A Study on Evaluation of Logistics Network Design and Information Technology Tools and Applications for Operating the Third and Fourth Party Logistics (3PL and 4PL) Systems

Harshitha Surendra
M.Com Student
Department of Commerce & Management
Mount Carmel College (Autonomous), Bengaluru, India

Abstract:
This research survey gives a review of the down to earth use of display to the logistic network design and information technology tool and application for operating the 3PL and 4PL systems in Business. Different area models are sorted and chose ones are delineated that speak to a case of the class as well as that have been utilized widely by logistics & Business. Proposals are made with respect to how information can be totalled to encourage the demonstrating procedure of logistical design and utilization of technical tools in Logistics. Various precedents are offered with respect to how and where these area models have been connected like 3PL and 4PL Logistics.

I. INTRODUCTION

Logistics is the general procedure of overseeing how assets are obtained, put away and transported to their last goal. Logistics are the executives including distinguishing planned wholesalers and providers and deciding their viability and availability. Logistic directors are alluded to as logisticians. "logistic" was at first a military-based term utilized in reference to how military faculty acquired, put away and moved gear and supplies. The term is presently utilized broadly in the business area, especially by organizations in the assembling areas, to allude to how assets are taken care of and moved along the store network. In simple terms, the goal of logistics management is to have the right amount of a resource or input at the right time, getting it to the appropriate location in proper condition and delivering it to the correct internal or external customer. 3PL (outsider logistic) supplier offers re-appropriated logistics administrations, which incorporate whatever includes the board of at least one aspect of acquirement and satisfaction exercises. In business, 3PL has an expansive implying that applies to any administration contract that includes putting away or shipping things. A 3PL administration might be a solitary supplier, for example, transportation or distribution centre stockpiling, or it tends to be a systemwide heap of administrations equipped for dealing with production network the executives. Fourth Party Logistic Model (4PL). The manufacturer does not only outsource the organisation of its logistic tasks to third parties, but also the management thereof. Fourth party logistic service providers often check the entire supply chain. The organisational and executive activities are again often outsourced to other parties

II. REVIEW OF LITERATURE

The Asian diary of transportation and logistics–
Logistics is a ripe field for logical research comprising the utilization of different hypotheses obtained from the more settled orders. There is an expanding requirement for the assessment of the hypothesis use so as to comprise a strong base for future advancement of the field

Lund university publication --
The reason for this paper is to give a paradigmatic reflection on hypothetical methodologies as of late recognized in logistics and inventory network the board (SCM); to be specific complex versatile frameworks and multifaceted nature considering, and to contrast it with the overwhelming methodology in logistics and SCM look into, specifically the frameworks approach.

Extensive single model approaches have been proposed for supplier selection-
For example, the Analytical Hierarchical Process (AHP) by Bayazit,O.(2005). The Author proposed conditions and cooperation among different criteria in a basic leadership show, pointing that the systematic system process is an increasingly fitting approach.

Bhutta, K.S., Huq, F. (2003)
Analysed as to how AHP provides a framework to cope up with multiple criteria situations, involving supplier selection, while total cost of ownership is a methodology and philosophy.

Chan, F. T. S. (2003)
Proposed a model using AHP for interactive supplier selection as a contribution to development of supply chain management.

Satty, T. H. (1994)
Told with regards to the best way to settle on a choice in multi-criteria basic leadership circumstance, utilizing the Analytical Hierarchical Process (AHP). Investigative Network Process (ANP) is utilized as a choice device to settle multi criteria basic leadership apparatus as additionally proposed by O Bayazit (2006) and Gencer C, Gürpinar D, (2007). Distinction between administrators rating is analyzed by Verma and Pullman (1998) utilizing discrete decision examination (DCA) to see the significance of various provider characteristics and their genuine selection of providers in an exploratory setting.

R. Verma et.al. (2008): Given bearings to planning and executing discrete decision ponders for administrations and talked about a few models for various ventures including social insurance, budgetary administrations, retail, accommodation and online administrations. Interpretive basic model (ISM) to International Journal of Managing Value and Supply Chains (IJMVSC) Vol.5, No. 1, March 2014 21 show dimensions of

significance in provider determination process and the between relationship of various criteria were created by Mandam A. also, Deshmukh, S.G. (1994).

Kannan and Haq (2007): Utilized an interpretive displaying system to comprehend the cooperations among the criteria, which impacts the provider determination. Kannan et. al. (2010), built up a structure to break down the associations among the criteria, for example, purchaser suppler relationship, assessment and accreditation framework, dormant authoritative correspondence, provider duty, focused weight, provider execution, long haul key objectives, provider improvement program, obtaining execution, joint activity, trust, top administration backing and provider vital target for the provider advancement utilizing ISM.

Case-based reasoning (CBR) by Paul Humphreys, et.al. (2003): Built up an information based framework (KBS) which incorporates the ecological variables into the provider determination process. Fake neural system (ANN) and shrewd provider choice relationship the board framework (ISRMS) utilizing cross breed case base thinking (CBR) was connected by Choy et. al. (2003a, b) to choose and benchmark a potential provider. To control the provider choice procedure for whom, the best outsider switch coordinations supplier (3PRLP) is applicable, Kannan et. al. (2009b) connected a multi-criteria cooperative choice making (MCGDM) show in a fluffy situation.

Honget.al. (2005): Proposed a numerical programming model, with the target work being to maxmise or limit the choice factors. In his audit work, Ho et. al. (2010) referenced that there are a few crossover procedures that have been utilized for comprehending provider choice in various sourcing situations and request assignment, for example, DEA and MOP.

Talluri et. al. (2008): Adequately viewed as numerous elements and interrelationships among them for aiding purchaser provider arrangement, proposing a streamlining model.

III. OBJECTIVES OF THE STUDY

- To understand the impact of logistic network design, the way it improves the movement of goods
- To study the impact of information technical tools used by the organizations that are effective, efficient and continuously improving the logistic function of the organization.
- To know the importance of logistics in an EXIM organization development.
- To know the 3PL and 4PL logistic productivity.
- Finding the pros and cons of logistic company.

IV. LIMITATIONS OF THE STUDY

- Less knowledge of technological tools
- No update in 3PL & 4PL design system
- Non- cooperative employees
- Difficulty in statistical data analysis
- Breakdown of appropriate software(SPSS)
- The sample size is only 50 and the study is restricted on those samples.
- The study is limited to few logistics companies at Bengaluru only.

- Time of study is limited.

V. HYPOTHESIS

A hypothesis is a supposition or proposed explanation made on the basis of limited evidence as a starting point for further investigation

- **H0= Null Hypothesis:** There is no significant relationship between Logistic network design and information technology tools used with Experience of the employees.
- **H1= Alternative Hypothesis:** There issignificant relation between the Logistic network design and information technology tools used and with the experience of the employees.

VI. RESEARCH DESIGN

- The study adopted in this research is the Descriptive Research Design.
- This Descriptive Research Design is a method to solve the research problem systematically in a manner that involves the gathering of data of logistic network design, information technology tools and 3PL 4PL logistic process, using of statistical techniques or measurement of skills, analyzing and interpretation of the data received and drawing conclusions about the research data.
- This research design helps in the arrangement of conditions for the collections and analysis of data in a manner that aims to combine to the research purpose.

VII. SOURCES OF DATA COLLECTION

DATA COLLECTION
The data collected in this study is conclusive and analytical in nature. In this study, the method of data collection incorporates the collection of both Primary data and Secondary data for an in depth investigation, where the data is collected through the distribution of questionnaires in order to enable one to answer the stated research questions in the questionnaire, test hypothesis, and to evaluate the outcomes and to collect the information from the other sources that are readily available.

DATA ANALYSIS PROCEDURE
In this analysis of data and testing of hypothesis, the statistical tool to be used for the study contained in SPSS(statistical package for social scientists)so as to adequately verify information collected for this study. In order to analyse the data, the Chi- square or the correlation will be used to test the hypothesis involved in the study.

SAMPLE DESIGN

SAMPLE SIZE
A simple random sample method has adopted to collect the data from the respondents. The information is gathered from 50 respondents at various logistics company at Bengaluru. Sample size consists of experience and qualified people who would ensure that the data provided by them will be appropriate.

SAMPLING TECHNIQUE
The sampling technique used in this study is the Simple Random Sampling, where the sample is collected from the larger population and the individuals are selected as a subset from the larger set. Each individual is chosen randomly and

entirely by chance, such that each individual has the same probability of being chosen at any stage during the sampling process.

SAMPLE SELECTION

Inclusion criteria: The Inclusion criteria of selection of sample is on the logistic network designs-skilled employees and managers , that is, the group of workers who do the same or similar work, who meet regularly to identify, analyze and solve related problems.

Exclusion criteria: The Exclusion criteria of selection of sample are where the group of workers who did not meet the expectations of skills and similar career designation

VIII. DATA ANALYSIS AND INTERPRETATION

Tools used for this study are
1.   Frequency test
2.   Correlation

For the purpose data analysis SPSS software is used and to know the frequencies.

Frequency & percentage analysis is used to understand the impact of logistic network design, the way it improves the movement of goods.

Importance of logistics is correlated to employee's experience of the various logistic companies with the correlation analysis test.

Table.1. Experience of the employees of various logistic companies

		Frequency	Percent
Valid	Less than 1 year	11	20.0
	1-5 years	19	34.5
	5-10 years	10	18.2
	10-15 years	13	23.6
	More than 15 years	2	3.6
	Total	55	100.0

Interpretation- This table shows the work experience of the various employees of the logistic firms where 20% of them have less than a year experience, 34.5% have the experience upto 5 years, 18.2% have the experience of 10-15 years and 3.6% have more than 15 years experience.

Table.2. Importance of Logistics to a company

	Frequency	Percent
1-Least important	3	5.5
2-Less important	13	23.6
3 -Indifferent	12	21.8
4 -More Important	12	21.8
5 -Most Important	15	27.3
Total	**55**	**100.0**

Interpretation – This table shows the Importance of Logistics to any sort of company, where 5.5% say that logistics is least Important to a company,23.6% say that logistics is less important to any company,21.8% say that its indifferent , 21.8 % say logistics is more important to company and 27.3 say that its most important to any company. Thus, as 27.3% say that logistics is very much important to company, therefore logistics plays a vital role in growth of business.

Table.3. Quality Matrix of Logistics

	Frequency	Percent
Cost saving	12	21.8
Error free	12	21.8
Reliability	15	27.3
Timely delivary	16	29.1
Total	**55**	**100.0**

Interpretation- from the above table it is observed that the Timely delivery is the most significant logistic quality matrices with 29.1% which is preferred by most of the logisticians and as well as by their customers. Reliability is the other quality matrix with 27.3% frequency where the customer also choose reliability as one of their quality preferences.

Table.4. Effects of 3PL and 4PL on Logistic plan

	Frequency	Percentage
	Rank	
Major improvements in efficientcy	1	34.5
Time saving	2	23.6
Cost saving	3	21.8
Competitive edge	4	10.9
Non- advantageous	5	9.1
Total	**55**	**100.0**

Interpretation- Above table reveals about the effects of 3PL and 4PL on logistic plan of firms. Major improvements in efficiency hold Rank -1 with 34.5% followed by time saving with 23.6% and cost saving effect with 21.8%. Thus major improvements has enormous effect on the 3PL and 4PL logistics plan

Table.5. Technical solution purchase stage

	Frequency	Percentage
Information gathering	11	20.0
Budgeting	17	30.9
Project Planning	11	20.0
No current plan	14	25.5
All of the above	2	3.6
Total	**55**	**100.0**

Interpretation- This table is about the technical solution purchasing stage. In this table we will get to know about the logistics companies ,where they stand at the time of purchasing of technical solutions (software). Here 17% of the organizations prefer technical solutions the stage of budgeting, where as 14% companies still have not come up with any technical solutions purchase as they still follow the old logistic procedure. Organizations at information gathering stage and project planning stage (20%-each) also purchase technical solutions to improve their logistics.

Table.6. Importance of logistics to a company

	Frequency	Percent
Least important	3	5.5
Less important	13	23.6
Indifferent	12	21.8
More important	12	21.8
Most important	15	27.3
Total	**55**	**100.0**

Table.7. Experience of the Employees

	Frequency	Percent
Less than 1year	11	20.0
1-5 years	19	34.5
5-10 years	10	18.2
10-15 years	13	23.6
15 years and above	2	3.6
Total	**55**	**100.0**

Table.8. Correlation between Experience of the employees and the importance of logistics to a company

	Exp	Q1
Pearson Correlation	1	.312[*]
Sig. (2-tailed)		.020
N	55	55
Pearson Correlation	.312[*]	1
Sig. (2-tailed)	.020	
N	**55**	**55**
*. Correlation is significant at the 0.05 level (2-tailed).		

Interpretation- In this table we can see the relationship between the experience of the employees and the importance of logistics to a company. From the tables consisting of importance of logistics & experience of employees we obtained the positive correlation with the positive value of 0.312(importance) & 0.020 (experience) with significance of 0.05 level of significance. Hence the experience of employees and importance of logistics is positively correlated.

H0=Null Hypothesis: There is no significant relationship between Logistic network design and information technology tools used with Experience of the employees.

H1=Alternative Hypothesis: There is significant relation between the Logistic network design and information technology tools used and with the experience of the employees. Since there is a significant relationship between employee experience and importance of logistics in a firm, H0= **Hypothesis is rejected, and H1=Alternative Hypothesis is accepted.**

IX. FINDINGS:

I found that logistics industry in Bengaluru, one has to keep in mind that the industry is less developed and is a relatively unexplored area as compared to other countries. However, with the increasing competitive pressure and with the rapid trend of logistics players changing their identities and expanding their service portfolios, there is increasing need for the industry service providers to gain supply chain advantage and improve their service offerings. Among the strategies recommended to players to improve chances of success in the logistics sector in Bengaluru are as follows:

a) Think local, service global:
b) As Bengaluru's logistics industry is in the infancy stage, setting up a nationwide distribution capabilities at the start-up stage would be difficult. Instead logistics players should consider comprehensive coverage of one part or one vertical before spreading out to the rest. This is because a successful business just in one part of the state capital can easily become dominant and attractive to cater both ends of supply and demand.
c) Focus on information and coordination in developing logistics solutions rather than asset ownership.
d) Be industry specific and provide customized solution.
e) Pursue alliances aggressively. In India it is required to have a better connecting facility, it either maybe railways or roadways or waterways.
f) Focus on organization building as much as strategy or operations.
g) Provide technological solutions. Usage of advanced technology to ensure standard service can be provided.
h) Explore for more opportunity outside India.

X. CONCLUSION

Times have taken major turn when it comes to transport and warehousing and export and import procedures. Logistics is become a main part of today's global activity where all the technology, resources can be accessed from across the world through logistics help and support. More and more enterprises are emerging in the logistics sectors providing variety of services to the customers and also by contributing to the countries growth and GDP. In India the logistics is still in the growing phase where it still requires proper guidance and support from the government in order to meet the competition of logistics of other countries across the world. We lack the innovation and knowledge to increase are logistics sector which is leading to the loss of logistics companies, we lack proper connecting network to transport the goods and understand the demography of the country. Even though small schemes and policy are passed in the favour of logistics entrepreneurs they still face difficulties due to lack of finance support or the other countries rules and regulations which cause them to leave the business. We must ensure are logistic industries are receiving the same type of support from our government in order to protect the interest of the logistic entrepreneurs and help them earn profits which in return contributes to the growth of the economy.

XI. REFERENCES

[1]. Donald Bowersox and David. Closs (2000) Logistics management, Tata McGraw.

[2].MartinChristopher, Logistics & Supply chain management: creating value- adding networks.

[3]. Song D. W. & Yeo, K. T. (2004) a competitive analysis of Chinese container ports, maritime economics & logistics

[4]. B.S.Sahay and Ramnesh Mohan,(2003) "Supply Chain Management Practices in Indian Industry", International Journal of Physical Distribution & Logistics Management,.

[5]. Mercer Management Consulting (2002), the Third Party Logistics Market in China: Opportunities and Challenges

[6]. Scope Marketing & Information Solutions Pte Ltd,(2002) Indian Logistics Industry, January2002.

Websites:

[7]. http://www.indexuae.com/Top/Business_and_Economy/ Services/Logistics

[8]. http://www.uae-shipping.net/Lintas-Freight-Logistics-L.L .C .html
[9]. http://www.dch.com.hk/english/investor/annual_ir/index. php ?yr=2017&rpt_id=31

[10]. https://www.yusen-logistics.com/en/east-asia/china/

[11]. https://www.cevalogistics.com/country/china

[12]. http://www.allcargologistics.com/

[13]. http://www.iamwire.com/2017/04/indian-logistics-indu stry- scenario/151331