CHAPTER 8 REPLICATION

The model and methods developed may be applied in the automobile manufacturing plants, where incoming components logistics cost are significant.

8.1 MANAGERIAL IMPLICATION

Supply chain network, being an intense capital investment area, should be focused well and the supply chain strategy should be framed while developing the new model. Tan, K. C. [78] mentioned that this model helps in strategizing the supply chain network that focus on cubic efficiency, packaging cost, supply base location, warehouse location and handling cost.

Through SEM analysis, the study found new ways to optimize the logistics cost. From the results, it can be inferred that cubic efficiency, handling cost, supplier distance, part volume and packaging type exhibit significant influence on the logistics cost. The results provide an opportunity to perform an in-depth analysis on packaging cost to understand the regression with packaging type. The logistics cost can positively be reduced through warehouse introduction by improving the cubic efficiency, but it actually increases the logistics cost. So, it is important for the managers to maintain an equilibrium between these two parameters in order to achieve cost advantage and increase the profit Gunasekaran, A., and Kobu, B. [79].

The Survey results and statistical outcome reaffirms this model can be generalized. Hence it can be widely applied to automobile Industry with intensive Inbound Logistics. The practical experimentation of this model and achievement of logistics cost reduction confirms the repeatability of the Model JICK, T. D. [57].

Thus the established least cost Logistics cost model should offer potential opportunity for policy making and achieve consistent, traceable decision making on raw material procurement strategy and supply chain nodes (warehouse). However, prior to introducing the proposed transportation least cost solutions in business applications, basic questions
need to be answered, taking into account that there are numerous and complex supply chain logistical interactions. The strategy of choosing raw material supplier and warehouse location and changing supply base location to reduce the logistics cost involve multiple functions, and hence decision has to be based on the wholistic picture of overall business objectives. Guillen, G., and Mele, F. D. [80]

8.2 SUMMARY AND CONCLUSION

The supply chain Logistics cost contribute substantially for the product cost. In Automobile sectors, thousands of components are procured from hundreds of supplier. It makes inbound logistics challenging. Hence it demands innovative methods to improve supply chain process in order to optimize the logistics operational cost.

Literature review brought insight on making use of statistical tool to establish “Least cost Supply Chain Model” and validation of the model using Structural Equation Model. The Case Study literature paved path to follow step by step Research Method using the data collected from Case Firm.

The Cause and effect diagram and expert interview helped to narrow down the key causal factors for Supply Chain Logistic Cost, namely Supplier Distance, Part Volume, Packaging, Handling Cost, Cubic Efficiency and Freight cost.

The causal factors are grouped under Supply Factors, Logistics Factors and Logistics Cost in order to establish “Basic Structural Equation Model”. The Case Firm was selected and the same found suitable to validate the Hypothesis and the Model. The data collected from Case Firm supported statistically to validate the “Least Cost Supply Chain Model” using MATLAB software.

The Basic SEM Model iterated to get the Best Goodness of Fit and the final SEM Model established. Then “Least Supply Chain Cost Model “ was applied to the Case Firm to reduce the Logistics Cost. The data collected for the Model Validation (Supplier Distance, Part Volume, Packaging , Cubic Efficiency and Handling cost), analyzed in
depth to reduce the Logistics Cost of the Product. The improvement summary showed the opportunity to reduce the Logistics Cost by 5%.

The key outcomes of the research which is validated generalized and experimented to optimize the logistic cost are a) the development of Least Cost Model for Logistics Cost, b) Validating the model using statistical tool and c) Industrial survey in order to generalize the model d) Experiment the model in the chose Case Firm to optimize the logistics cost. In effect, the model could be employed to study the Logistics cost and optimize the supplier selection (supplier and location), Part Volume, Packaging, Cubic Efficiency and Handling cost for any automobile product. Such an approach would significantly contribute to the product profit margin, Business profit and managerial decision Turhan, D. [81].

8.3 LIMITATIONS OF THE STUDY

The limitations that are experienced in the current research work are summarized below.

8.3.1 The study is done for one particular variant

The Case Firm has different variants such as high end model, low series, petrol-based engines and diesel-based engines. The data collected in the current study is only one of the variants, not all of the above. But, considering the wholistic perspective, it is possible to study the supply chain of any variants or possible mix of variants.

8.3.2 The scope of the study is limited to Domestic Parts

Usually, the automobile consists of 1,000+ components whereas only 500 local part’s components data was considered for the study as per Pareto principle (A vehicle’s logistic contribution of domestic parts’ is twice that of the overseas components’ logistic cost contribution)
8.3.3 Transportation mode

This study assumed that road transport is used, that too, trucks for transporting the parts. But other transit modes are also preferred based on the production requirement and availability of supplier components.

8.3.4 Part Size / Shape / Assembly condition

This study assumes there is no opportunity to change the part design / shape / assembly level (Bring Bumper and Lamps separately to assemble in the plant) and focuses only on packaging optimization.

8.4 SCOPE FOR FURTHER RESEARCH

The outcome of the research study can be effectively used to predict the likelihood of logistics cost contribution to new product business viability. The study presents an in-depth analysis of the various factors influencing the supply chain system. New model launch team can now make an advanced assessment of the logistics cost and the potential opportunity to identify the gaps in the supply chain system. Thus, the study gives the option to bridge the identified deficiencies in the supply chain system, thereby improving the probability of success.

Further scope:

- The study can be extended for imported incoming components.

- The study is in planning stage, and this study can be extended to measure the actual logistics cost incurred against the plan post launch phase.

- There is an opportunity to study the part volume and possibly re-design to achieve the least logistics cost.

- Simulation tool can be deployed to study the Logistics cost variation by adjusting the critical factors established through SEM.