retails chains aware a success in India. These have a good potential in Kerala considering the economic conditions. There are some major players like, Big Bazaar, Reliance Fresh, More with limited number of outlets. He other prominent chain is the Margin Free Markets which is based on Kerala. There are many other small chains also.

The success of the supply chain decides the way in which the customers are treated. For the supply chain to be effective there needs to be proper communication, trust and collaboration among the stages. These can be achieved by proper use of new tools in supply chain and logistics management. This study is aimed at understanding the level of use of new tools related to logistics and supply chain management among the suppliers and transporters in the retail chains in Kerala.

The information technology wave has created new ways to conduct business in this millennium. Some of the new tools in supply chain management are given below.

- **Bar codes**: Bar coding refers to the placement of computer readable codes on items, cartons, containers, trucks and even railway wagons (Upendra Kachru, 2009). Bar codes increase productivity in three ways: speed, accuracy and reliability. (V.V, Sople, 2010).

- **RFID:** Radio Frequency Identification is an automatic identification method, relying on storing and remotely receiving data using devices called RFID tags and transponders. In many RFID based solutions, the item to be scanned need not be in the Line of Sight and hundreds of tags can be simultaneously read at the same moment (Upendra Kachru, 2009). To ease the transition, one common type of RFID tag in use these days is a smart label. It comes with an adhesive sticker, is applied to a product or container, and contains printed text, a bar code and a passive RFID tag as well (Sridhar, 2011).

- **ERP:** A seamless collaboration of SCM software with ERP systems is necessary for supply chains (G. Knolmayer et al., 2002). Enterprise Resource Planning is a product of the emergence of more powerful, lower cost computer, local area networks and client server technologies (Stanley E. Fawcett et al, 2008). In today's intensely competitive marketplace, companies can benefit strategically and tactically from the implementation of ERP (Vijaya, G. S., 2010).

- **Cross-docking:** Cross-docking is a system where the incoming shipment is transferred in to an outgoing shipment without entering the warehouse (Upendra Kachru, 2009).

- **JIT:** Just-In-Time is extremely difficult to implement because inventories between the different production steps were practically eliminated, so if one small part is not available, the entire production system fails (R P Mohanty et al., 2003).

- **Forecasting:** Forecasts drive logistics information system planning and coordination (Satish C. Ailawadi et al, 2005). Where sales were increasing at an unpredictable rate in present period and there arises the necessity of demand forecasting in this field (Vijay Gabale, 2008).

- **Vendor Managed Inventory**: With Vendor Managed Inventory (VMI), the manufacturer or supplier is responsible for all decisions regarding product inventories at the retailer (Kiran Raveendran, U. Faisal, 2009).

- **GPS:** The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense.

GPS now comes with sensors to monitor fuel levels, ambient temperature in the truck and so on (Sridhar, 2011).

OBJECTIVES AND HYPOTHESIS

The objectives are:

- To understand the level of implementation of latest tools in supply chain management among the suppliers in Kerala
- To understand the level of implementation of latest tools in supply chain management among the transporters in Kerala

The hypotheses are:

- There are no significant differences on the opinion on the need of each of the latest tools of supply chain management among different category of suppliers.

RESEARCH METHODOLOGY

The study is a descriptive research. There were two different questionnaires for the two categories viz., suppliers and transporters. The population includes the suppliers and transporters. The study used primary data as well as secondary data. The sample is selected using multi stage sampling process, where from the 14 districts, 4 districts were chosen first using random sampling and from each of these districts the retail chains were chosen to collect data. The sample size for suppliers was 28 and the sample size for transporters was 25. There were 5 suppliers selected for the pilot study and the Cronbach alpha was calculated to be 0.802. There were 5 transporters selected for the pilot study and the Cronbach alpha was calculated to be 0.783. Both these values were acceptable which made the questionnaire reliable. The analysis was done using Likert scale technique and statistical tests like Mann-Whitney U test also were used.

Possible limitations include the inaccuracy in formulation of information by the respondent, ambiguity in response, bias and lack of time (Paul E. Green et al, 1966), where this study is not an exception.

ANALYSIS

The analysis is done separately for the responses from suppliers and transporters.

(a)   Analysis of responses from the suppliers is given below.

The level of usage of new tools by different suppliers is given in table 1 and figure 1.

Table No. 1: The level of usage of latest tools by different suppliers in percentages

Concepts	Perishable	Non-perishable	Overall
JIT	0	0	0
e-Procurement	30	50	40
ERP	10	0	5
Separate Logistics Department	0	10	5
Bar coding	90	70	80
RFID	0	0	0
Forecasting	100	100	100
VMI	10	0	5
Assistance from Supply Chain experts	20	10	15

Source: Primary data

Figure No. 1: The level of usage of latest tools by different suppliers in percentages
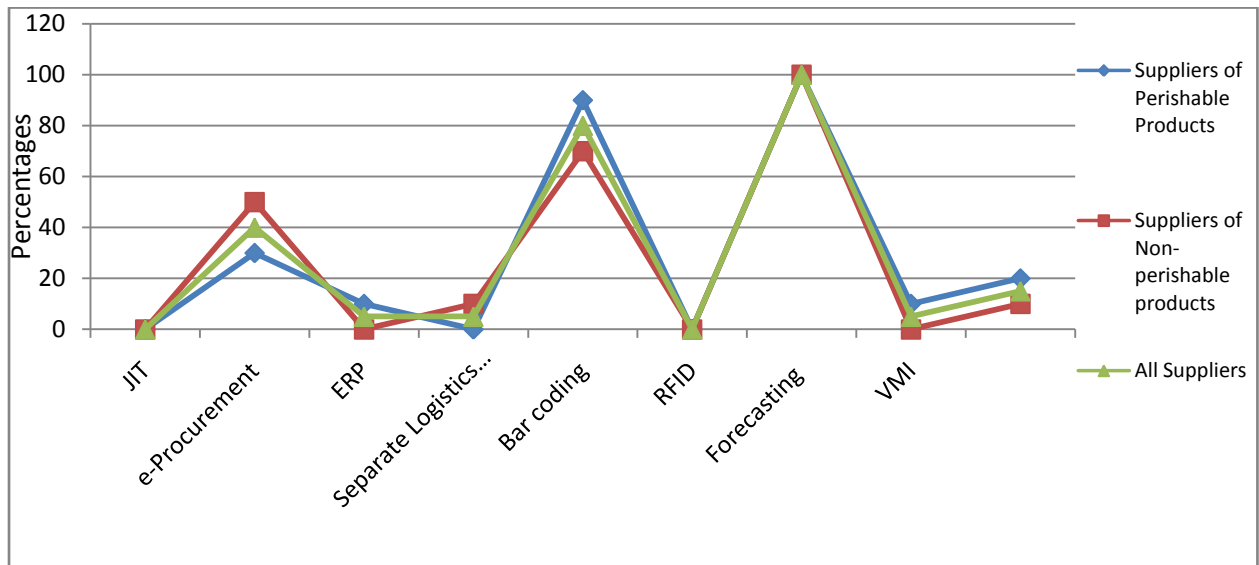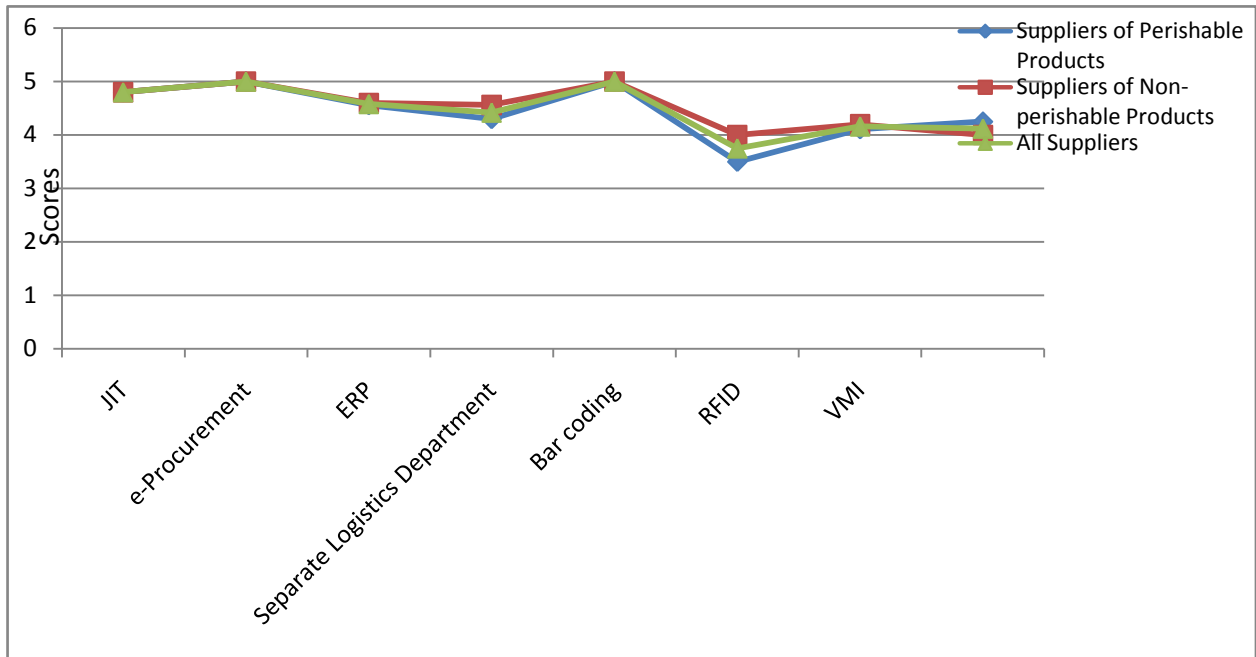

Source: Primary data

- The usage of the new tools on the supply chain varies with suppliers. Majority of the suppliers use Bar coding and Forecasting. Some of them use e-Procurement. The usage of JIT, ERP, Separate logistics department, RFID, Assistance from supply chain experts and VMI are Very small.

The opinion on necessity of the new tools in supply chain management by the suppliers who are not using them now is given in Figure 2.

Figure No. 2: The opinions on necessity of latest tools by suppliers

Source: Primary data

- It is observed that the suppliers who do not use JIT now feel that it is highly necessary. By Mann-Whitney U test, the p value is 1.000 (> 0.05). Hence, it is inferred that there is no significant difference on the opinion between suppliers of perishable and non-perishable products on necessity of JIT.

- It is observed that the suppliers who do not use e-Procurement now feel that it is highly necessary. By Mann-Whitney U test, the p value is 1.000 (> 0.05). Hence, it is inferred that there is no significant difference on the opinion between suppliers of perishable and non-perishable products on necessity of e-Procurement.

- It is observed that the suppliers who do not use ERP now feel that it is highly necessary. By Mann-Whitney U test, the p value is 1.000 (> 0.05). Hence, it is inferred that there is no significant difference on the opinion between suppliers of perishable and non-perishable products on necessity of ERP.

- It is observed that the suppliers who do not use Separate Logistics Department now feel that it is highly necessary. By Mann-Whitney U test, the p value is 0.849 (> 0.05). Hence, it is inferred that there is no significant difference on the opinion between suppliers of perishable and non-perishable products on necessity of Separate Logistics Department.

- It is observed that the suppliers who do not use Bar Coding now feel that it is highly necessary. By Mann-Whitney U test, the p value is 0.339 (> 0.05). Hence, it is inferred that there is no significant difference on the opinion between suppliers of perishable and non-perishable products on necessity of Bar Coding.

- It is observed that the suppliers of non-perishable products feel that RFID to be more necessary compared to other suppliers. The suppliers who do not use RFID now feel that it is just necessary. By Mann-Whitney U test, the p value is 1.000 (> 0.05). Hence, it is inferred that test shows that there is no significant difference on the opinion between suppliers of perishable and non-perishable products on necessity of RFID.

- It is observed that the suppliers who do not use VMI feel that it is highly necessary. By Mann-Whitney U test, the p value is 0.089 (> 0.05). Hence, it is inferred that there is no significant difference on the opinion between suppliers of perishable and non-perishable products on necessity of VMI.

- It is observed that the suppliers who do not use Assistance from Supply Chain Experts now feel that it is highly necessary. By Mann-Whitney U test, the p value is 0.793 (> 0.05). Hence, it is inferred that there is no significant difference on the opinion between suppliers of perishable and non-perishable products on necessity of Assistance from Supply Chain Experts.

- It is observed that the suppliers feel that the e-Procurement and Bar Coding are more necessary now than any other latest technologies.   It is also observed that the suppliers of perishable products feel that RFID is less required now where, the suppliers of non-perishable products feel that RFID and Assistance for Supply Chain Experts are less required now.   It is seen that, overall the suppliers feel that the e-Procurement and Bar Coding are more necessary now than any other latest technologies and they feel that RFID is less required now.

(b) Analysis of responses from the transporters is given below.

The level of usage of new tools by transporters is given in table 3 and figure 3.

The following table shows the usage of these tools by transporters.

Table No. 3: The level of usage of latest tools by transporters in percentages

Concepts	Overall
JIT	80
Vehicle tracking systems	90
ERP	0
GPS	55
Bar coding	40
RFID	0
Forecasting	100
Cross Docking	40
Assistance from Supply Chain experts	35

Source: Primary data

Figure No. 3: The level of usage of latest tools by transporters in percentages
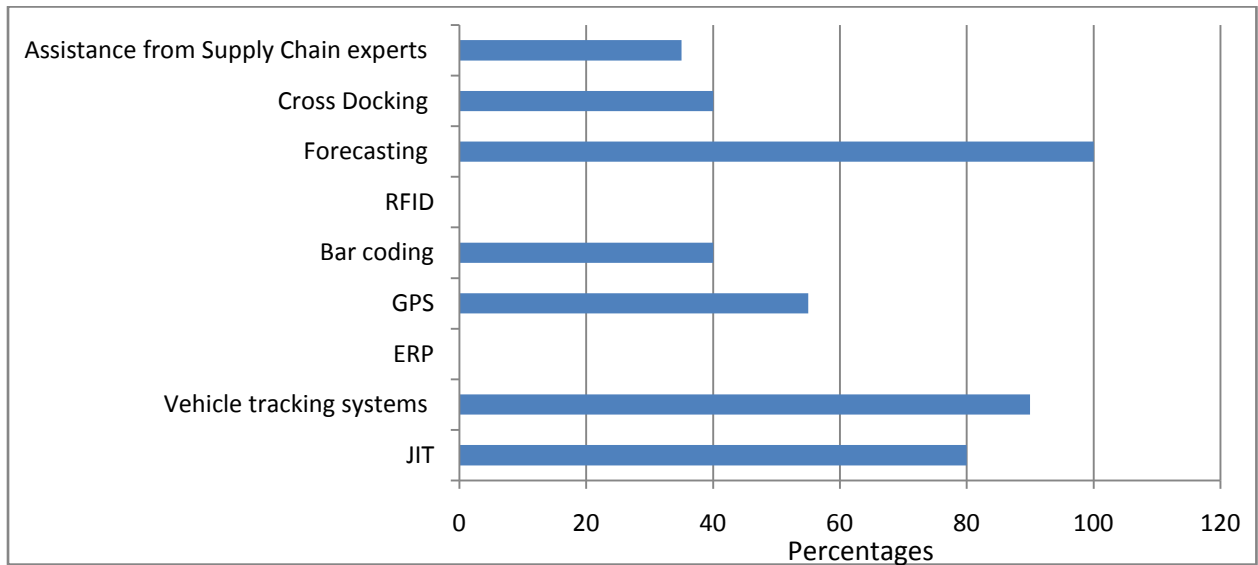
Source: Primary data

- Majority of the transporters use JIT, Vehicle Tracking Systems, GPS and Forecasting. Some of them use Bar coding, Cross Docking and Assistance from supply chain experts. ERP and RFID are not used.

The opinion on necessity of the new tools in supply chain management by the transporters who are not using them now is given in Table 4 and Figure 4.

Table 4: Table showing the opinion on necessity of the new tools in SCM by the transporters who are not using them

	N	Mean	Std. Deviation	Median	Percentage mean
JIT	4	4.50	.577	4.50	90.00
Vehicle tracking systems	2	5.00	.000	5.00	100.00
ERP	20	4.75	.444	5.00	95.00
GPS	9	4.56	.527	5.00	91.11
Bar coding	12	4.42	.793	5.00	88.33
RFID	20	3.45	.605	3.50	69.00
Cross docking	12	3.33	.651	3.00	66.67
Assistance from Supply Chain experts	13	4.46	.519	4.00	89.23

Source: Primary data

Figure No. 4: The opinions on necessity of latest tools by transporters
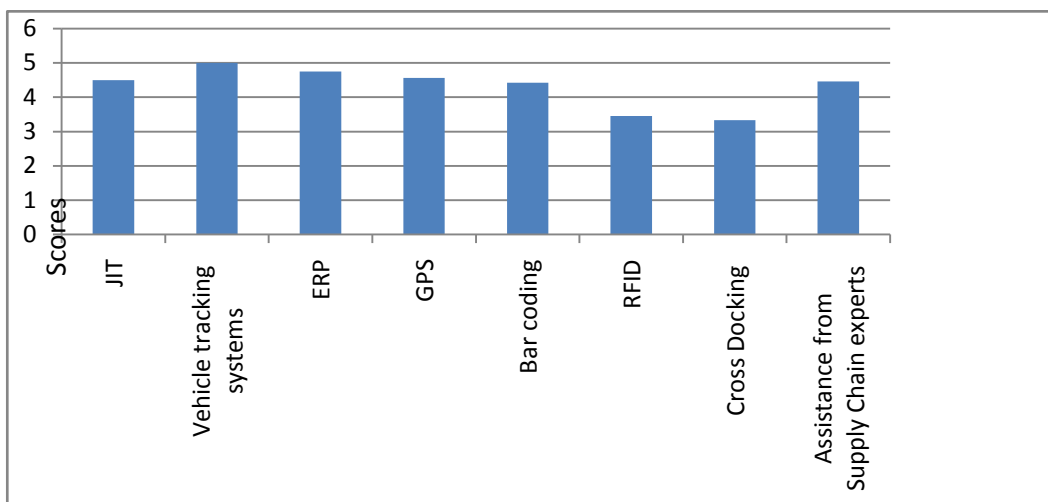
Source: Primary data

- It is observed that the transporters who do not use these tools feel that Vehicle Tracking Systems is the most necessary technology is to be used. It is also observed that they feel that JIT, ERP, GPS, Bar Coding and Assistance from Supply Chain Experts also are highly necessary where RFID and Cross Docking are just necessary.

FINDINGS

The findings from the study are consolidated.

The level of application by the suppliers:

- The level of application of ERP, JIT, RFID, VMI and Separate Logistics Department are very low among suppliers. It is also seen that all the suppliers use forecasting. A majority of them use Bar coding.

- The suppliers who do not use JIT, e-Procurement, ERP, Bar Coding, VMI, Separate Logistics Department and Assistance from Supply Chain Experts now feel that it is highly necessary. In case of RFID they feel that it is just necessary. It is inferred that there is no significant difference on the opinion between suppliers of perishable and non-perishable products on necessity of these tools. It is observed that the suppliers feel that the e-Procurement and Bar Coding are more necessary now than any other latest technologies and RFID is less required now.

The level of application by the transporters:

- Majority of the transporters use the concept of JIT, Vehicle Tracking Systems, GPS and Forecasting.   It is also observed that some of them use Bar coding, Cross Docking and Assistance from Supply Chain Experts and usage of ERP is very low.

- The transporters feel that Vehicle Tracking Systems is the most necessary technology is to be used. They feel that JIT, ERP, GPS, Bar Coding and Assistance from Supply Chain Experts also are highly necessary where RFID and Cross Docking are just necessary.

SUGGESTIONS

The following are the suggestions for the suppliers.

- The suppliers need to enhance the application of ERP, JIT, RFID, VMI, Assistance from Supply Chain Experts and Separate Logistics Department among them as the usage of these is very low. They feel that the e-Procurement and Bar Coding are more necessary now than any other latest technologies and RFID is less required now. They have to learn more about RFID and try to adopt it.

- Many firms have observed the bullwhip effect in which fluctuations in orders increase as they move up the supply chain from retailers to distributors to manufacturers to suppliers. The bullwhip effect distorts demand information within the supply chain, with different stages having a very different estimate of what the demand looks like.   The result is the loss of supply chain coordination.   Some proposals for reducing the Bullwhip effect are: access to POS data, single control of replenishment, reduction of lead-times and JIT supply, Vendor-Managed Inventory (VMI), Electronic Data Interchange (EDI) and Computer Assisted Ordering, discount on assorted truckload, regular delivery appointments, reduction of frequency and

magnitude of special trade deals and sales promotions, everyday low prices, allocation of short products based on past sales, shared capacity and supply information, limitation of flexibility over time, capacity reservation and penalties in order cancellation (Lee H.L., et al, 1997a), (Lee H.L., et al, 1997b), (Lee H.L., 1998).

The following are the suggestions for the transporters.

- The transporters need to enhance the application of Bar coding, Cross Docking, Assistance from Supply Chain Experts and ERP among them as the usage of these is very low. They feel that Vehicle Tracking Systems is the most necessary technology is to be used. By proper tracking, guaranteed delivery is often promised, and a sophisticated shipment tracking system helps fulfil the goal (Ronald H. Ballou et al, 2007).   The transporters need to adopt Vehicle Tracking Systems as they feel it highly necessary.

- They feel that JIT, ERP, GPS, Bar Coding and Assistance from Supply Chain Experts also are highly necessary where RFID and Cross Docking are just necessary. Wal Mart's supply chain efficiency is, to a large extent, based on its success in cross docking (Upendra Kachru, 2009). Supply Chains need to improve the cross docking process to have better responsiveness to the customer.

CONCLUSION

The study was aimed at understanding the level of usage of latest tools in supply chain management among the suppliers and transporters in the corporate retail chains in Kerala. It is found that the usage of new tools is very low among the suppliers and transporters. Majority of them currently use bar coding now. They feel that most of these tools are highly necessary and need to be implemented.

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