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Designing Logistics information System: Theoretical Background and Literature Review

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Abstract—Logistics is the system of people and things that are involved in getting a product from the place where it is made to the person who buys it. Information system is an interactive structure of people, equipment, methods, and control, designed to create information flow in the required format for the user to make the decision to reduce the risk element. This paper aim is to designing Logistics Information System in theoretical underpinning and also discussed characteristics of Logistics Information System. In review of 40 papers related to Logistics Information System also discussed.
Keywords: Information sources, logistics system, characteristics, theoretical

I. INTRODUCTION

Logistics is that part of the supply chain process that plans, implements and controls the effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption, in order to meet the customer's requirements **(Reji ismail, 2008).** Logistics is the process of planning, implementing and controlling the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption for the purpose of conforming the customer requirements **(Amercian council of Logistics management, 2011)** . Logistics essentially a planning process and an information based activity. The science of planning, organizing and managing activities that provide goods or services

Logistics information system (LIS) involves the integration of information, transportation, inventory, warehousing, material handling and packaging**.** Logistics information system, information can be as lifeblood of a logistics and distribution system. The effectiveness and accuracy of distribution systems depend on the transfer of information. Logistics information system holds the whole system and coordinates all the components of logistics operations: planning and coordination and operation. Planning and coordination defines nature and location of customers that supply chain operations seek top match to planned product and services and promotions **(Shivani Dubey and Dr.Sunayana Jain, 2014).** A logistics information system links up the logistical activities. It integrates a number of information sources, including the order information, purchasing information, production information schedule, the packaging information schedule, the transport and warehousing information, the distribution information, the payment information and the delivery information. It serves to enable logisticians retrieve date as and when it is required, process data through the system and analyse data. **(Voortman.C, 2004).**

LIS is an information system that provides management with relevant and timely information related to logistics. Implementing information technology in retail outlets to bring number of benefits in that industry. LIS as a computer-based information system that supports every aspect of the logistics management process, which involves the coordination of activities, such as scheduling, inventory replenishment and material flow planning. Through Information System, suppliers, manufacturers, and customers are integrated into a logistics network for efficient supply chain management. The global nature of logistics now requires information systems that enhance inventory control, track orders and materials and monitor resource utilization. Information systems and computer technologies are vital to the development of an organization willing to understand and attain to customers' requirements and needs. The ability of a company to optimize its logistics costs and levels of customer service is affected by the LIS it uses. Add that these systems are extremely important in reducing inventory and lead time along the supply chain. The effectiveness and accuracy of distribution systems depend on the transfer of information. Logistics information system holds the whole system and coordinates all the components of logistics operations: planning and coordination and operation. Planning and coordination defines nature and location of customers that supply chain operations seek top match to planned product and services and promotions.

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II. REVIEW OF LITERATURE

Anil Gurung, (2013) Analysed impact of Information Technology on logistics and identify the technologies used and their benefits on logistics.

Md. Salah Uddin Rajib, Md. Shariful Alam and Md. Shamsul Arefin, (2010) Conducted a case study for casual relationship of success through Logistics information system. For success of information system only combines with resources of an organization and human knowledge.

Veranda Tilokavichai and Peraphon Sophatsathit, (2011) Explored the interrelationship between ERP and Information System and identified the missing link between ERP and IS. Factors also identified to influence the user satisfaction by using ERP and IS.

Varanya Tilokavichai, Peraphon Sophatsathit and Achara Chandrachai, (2012) Analysed the factors of LIS usage that affecting Logistics Performance Management under uncertainty and also proposed model called TAM model for LIS adoption.

Soo Wook Kim, (2004) Proposed a strategies for LIS utilization and find out the relationship between Corporate and LIS and also discusses the factors affecting for LIS utilization.

Yu Liu, (2012) Examined the behavioural factors that target to use LIS. Customer attitude is also considered to use LIS. Impact of technology towards customer behaviour is also investigated.

Rajiv Bhandari, (2013) Examined the technologies used in Logistics and Supply Chain Management and then impact of them. To achieve competitive advantage proper logistics system should be used to support various logistics functions.

H.C.W. Lau, C.K.M. Lee and K.L. Choy, (2004) Proposed an infrastructure for design and support reverse logistics system. Information system should be important one for maintain reverse logistics activities in low cost and also connects technology and managerial activities.

David J. Closs, Thomas J. Goldsby and Steven R. Clinton, (1999) Identified a competence and logistics strategy then determines relationship between logistics information system capabilities, competence and strategy.

Kyungwoo Kang and Oh Kyoung Kwon, (1997) Discussed a physical infrastructure is not sufficient for improving Logistics system and the issues to be considered for implementing Integrated Logistics Information System.

Prabir K. Bagchi, (1992) analysed the needs of logistics in global market place and uncover the issues for implement International LIS and framework are discussed.

A. D. Shalini Prieya and S. Sankaranarayanan, (2015) Identified the factors underlying the advantages of LIS and software's usage in logistics service companies.

Shivani Dubey and Dr.Sunayana Jain, (2014) Discussed the adoption of LIS into cloud and the benefits of integration of LIS in cloud.

E.W.T. Ngaia, Kee-Hung Laib, and T.C.E. Chengb, (2008) Proposed a model for LIS adoption and find out relationship between Organizational Context, Perceived benefits and Perceived barriers then discuss use of IT to support logistics operations.

David J. Closs and Kefeng Xu, (2000) Examined an IT practices in different industries and identify the gaps between world class logistics firms and their baseline region.

Pablo Gonzalo Lázaro, Ruth Mateos de Cabo and Juan Carlos García Villalobos, (2015) Discussed an implications on firm operational performance by adoption of LIS. Relationship between LIS and firm performance depends on logistics performance and flexibility.

Dr. Anubha Vashisht and Aakanksha Uppal, (2000) Analysed the Logistics Information System and then logistics integration with information technology that are used in different companies.

Danilo Hisano Barbosa and Marcel Andreotti Musetti, (2010) Examined adoption of LIS in manufacturing companies with connection of Organization variables. Organization size and operation greatly depends on LIS adoption. Large business adopt LIS is more likely than smaller business.

Petri Helo and Bulcsu Szekely, (2005) Discussed the software application functionality development and that benefits to supply chain management. Different management systems used for incorporating ERP functionalities in a particular platform.

Feng Liang, (2008) Proposed approach for reconfigurable logistics information system using soft components to support entire supply chain. LIS architecture based on soft components technology and also create new system rapidly and improve efficiency.

Lucas D. Introna, (1991) Discussed the impact of Information Technology on logistics and also implications.

Stephen M. Rutner , Brian J. Gibson and Susan R. Williams, (2008) Discussed the impact of e-commerce and ERP on LIS and tools for LIS to direct the business in right direction. In logistics organization information flow is important both inside and outside the organization.

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Ndeda bernadette jadamba, (2014) Analysed the impact of LIS performance in international humanitarian organizations and challenges facing for implementing for LIS. It provides value for an organization and adequate support of logistics functions.

Chieh yu lin, (2006) Analysed the information systems to help for coordinate the supply chain network in logistics service providers and also identify the factors for both internal and external criteria affects innovation in LIS for logistics service providers.

Yandra Rahadian Perdana, (2012) Examined use of agricultural LIS to support supply chain in right time at right place then utilization of agriculture LIS can be benefits for global market place and decision making for customer and producer point of view.

Dr. Pratyush Tripathi and Deepak Tiwari, (2014) Studied the role of inventory management techniques that leads to retailer's sale and customer satisfaction. Customer faced problems for inventory management techniques adopted by retailers.

Asiegbu, Ikechukwu F and PoweiDaubry M, (2012) Analysed the inventory policy adopted for manufacturers and retailers. Both of them not adopt same inventory policy because reasons varied from manufacturer to end user.

Abisoye Opeyemi A, Boboye Fatoba,and Abisoye Blessing, (2013) Design a computerized inventory management system to maintain stock level for supermarkets and transaction updates, decision making.

Hsi-Mei Chen, (2009) Analysed problem solving related inventory management and design Integrated Inventory Management System to increase inventory control effectiveness. This design constitutes software agents to cooperate with each other.

IKitheka Samson Samuel, and Gerald Ochieng Ondiek, (2014) Studied the automation of inventory management and the impact of performance in supermarkets and also discussed inventory management automation used in supermarkets.

Cynthia Wallin, M. Johnny Rungtusanatham and Elliot Rabinovich, (2006) Analysed the inventory management approaches deciding for a particular firm and impact of profitability and its success in market place.

H. Amoozad-khalili, R. Tavakkoli-Moghaddam and N.Shahab-Dehkordi, (2010) Deliberated the application of RFID in manufacturing, retail, inventory, logistics and supply chain and benefits of using RFID in each section also discussed.

Samir K. Srivastava, (2007) Studied the impact of RFID application in logistics and supply chain and also obstacles to implement of RFID in retail outlet for Indian scenario.

Swapnil Pande and Terry Collins, (2007) Analysed implement IT in retail supply chain to improve efficiency of business. IT implementation in small firms will increase demand agility and also centralized inventory control model suggested to reduce bullwhip effect.

Lakshmi Narayana K, Ajata Shathru Samal and P Nagaraja Rao, (2013) Understand the consumer behaviour and satisfaction level towards organized and unorganized retail formats.

Varanya Tilokavichai, Peraphon Sophatsathit and Achara Chandrachai, (2012) Analysed the impact of logistics performance management in retail outlet and investigates the factors influence on Logistics Performance Management (LPM). Relationship between LPM and IS also measured.

Satish Kumar Singh, Dr. Pratyush Tripathi and Dr. P.K. Jain, (2012) studied the factors that impact on consumer behaviour towards organized retailing and also customer awareness, and perception about buying criteria in different formats.

Jabir Ali and Sanjeev Kapoor and Janakiraman Moorthy, (2010) Analysed the consumer preferences towards food and grocery products in retail chain and also to make good decision about product and market attributes.

Shailesh Pandey and Dr. Vipin Chand Rai, (2014) Studied the consumer behaviour towards retail outlets in India and also strategies adopted by small retailers to attract customers.

Saroja S, (2012) Studied the how information technology is useful to both customers and retailers and the benefits also discussed.

S.Ramesh Babu, P.Ramesh Babu and Dr.M.S.Narayana, (2012) Analysed the role of latest technologies like RFID in retailing and discussed how to achieve competitive advantage in Indian scenario.

Ms. Vijaya Jacquiline, (2012) Research about the factors contributing to popularize organized retail formats and study consumer performance towards organized retail format with position to retail management.

Rama Krishna Prasad. Y, (2011) Research about the growth and development food and grocery retailing then effect of consumer characteristics, situational factors and store format attributes was discussed.

L.Shanthi, (2011) Research about consumer awareness, customer faced problems, retailers attitude towards traditional and modern retail formats.

Priya. S, (2013) Research about application and impact of technology innovation in retail industry and investigate problems, challenges, and awareness about RFID in retail business.

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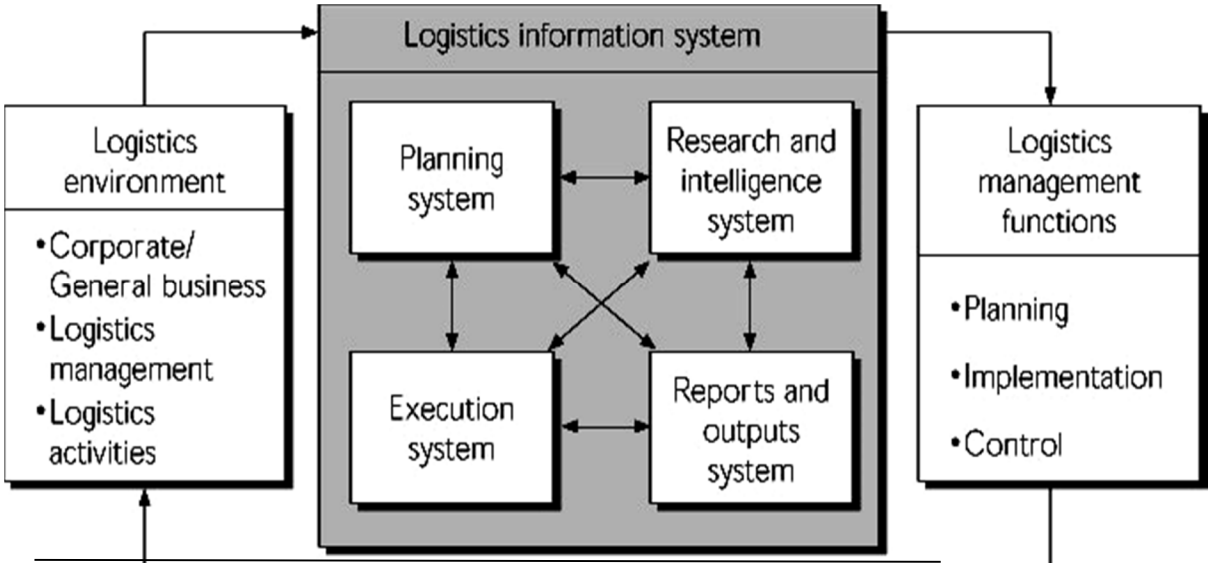
III. THEORETICAL STUDY

A. *Elements of Logistics Information System*

Logistics Information System basically consists of the following elements:

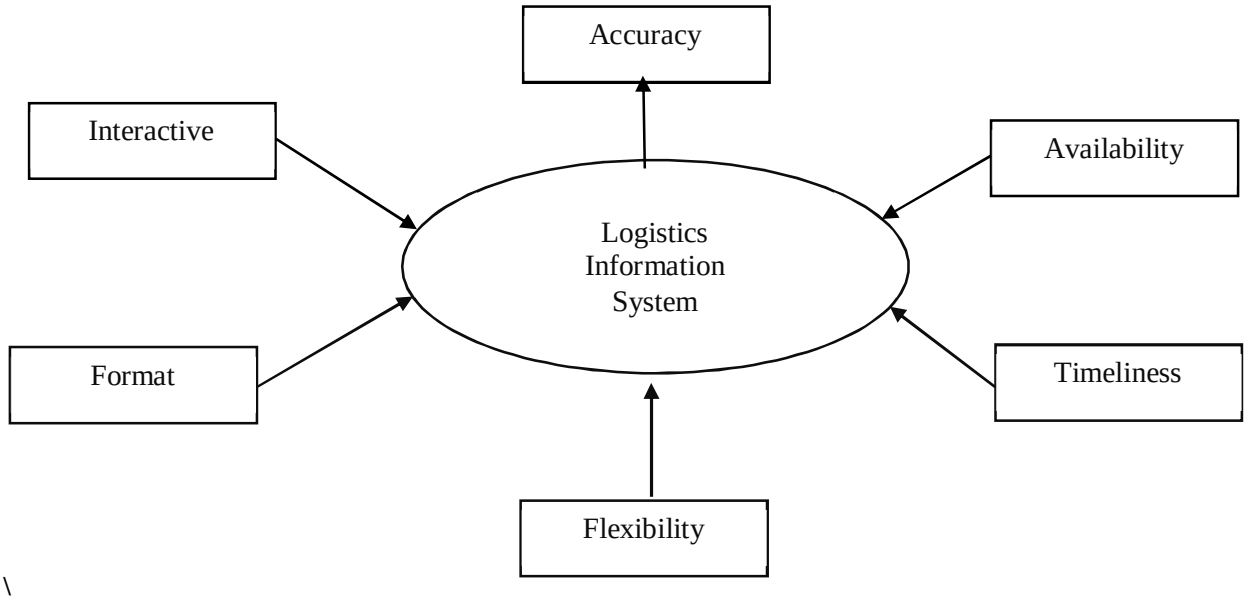
1) Information sources
2) Information collection system
3) Storage
4) Processing
5) Retrieval
6) Report Formatting

FRAMEWORK OF LOGISTICS INFORMATION SYSTEM



SOURCE: Management of Business Logistics, Chapter 12, 7th Edition.

CHARACTERISTICS OF LOGISTICS INFORMATION SYSTEM



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IV. DISCUSSION

Logistics information system framework having input consists of logistics environment such as logistics activities and output as logistics functions then intermediate process having execution system. Information sources consists of two basic resources, namely external customers and internal departments of an enterprise. Information may be fed into system through e-mail, Electronic data interchange. Information Storage such as CD, Hard disk, and magnetic tapes. Using microchips instant processing of data with great accuracy is possible. Data retrieval is possible at user terminals spread across systems. The appropriate software designed for the installed system makes it possible to generate reports for users in the required formats.

V. CONCLUSION

In this paper designing logistics information system framework and also characteristics of Logistics Information system was discussed. Non value added system output capabilities may be identified and taken out of the system to reduce investment cost. It is also determine the rate at which information and technology investment is influenced by order processing. It is obvious, that the trend is becoming new among manufacturing companies in all over the world. For using logistics Information System, personnel need to be trained and devices need to be maintained.

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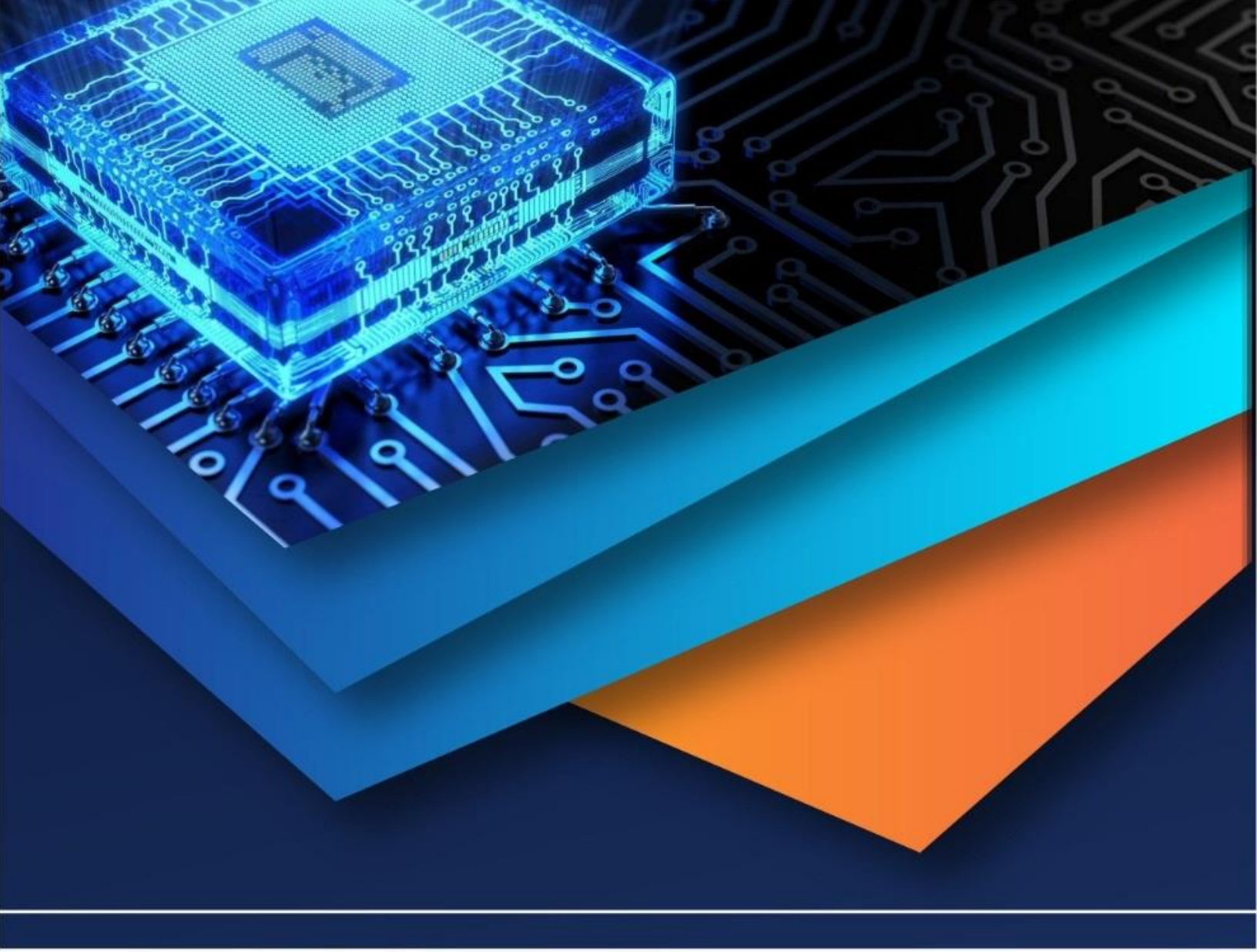
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