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DO SPACE OPTIMIZATION IN SCM TO SUSTAIN AN EFFECTIVE INDIAN LOGISTICS SYSTEM?

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Abstract

SCM in operational terms involving the flow of materials and products, some viewed it as a management philosophy, and some viewed it in terms of a management process. Descriptive research, the main goal of this type of research is to describe the data and characteristics about what is being studied. The idea behind this type of research is to study frequencies, averages, and other statistical calculations. The data have been collected from the 300 supply chain partners those who closely deals with supply chain operations by using non probability sampling method with help of convenient sampling from the total population. The paper results have been made according to the research objectives and statistical evidences, such as the panels must be fixed for materials what we allotted, no more binning or clubbing in these panels is mandatory even in empty panels, effective communication must be given to all shifts, avoid Human Error, support from Management, proper update in SAP and avoid entering of RM without clearance of Quality/MIGO generation.

Keywords: Supply Chain Partners, SCM, MIGO Generation, Convenient Sampling and Descriptive Research.

INTRODUCTION

The term, “supply chain management,” has risen to eminence over the last ten years. About 13.55% of the concurrent session titles contained the words “supply chain” at the 1995 Annual Conference of the Council of Logistics Management. The number of sessions containing the term rose to 22.4% at the 1997 conference, just two years later. The term is commonly used to illustrate executive responsibilities in corporations (La Londe 1997). SCM has become such a “hot topic” that it is difficult to pick up a periodical on manufacturing, distribution, marketing, customer management, or transportation without seeing any article about SCM or SCM-related topics (Ross, 1998).

Some authors defined SCM in operational terms involving the flow of materials and products, some viewed it as a management philosophy, and some viewed it in terms of a management process (Tyndall et al., 1998), some viewed it as integrated system. Authors have even conceptualized SCM differently within the same article: as a management philosophy on the one hand, and as a form of integrated system between vertical integration and separate identities on the other hand (Cooper and Ellram, 1993). According to Christopher (1994), a supply chain is “a 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 in the hands of the ultimate customer.” An example of a basic supply chain is shown in Figure 1.

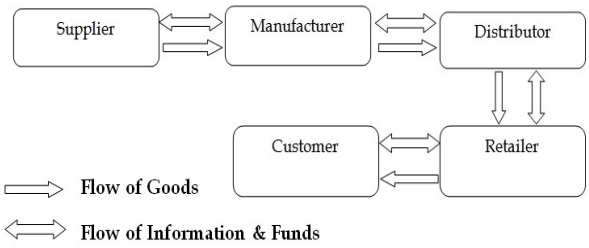

Figure 1 - Basic Supply Chain Process

In the course of time, the most considerable benefits to businesses with advanced SCM capabilities will be radically improved customer responsiveness, developed customer service and satisfaction, increased flexibility for changing market conditions, improved customer retention and more effective marketing (Horvath, 2001). SCM is a concept, "whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers" (Monczka, Trent and Handfield, 1998). Stevens (1989) stated the objective of SCM was to synchronize the customers' requirements with materials flow to strike a balance among conflicting goals of maximum customer service, minimum inventory management, and low unit costs.

The supply chain is viewed as a single process. Responsibility for the different divisions in the chain is not fragmented and transferred to functional areas such as manufacturing, purchasing, distribution, and sales. SCM calls for, and in the end depends on, strategic decision-making. "Supply" is a shared objective of practically every function in the chain and is of particular strategic importance because of its impact on overall costs, profits and market share. SCM calls for a different point of view on inventories that are utilized as a balancing mechanism of last, not first, resort. A latest approach to systems is required - integration rather than interfacing (McMillan, D. N., & Houlihan, D. F. (1989)). SCM is delivering major economic benefits to businesses as diverse as manufacturing, retail, and service organizations, etc. (Horvath, 2001). The scope of SCM was further expanded to include re-cycling (Baatz et al., 1995). SCM deals with the total flow of materials from suppliers through end users (Jones and Riley, 1985). It highlights "total" integration of all stakeholders within the supply chain, a realistic approach is to consider only strategic suppliers and customers since most supply chains are too complex to attain full integration of all the supply chain entities (Tan et al., 1998).

SCM incorporates logistics into the strategic decisions of the business (Carter and Ferrin, 1995). Eventually, the philosophy developed and combined into a common body of knowledge that encompassed all the value-adding activities of the manufacturers and logistics providers (Tan, 2001). Many SCM strategic models have been investigated to link its vital role in overall strategic corporate planning (Frohlich et al., 1997[16]; Watts et al., 1992). Experts agree that a formal supply chain strategy will be critical to both manufacturing and service industries (Kathawala, 2003).

Proper performance measures and metrics including activity-based costing and management may be helpful in identifying non-value-adding activities across a supply chain. Total Quality Management (TQM) methods can be utilized to eradicate these inefficiencies, thereby improving the overall effectiveness of a supply chain. Customer demands and supply chain relationships are the key in selecting the most appropriate method of target costing for supply chains. Activity-based, process-based, value-based and cost management approaches may be fit for TQM in SCM (Lockamy and Smith, 2000). Supply chain strategy includes "two or more firms in a supply chain entering into a long term agreement; the development of mutual trust and commitment to the relationship; the integration of logistics events involving the sharing of demand and supply data; the potential for a change in the locus of control of the logistics process" (La Londe and Masters, 1994). Manufacturers are able to develop alternative conceptual solutions, select the best components and technologies, and assist in design assessment by involving suppliers early in the design stage, (Burt and Soukup, 1985).

LITERATURE REVIEW AND GAP IDENTIFIED

Mousavi, S. M., Bahreininejad, A., Musa, S. N., & Yusof, F. (2017) explains main objective of this research is to find out the optimal locations of the potential vendors in addition to the quantity ordered (allocation) by the buyers so that the total inventory cost including ordering (transportation), holding and the purchasing costs is minimized. Besides, the distance from the buyers to the vendors is considered as the Euclidean distance. The total budget to buy the products is limited and the production capacity of each vendor is also restricted.

Eskandarpour, M., Dejax, P., Miemczyk, J., & Péton, O. (2015 suggested review finds that there are a number of limitations to the current research in sustainable SCND. The narrow scope of environmental and social measures in current models should go beyond limited greenhouse gas indicators to broader life-cycle approaches including new social

metrics. The more effective inclusion of uncertainty and risk in models with improved multi-objective approaches is also needed. There are also significant gaps in the sectors used to test models limiting more general applicability. Garcia, D. J., & You, F. (2015) explains the growing area of enterprise-wide optimization and the increasing importance of energy and sustainability issues provide plentiful opportunities for supply chain design research. However, modeling, algorithmic, and computational challenges arise from these research opportunities.

Heckmann, I., Comes, T., & Nickel, S. (2015) suggested increased frequency and the severe consequences of past supply chain disruptions have resulted in an increasing interest in risk. This development has led to the adoption of the risk concepts, terminologies and methods from related fields. In this paper, existing approaches for quantitative supply chain risk management are reviewed by setting the focus on the definition of supply chain risk and related concepts.

METHODS

A. Research type

Descriptive research, the main goal of this type of research is to describe the data and characteristics about what is being studied. The idea behind this type of research is to study frequencies, averages, and other statistical calculations. Although this research is highly accurate, it does not gather the causes behind a situation. It is quantitative and uses surveys and panels and also the use of probability sampling. Descriptive research is the exploration of the existing certain phenomena. The details of the facts won't be known. The existing phenomena's facts are not known to the persons.

B. Source of data

Primary data was collected through survey of supply chain partners. Secondary data was collected from previous research by various authors on this topic, retail biz magazine and articles and reports on the internet.

C. Research tool

Well-structured questionnaire was used and it includes questions related with service quality.

D. Sample design

The data have been collected from the 300 supply chain partners those who closely deals with supply chain operations by using non probability sampling method with help of convenient sampling from the total population.

E. Data Analysis

Inferential statistics (through Minitab) is used in order to draw a conclusion. Result of the study has been put in tables and graphs for easy understanding of the findings of the research.

F. Statistical tools: T-test

T-tests are handy hypothesis tests in statistics when you want to compare means. You can compare a sample mean to a hypothesized or target value using a one-sample t-test. You can compare the means of two groups with a two-sample t-test. If you have two groups with paired observations (e.g., before and after measurements), use the paired t-test.

G. Variables Identified

Table 1 – Justification for Selected Variables

S.No	Variables Identified
1	5S Discipline in Warehouse is maintaining successfully
2	No Spelling's in Warehouse
3	Proper Safety Measurements are maintaining properly.
4	Good maintenance in receiving area
5	Safety stock is maintain and accurately
6	No lead time while giving material in to the shop floor
7	Cyclic count was maintaining regularly
8	No conflicts among labors
9	Proper ventilation was maintaining in warehouse
10	There must be a place allotted for every thing

IV. DISCUSSIONS AND IMPLICATIONS

Table 2 - Number of Supply Chain Partners

Experience	Number of Supply Chain Partners
0-3 Years	120
4-5 Years	40
5-10 Years	80
11-15 Years	30
> 16 Years	30

Source: Primary Data through Questionnaire

From the table 2 explaining about the sample size, i.e., in the experience of 0-3 years 120 number of supply chain partners, in the experience of 4-5 years 40 number of supply chain partners, in the experience of 5-10 years 80 number of supply chain partners, in the experience of 11-15 years 30 number of supply chain partners and finally in the experience of more than 16 years 30 number of supply chain partners and totally 300 number of supply chain partners.

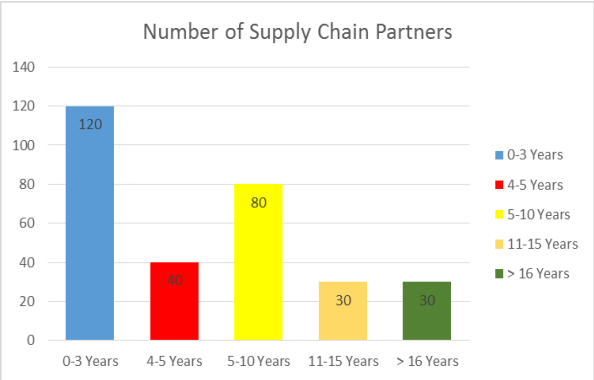

Figure 2 - Number of Supply Chain Partners

Table 3 – Satisfaction Factors

SA- Strongly Agree/A-Agree/N-Neutral/D-Disagree/SD-Strongly Disagree

5S Discipline in Warehouse is maintaining successfully			**No Spilling's in Warehouse**		
Satisfaction level	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**	**Satisfaction level**	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**
SA	10%	30	SA	17%	50
A	60%	180	A	47%	140
N	30%	90	N	37%	110
D	0	0	D	0%	0
SD	0	0	SD	0%	0
Proper Safety Measurements are maintaining properly			**Good maintenance in receiving area**		
Satisfaction level	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**	**Satisfaction level**	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**
SA	70%	210	SA	47%	140
A	30%	90	A	27%	80
N	0%	0	N	27%	80
D	0%	0	D	0%	0
SD	0%	0	SD	0%	0
Safety stock is maintaining accurately			**No lead time while giving material in to the shop floor**		
Satisfaction level	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**	**Satisfaction level**	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**
SA	77%	230	SA	77%	230
A	23%	70	A	17%	50
N	0%	0	N	7%	20
D	0%	0	D	0%	0
SD	0%	0	SD	0%	0
Cyclic count was maintaining regularly			**No conflicts among labours**		
Satisfaction level	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**	**Satisfaction level**	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**
SA	57%	170	SA	27%	80
A	17%	50	A	57%	170

N	10%	30	N	17%	50
D	17%	50	D	0%	0
SD	0%	0	SD	0%	0
Proper ventilation was maintaining in warehouse			**There must be a place allotted for every thing**		
Satisfaction level	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**	**Satisfaction level**	**Number of Supply Chain Partners (%)**	**Number of Supply Chain Partners**
SA	87%	260	SA	20%	60
A	13%	40	A	50%	150
N	0%	0	N	30%	90
D	0%	0	D	0%	0
SD	0%	0	SD	0%	0

Source: Primary Data through Questionnaire

From the table 3 explaining about the satisfaction level of supply chain partners for 5S Discipline in Warehouse is maintaining successfully, i.e., for SA "120" supply chain partners, for A "180" supply chain partners, for N "90" supply chain partners . Satisfaction level of supply chain partners for No Spilling's in Warehouse, i.e., for SA "50" supply chain partners , for A "140" supply chain partners, for N "110" supply chain partners , Satisfaction level of supply chain partners for Proper Safety Measurements are maintaining properly, i.e., for SA "210" supply chain partners , for A "90" supply chain partners , Satisfaction level of supply chain partners for Good Maintenance in Receiving Area, i.e., for SA "140" supply chain partners , for A "80" supply chain partners , for N "80" supply chain partners , Satisfaction level of supply chain partners for Safety Stock Is Maintaining Accurately, i.e., for SA "230" supply chain partners , for A "70" supply chain partners , The satisfaction level of supply chain partners for No lead time while giving material in to the shop floor, i.e., for SA "230" supply chain partners , for A "50" supply chain partners , for N "20" supply chain partners . The satisfaction level of supply chain partners for Cyclic count was maintaining regularly, i.e., for SA "170" supply chain partners , for A "50" supply chain partners , for N "30" supply chain partners and for disagree "50", The satisfaction level of supply chain partners for No Conflicts among labours, i.e., for SA "80" supply chain partners , for A "170" supply chain partners , for N "50" supply chain partners , The satisfaction level of supply chain partners for Proper ventilation was maintaining in warehouse, i.e., for SA "260" supply chain partners , for A "40" supply chain partners and satisfaction level of supply chain partners for There must be a place allotted for everything, i.e., for SA "60" supply chain partners , for A "150" supply chain partners and for N "90".

Table 4 - Discipline in Warehouse is maintaining successfully

Experience	0-3 Years	4-5 Years	5-10 Years	11-15 Years	> 16 Years
Supply Chain Partners	120	40	80	30	30
			Mean		
	SA	**A**	**N**	**D**	**SD**
0-3 Years	0.33	**0.39**	**0.44**	0.00	0.00
4-5 Years	0.00	0.17	0.11	0.00	0.00
5-10 Years	0.00	0.33	0.22	0.00	0.00
11-15 Years	0.00	0.06	0.22	0.00	0.00
> 16 Years	**0.67**	0.06	0.00	0.00	0.00
T – Value	**1.50**	**2.89**	**2.71**	**0.00**	**0.00**

Source: Primary Data through Questionnaire

Table 4 explains about the mean for "5S Discipline in Warehouse is maintaining successfully", in that criteria significant difference in strongly agree is > 16 years' experience people 2 of 3 i.e., highest mean (M=0.67, SD=0.29) and for Agree is 0-3 years experienced people 70 of 120 i.e., highest mean (M=0.39, SD=0.15). Thus value of T –test will be T=1.50, 2.89, 2.71. By those interactions we clearly got the result that 210 of 300 people stated SA & A for 5S discipline.

Table 5 - No spilling's in Warehouse

Experience	0-3 Years	4-5 Years	5-10 Years	11-15 Years	> 16 Years
Supply Chain Partners	120	40	80	30	30
Mean					
	SA	**A**	**N**	**D**	**SD**
0-3 Years	0.200	0.500	0.364	0.000	0.000
4-5 Years	0.000	0.143	0.182	0.000	0.000
5-10 Years	0.400	0.071	0.455	0.000	0.000
11-15 Years	0.200	0.143	0.000	0.000	0.000
> 16 Years	0.200	0.143	0.000	0.000	0.000
T – Value	**3.162**	**2.622**	**2.157**	**0.000**	**0.000**

Source: Primary Data through Questionnaire

Table 5 explains about the mean for "No Spilling's in Warehouse", in that criteria significant difference in Strongly agree is 5-10 years experienced people 20 of 80 among 50 respondents i.e., highest mean (M=0.40, SD=0.14) and for Agree is 0-3 years experienced people 7 of 12 i.e., highest mean (M=.500, SD=0.17). Thus value of T –test will be T=3.162, 2.622, 2.157. By those interactions we clearly got the result that 190 of 300 people stated SA & A for spilling's in warehouse.

CONCLUSIONS

The following results have been made according to the research objectives and statistical evidences, such as the panels must be fixed for materials what we allotted, no more binning or clubbing in these panels is mandatory even in empty panels, effective communication must be given to all shifts, avoid Human Error, support from Management, proper update in SAP and avoid entering of RM without clearance of Quality/MIGO generation.

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