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A Study on Successful Practices in Implementing Information & Communication Technology (ICT) in Logistics Industry in India

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Abstract: Many organizations are finding new ways to overcome the competition. They are constantly under pressure to create and deliver competitive value to their customers. Adding to this is the ever growing technology trend, especially information and communication technology. ICT is invariably being applied in almost all the organizations, across domains, for their regular and strategic operations. ICT has helped these organizations explore new ways to collect, preserve and disseminate both internal and external information and also keep the respective stakeholders in the loop. The logistics sector is no different.

The logistics industry across the world rests on the pivotal idea of reducing costs for customers and providing efficient services. In India, the logistics industry has been growing by leaps and bounds. Although the Indian logistics industry is recording a steady growth, it seems to be somewhat stagnant at crossroads. At the same time, the industry is gearing up for a drastic makeover by leveraging on the latest technology innovations for the sector.

This paper is aimed at understanding the major challenges the logistics organizations are facing in India, their causes and the options to overcome them. The main objective of this paper is to propose Information and communication technology based collaborative system that can help the logistics organizations address their challenges more effectively.

Key words: Information & Communication Technology (ICT), Logistics industry, ICT in logistics, Challenges in logistics sector, Benefits of ICT.

Introduction

The present business environment has been constantly going through changes owing reasons to varying market condition, changing technology trends, growing competition, uncertain customer demands, turbulent economies to name a few. As a result many organizations are finding new ways to overcome the competition. They are constantly under pressure to create and deliver competitive value to their customers. Adding to this is the ever growing technology trend, especially information and communication technology. ICT is invariably being applied in almost all the organizations, across domains, for their regular and strategic operations. ICT has helped these organizations explore new ways to collect, preserve and disseminate both internal and external information and also keep the respective stakeholders in the loop. A close observation and various newspaper articles / journals / researches / on the organizations on a regular basis substantiate this claim.The logistics sector is no different.

The logistics industry across the world rests on the pivotal idea of reducing costs for customers and providing efficient services. In India, the logistics industry has been growing by leaps and bounds. Although the Indian logistics industry is recording a steady growth, it seems to be somewhat stagnant at crossroads. Thanks to the ongoing global economic uncertainty and its impact on Indian economy. But given the various initiatives by the Government of India (Make in India, Digital India, Smart Cities development, Establishment of Food Parks are some of the examples), it may not wonder many if Indian economy will walk past this uncertainty. Logistics industry in particular has well positioned itself to post an exponential growth owing to these initiatives, focus on developing infrastructure, proposal to introduce GST, rise in the e-commerce industry, rising investment in the sector, to name a few. This offers opportunities across the spectrum for companies in transportation, storage, distribution, and allied services, according to a report by MotilalOswal Securities Ltd[1].

[1]Logistics|Transformational Times, March 2015, MotilalOswal Securities Limited

Indian logistics scenario

According to the latest research by Frost and Sullivan[2], the Indian logistics market recorded revenues of about US $104.10 billion in 2014, witnessing a growth of about 4.9 percent over the previous year. Transportation accounts for about 60 percent of the market revenues. The Indian logistics market is likely to witness consistent growth of around 6-7 percent every year during the period 2014-2020 and reach revenues of about US $150-$160 billion by 2020.

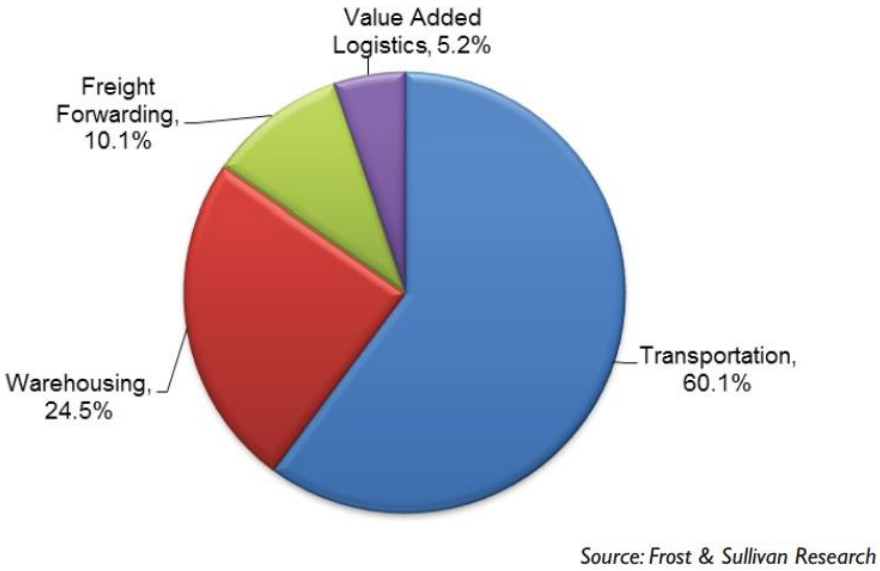


Fig. 1: Segmentation of Indian Logistics Market, 2014

Empirical evidence suggests the Indian logistics industry grows at 1.5-2 times the GDP growth. Indian logistics sector is estimated to have grown at a healthy 15% in the last five years. However, growth in sub-sectors varies, with the lowest being in basic trucking operations and highest in supply chain and e-tailing logistics. It is estimated that the share of India's logistics spend in GDP (2014) at 13% (versus 7-8% in developed countries), implying overall size of $180-220 Bn (direct costs + wastages from inefficiencies). A comparison with other countries shows inefficiencies are high in the Indian logistics sector[3].

India's logistics costs are approximately 10-20 percent of the GDP. As per the World Bank's Logistics Performance Index 2010, India is placed at 47th position out of 155 countries[4].

Last two decades has witnessed a technological revolution offering solutions to make logistics and supply chain management more effective and efficient than it has ever been. One of the three major flows of supply chain management is "information flow". It is said 'no product flows unless information flows'. One of the key components to meet this requirement is the adaption of Information and Communication Technology (ICT). The necessity to meet ever growing customers' expectations in a speedy and effective manner has left no option for the supply chain partners but to take maximum advantage of ICT. This has enabled them to create a strong network among the participating companies to ensure continuous flow of supply and demand information. This has led to an increased level of intensity for information requirement.

On the other hand, ICT has witnessed exponential development that has been strongly influencing the logistics services industry, making the companies involved, transform themselves from 'brick & mortar' to 'brick & click' in a very short period of time. This has opened up challenges among the competing logistics organizations across the globe. The scene is not as good in India. Reasons may be many. Unlike in some developed countries, the Indian logistics industry lags behind in adapting ICT. This can be attributed to constraints on investment in ICT, highly unorganized, varying levels of professionalism, traditional resistance to change, etc.

[2]Mega Trends in the Indian Logistics Sector for 2015-16, Frost and Sullivan and the CII Institute of Logistics
[3]Logistics|Transformational Times, March 2015, MotilalOswal Securities Limited.
[4]Business World, 26 August 2013

Importance of the Study

According to a latest report in the Financial Express that states, low penetration of new technology in the supply chain process is resulting in damage of goods. India has the least warehouse capacity with modern facilities, and given the fragmented industry state (large share with unorganised players), investment in IT infrastructure is almost absent at required scale. This is hampering the operations of the industry in terms of integration among the participant partners.

The focus of this research is on adaption of ICT in logistics organizations and its impact. This research is important for the logistics and IT industry to understand the depth of penetration of ICT and its effective use in the organization. By knowing this, it will be help organizations to evaluate their ICT strengths/weaknesses and can adjust the deviation, if any, for better efficiency. Also, the organizations offering IT solutions to logistics sector will get to know the gaps between what is been offered and what is required.

Statement of the Problem

Logistics firms need to manage information effectively and to integrate several activities including inbound and outbound transportation, distribution, warehousing, and fleet management, in order to streamline the physical product flows of their customers. The ICT systems are important to logistics, since they make available the right information, at the right time, at the right place, to the right person (which is also known as E-logistics). ICT systems are critical for managing logistics operations. Lack of timely information may lead to improper management of the above mentioned issues, impacting the overall performance of the organization. From the initial review of literature and various industry reports mentioned, it is evident that the Indian logistics industry is way far in achieving excellence from their overseas counterparts. This inefficiency can be brought down with the efficient use of ICT in the industry. The technological advancement in the industry is a boon for the logistical firms. This gap in the availability and the implementation of ICT in the industry motivated the researcher to take up the study which helps the people concerned understand the reasons behind the same.

Review of Literature

The present form of logistics industry in India is still in its infancy and is highly fragmented. There are thousands of logistics companies, ranging from the international giants to the highly localised small players in the country. As the logistics industry in India is in nascent stage, there are a lot of logistics issues to be improved (Viswanadham, Puvaneswari, 2004).

The transportation industry is fragmented and largely un-organized – a large number of independent players with regional or national permits that carry freight, often with small fleet size of one or two single-axle trucks. This fragmented segment comprises owners and employees with inadequate skills, perspectives or abilities to organize or manage their operations effectively **(Chandra, Jain, 2007).**

Logistics technologies refer to the hardware, software, and network design required facilitating processing and exchanging. It includes related components in the supply chain, such as satellite transmissions, web-based ordering, EDI, bar coding, systems for order entry, order processing, vehicle routing and scheduling, inventory replenishments, automated storage, and retrieval systems, etc. The correct implementation of technologies can be a significant source of competitive advantage to the service providers **(Srinivas, Krishna, 2009).**

The extent of IT usage has a greater influence on IT alignment of the firm with channel partners than IT advancement. IT Alignment influences supply chain capabilities more positively than IT Advancement. Capabilities of the supply chain like information sharing, coordination, collaboration and responsiveness are achieved more through investing in technology to align IT with that of their downstream channel partners **(Sundar, 2010).**

Benefits of IT in SCM are multitude and vary in the context of their implementation. Moreover, as the use of IT is closely related to process changes, most of the benefits are overlapping and interlinked **(Auramo, et all 2005)**

IT as a productivity tool can be utilized to both increase the capability and decrease the cost at the same time. Some of the enablers are Logistics Information System, Electronic Data Interchange (EDI), Bar coding, Real-time Communications capability, Radio Frequency Identification (RFID), to name a few **(Gurung, 2013).**

IT will remain on top of the agenda of logistics companies for the coming years and requires proper strategic management. In this perspective, taking it as a "strategic necessity" or as a source for "competitive advantage" or stated more simply as "a pain to cope with" or as a "strategic opportunity" is consequential **(Founou,2002)**

Moderate impact of ICT signifies that ICT is re-shaping the logistics system from traditional methods to modern logistics. Specifically, it was supported by the current types of ICT, their uses, and the applications as well the barriers presented **(LIDASAN and OBOGNE,2005).**

ICT developments are more and more influencing the transport and logistics service market and give rise to new organizational forms for these services. Accurate and timely information allows minimizing inventories, improving routing and scheduling of transportation vehicles, and generally improving customer service levels **(Evangelista, Sweeney, 2003)**

Scope of the Study

The present research will investigate the possible benefits the Logistics industry (road transportation in particular) can get through effective ICT implementation in order to integrate different participants in achieving effective and efficient delivery of goods. The research will also investigate the required framework of adaption of ICT. The scope of this research is limited to smaller organizations.

Objectives of the Study

- To understand the challenges of logistics industry in efficient order processing and to propose the tentative framework of ICT to overcome this challenge.

Methodology

This descriptive study aims to understand the current situation of the logistics industry in delivery, time management, relationship between participating companies in achieving effective delivery, ICT application in the industry and its implications. The study proposes to describe the industry based on the above parameters and give a tentative framework for better ICT usage in the industry.

For the research purpose, both primary and secondary data are utilized. Primary data was collected through structured questionnaire. The Primary data sources were the representatives of the organizations in logistics industry. The secondary data sources are various published reports that are related to the research topic. Simple random sampling technique was used to select the sample of a size of 150. These samples are an active part of the logistic sector. Data analysis was conducted using MS Excel and IBM SPSS.

Limitations of the Study

- The study is limited to road transporters only.
- The study is conducted in and around Bangalore city. As the logistics industry is the most fragmented one can find organizations with branches across in the city.
- Data collected may be biased as some of the respondents may / may not want to implement technology.
- Sample providing the data may not be qualified. At times respondents had to be explained about the technology and the how it may help their day to day processes.
- Sample may not be aware about technology in their domain.

Demographics

- It is found that the majority of the respondents are fleet owners who are in the transportation business. Rest of the respondents is intermediaries. The industry comprises majorly the vehicle owners and the transporters than the intermediaries.
- Though there are public limited organizations in the industry, the number is fairly less compared to the above legal entities. Moreover, for this research, the sample is small and medium firms which are in larger numbers than the larger organizations which are in smaller number.
- It is found that most of the organizations are less than 10 year old in the industry. Though the margin between the organization who are less than 5 years in the industry and those who are between 6 and 10 years is very thin, it can be inferred that the industry is attracting more number of people to be a part of it. It can be implied that the entrepreneurs are willing to collaborate with other like-minded professionals for better business propositions than going solo. This is a positive sign for the industry given the fact that integration is the key for success in this sector particularly.
- It is learnt that there are multiple points of source and destination for these organizations. Having branches across the country help them in fulfilling the customer needs without geographical restrictions within the nation. This also assures them that they will not be left out in receiving orders citing less accessibility.
- It is evident from the data that large portion of the respondents have less than 10 trucks, followed by about those who have more than 10 and less than 50. There are only few who have more than 50 trucks. This acknowledges the earlier researches that there is more number of small operators in the industry in India.

The outcome of a study conducted by the Central Institute of Road Transport also indicates a large number of small operators with 77 per cent of truck operators owning 5 or less trucks[5]. This supports the fact that Indian logistic industry is very fragmented and unorganized.

- It is evident that it is the large portion of private limited establishments among the fleet owners that are beyond 10 years in the sector.
- It is clearly evident from the above analysis that the fleet owners and the intermediaries agree to be part of the computer based information system to resolve their present problems. It can be ascertained that irrespective of the type of the organization, the respondents are willing to adapt the computer based information system in order to integrate with other industry partners for fulfilling the orders more effectively and efficiently.

Adoption of ICT in Logistics Organization

- It is evident from the above data that most of the respondents use computers in their business. Some of them are still not using computers for their business. It can be implied that most of them are dependent on technology for their routine processes. In today's technology era, it is becoming necessary to use technology on a day-to-day basis. The days of treating computers as a luxury commodity are gone.
- Out of the respondents who said they use computers in their business, about $3/4^{th}$ of them use it for e-mailing, office automation (taking print outs of official records, generating manual reports, manually maintaining database of customers, business partners, & intermediaries). Only few of them use ICT for tracking their consignment and automated their business process.
- This analysis helps in understanding the fact that though ICT is in use in the industry, it is limited mostly to access internet and perform basic activities classified under office automation.
- It can be seen from the above data that most of them are not using any industry specific software in their computers for any of their business processes. It is also found earlier that the main purpose the computer is used is for email followed by office automation. There exists an opportunity for the software solution providers to tap this great potential market for providing economical industry specific automation.

Order Management

- It can be inferred that most of the respondents procure the order through intermediaries, some procure directly from the organizations (customers) and few of them are on contract with their clients. This shows that the industry is ruled by intermediaries and also supports the fact that the industry is much unorganized. There is no single operator who can fulfill the order completely.
- It is clearly evident from the above data that most of respondents collaborate with other organizations to fulfill the order procured as their fleet is insufficient to do so. They need to collaborate with anywhere between 1 and 5 organizations to fulfill the orders they have procured from their customers. This highly suggests the need for the organizations to be in touch their fellow organizations to fulfill an order. This makes them to be on their toes to be in touch with the intermediaries in order to procure as well as fulfill the orders. Since there is large number of small operators in the industry, it makes them more vulnerable to associate themselves with other players in the industry. Though it is beneficial for all the participating operators, in the long run it may pose different challenges for the organizations to continue the collaboration as there is no permanent fixtures. For every order there may be different organizations collaborating with each other for their order fulfillment.
- When queried about how they will arrange for the additional vehicles required to fulfill the orders, most of them confirmed that they will arrange the vehicles through intermediaries. This is evidence for the fact that the industry is literally controlled by intermediaries and small operators in large numbers.

Challenges in Logistics Industry

- The query about various challenges the operators face during collaborating with other operators for additional fleet brought out most of the things. The other operators' ambiguous response and the intermediaries try to take advantage of the situation by quoting higher than existing rates for the vehicles are the two major challenges that the organizations are facing. This makes the organizations to talk to more intermediaries. A lot of time is wasted here in finding the right operator to collaborate. Some of the respondents also quoted that at times the intermediaries just shun the door on them. The intermediaries will be unwilling to support. Though this is a very small chance, it cannot be neglected for a larger gain.

[5] The Impacts of India's Diesel Price Reforms on the Trucking Industry, June 2013, Integrated Research and Action for Development, New Delhi

Another major challenge is that of multiple middlemen playing critical role in operating the industry. Absence of adequate and timely availability of the vehicles to fulfill the orders is another challenge. The respondents also felt that feeble communication among the concerned partners, and multiple middlemen are also considered as major problems. Lack of visibility to the customers, low capacity utilization of trucks and lack of focus on time sensitivities are also adding complexities to the already unorganized industry.

- All these problems are hampering the growth of the industry contributing to more complexities in operating the business. This analysis suggests that there is an urgent need to overcome these obstacles in an organized manner.

Benefits of ICT for the logistics organization

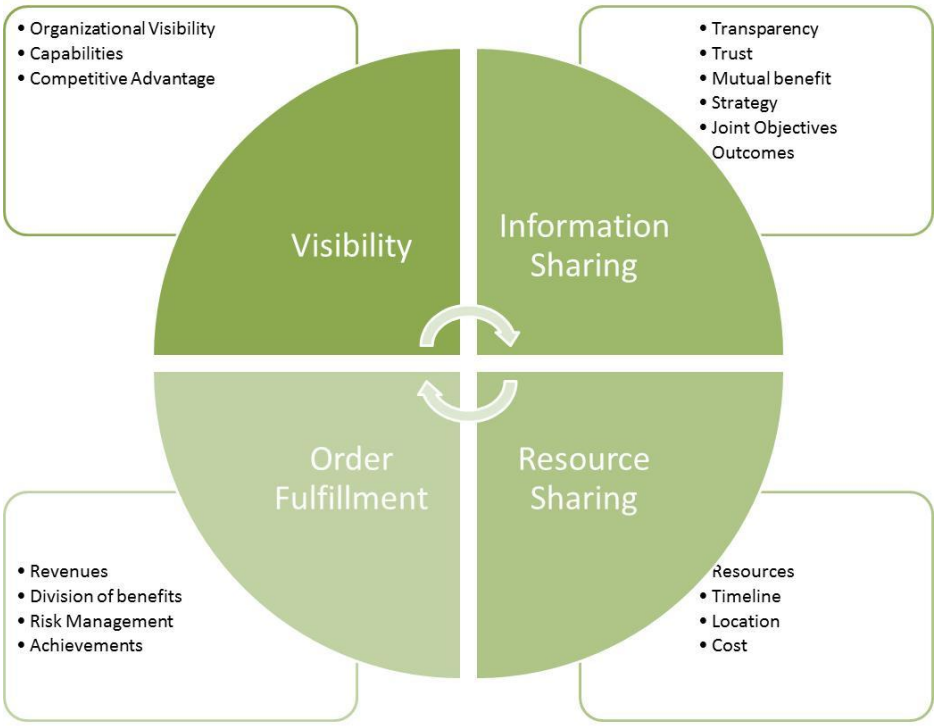
- From the analysis it can be inferred that the respondents are in favor of getting accurate information, reduced overall cost, reduced the overall waiting period of the fleets, increased visibility to the customers, more opportunities for business expansion and can have better control over their business, when they implement ICT.

Preferred Solution

- It is seen that most of the respondents are willing to connect through a system to other integrating partner in the industry to fulfill the customer needs.This indicates how fragmented the industry is and the need for integration among them.The data clearly indicates the need for a computer based information system that can integrate the participating partners in fulfilling the orders. The respondents feel that a computer based system can share the resources related information in real time among the partners during the crucial times which is the need of the hour.

Proposed Collaborative Model for the Participating Partners

It is found from the research that most of the organizations do not have required fleet size in order to fulfill the order. They collaborate with other organizations in order to fulfill the orders they receive. This becomes cumbersome when they have to deal with the middlemen or intermediaries who charge exorbitantly during the time of crisis. Worst is that the organizations do not even get proper response during the need of the hour. This signifies how important the collaboration among the participating partners is. Most of the respondent organizations have agreed to the point that there is need for a computer based information system that connects all the participating partners in order fulfillment. During the interaction among these organizations, most of them agreed upon the need for collaboration of participating partners and also on some of the guidelines they need to follow for the same. The same has been interpreted as under:



The collaboration is based on four factors viz., Visibility, Information sharing, Resource sharing and Order fulfillment. This collaboration is needed in order to:

- Enable organizations achieve higher visibility among the logistics organizations.
- To facilitate collaboration among the participating partners for effective and efficient order fulfillment
- To meet and enhance the individual capabilities of the participating partners into collective strength
- To stimulate the need to grow and sustain the growth
- To address the challenges faced during the need of the hour

Visibility

It is important for an organization to be visible in the industry in order to be recognized by the prospective customers to fulfill their delivery needs. Visibility simply means to make the presence of the organization felt where it matters. It can be classified as under:

- **Organizational Visibility:** Making the presence of the organization felt in the circle of prospective customers in order to be selected to fulfill their need for delivering their goods/products from multiple sources to multiple locations.
- **Capabilities:** Apart from being present in the industry, it is also required to exhibit different capabilities of the organization.
- **Competitive Advantage:** In its simple form, an organization's competitive advantage lies in its capability to fulfill its customers' needs completely. It makes sense for an organization to demonstrate its competitive advantage to the industry in order to be collaborated with other participating partners.

Information Sharing

Sharing critical information among the participating partners for efficient order fulfillment is very important. Information pertinent to using available resources for mutual benefit plays an important role. It helps the organizations in:

- Being transparent
- Developing trust
- formulating and arrive upon mutual benefits
- Charting out strategies on effective utilization of available collective resources and subsequent order fulfillment
- Framing joint objectives
- Foreseeing the expected outcomes

Resource Sharing

The organizations must be clear about the type and size of the resources being shared with other participating partners. The availability of the resources, constraints, etc. has to be made available. This helps the other organization to decide whether these resources would help them at the hour of need.

- Resources – type of resources
- Timeline – their availability with respect to time i.e. when the resources are available for utilization
- Location – location of the resources
- Cost – cost of utilization of resources

Order fulfillment

Post order fulfillment processes have to be formulated. This is required in order to avoid any conflicts that may arise out of any disagreement. If the terms of utilization of resources are clear, this collaboration can go a long profitable way.

- Revenues – strategies to generate maximum possible revenue.
- Division of benefits – terms and conditions of profit sharing.
- Risk Management – strategies to mitigate and manage risk that may arise out of collaboration.
- Achievements – strategies to achieve the prescribed goals through consistent and collective performance by utilizing the combined resources.

In Conclusion…

Logistics firms may understand the need to manage information effectively and the importance of integrating with other participating logistics organizations in order to achieve efficient functioning of several activities including inbound and outbound transportation, order procurement and fleet management, in order to streamline the physical product flows of their customers. The study insists on the importance of ICT systems to logistics, since they make available the right information, at the right time, at the right place, to the right person.

The findings support the fact that ICT systems are critical for managing logistics operations and lack of timely information may lead to improper management of the above mentioned issues, impacting the overall performance of the organization.

Further Research:

This research work was conducted to study the adaption of ICT in general in the logistics industry, transportation in specific. Studies related to specific technology used for specific purpose in the industry can be conducted as an extension of this study. Some of the examples include use of RFID to track the consignment, Warehouse management system for managing the inventory in the warehouse, decision systems for managing supply and demand, Inventory management systems to manage inventory, hand held and mobile devices to track/manage consignments/inventory/order processing/order picking. Further research can also be conducted on improvising on the suggested models.

Further research can focus on SCM (Supply Chain Management) as this gaining momentum in the present economic scenario. The organizations are looking at comprehensive solutions rather than fragment them. Another area where there is further scope for research is to offer a cloud based system. The technology is well matured in India too to offer cloud based solutions. But a proper research can be conducted before proposing this type. One more scope of further research can be to integrate the logistics organizations using IoT (Internet of Things) approach. As the country is witnessing digital movement, this approach makes sense as the system can be more smarter with less human involvement leading lesser errors.

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