Simulation Model to Evaluate Logistic Network of 3rd Party Logistic Providers

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Abstract—**Uncontrollable high logistics cost is one of the main problem, which is in front of the third party logistic providers. Since the cost of distribution is on the client's hand most of the 3pl companies do not care about the cost arises from the transportation activities. Normally 3pls handle their clients by relevant team assigned for the particular client. With this, companies always suffer from inefficient business processes. This paper investigates a way to reduce transportation cost by eliminating the handling customers by separately. Here authors have used simulation tool to identify the places where the unnecessary costs occur in the logistic network. Using ARENA simulation software authors have stated that 3pls can reduce cost by eliminating duplication of activities. In addition to that, by analyzing current literatures authors have found that 3pl should go beyond the traditional role of providing the logistic service to the client.**

I. INTRODUCTION

This paper discusses about a leading 3rd party logistic provider(3pl) in Sri Lanka. Outsourcing of logistic function or third party logistic providing is generally defined as the provision of a single or multiple logistics services by a vendor or a contractual basis (Razzaque and Sheng, 1998). Companies who are providing logistics service to another companies call third party logistic providing company (3pl Company). Over the past few decades 3pl companies have achieved significant growth as well as still there is a big business opportunity to 3pl companies as there is new trend to outsource business functions to a specialist. It is estimated that 40 percent of world logistic functions have outsourced.

In current literatures, authors have deeply stated that cost is not a significant factor, which a company considers when it outsources their logistic function to a third party. Normally 3rd party companies provide logistic services plus warehousing facilities to their vendors. Manufacture's or importer's main aspect from outsourcing the logistics function to a 3pl company is only the distributing as well as once 3pl company done a distribution they put the cost into their client. Since both parties do not consider the cost part authors have identified lot of unnecessary costs in logistic service function.

Current scenario

At present, almost all 3pl companies handle their clients separately as one cluster for one client. The authors have

identified that this process have led to lot of duplication of activities and increase the complexity of the business process that means lot of unnecessary operating costs occur in the logistics providing function.
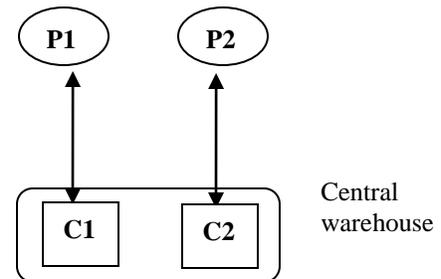

Figure 1-current process of 3pl companies, handling each client by each cluster of the company.

As shown in the figure 1, once cluster 1 got an order to pick up goods from plant 1 which is in under the cluster 1, it sends a suitable vehicle to plant 1 and takes goods into the central warehouse. Same as cluster 2 does. However, the amount of the order and the place where the logistics are planned to go do not communicate with each clusters. So sometimes separate vehicles go to nearby places and come again with underutilized vehicles. This way of handling clients always leads to high cost even though the cost is bared by the client companies can achieve competitive advantage by reducing those cost and give high quality service for cheaper price, and also use existing resources efficiently provides lower cost to the company and achieve higher profit.

The authors have emphasized that 3pl companies can save those unnecessary cost by consolidating possible pick up deliveries of various clients. Authors stated that by eliminating the existing cluster method 3pl companies could enjoy higher profit.

II. LITRETURE REVIEW

In recent years, hundreds of studies have been carried out on various logistics topics, e.g. enterprise resource planning (ERP), warehousing, transportation, e-commerce, etc.

A. Creazza and F. Dallari (2010) have come-up with global logistic networks configurations that describe distribution between continentals. The aim of the paper is to identify and assess different configurations to design logistics networks in global sourcing contexts. A framework to support the choice of the most suitable logistics network is developed. User can

select most appropriate configuration among five configurations developed by the researcher. Those configurations are involving with overall annual demand, annual average demand between supplier and regional warehouses, supplier's dispersion, product value density and differential labor cost of a particular product. By applying sensitivity analysis with data of those classifications for a product, managers can get idea about the most suitable configuration.

As suggested by Zeng and Rossetti (2003), the differential logistics cost categories connected to the configurations are represented by transportation cost, handling cost, inventory carrying cost and order processing cost. It is obviously almost all researches are trying to minimize all or some of those costs.

Hyun Jeung Ko, Chang Seong Ko and Taioun Kim (2005) have given an optimization and simulation model to minimize cost of 3PL companies using genetic algorithm. It is basically about optimizing warehouse management in a dynamic environment. Hub-and-spoke logistic network of 3PLs has been investigated by GuK nther ZaK pfel, Michael Wasner (2000) and came up with design optimizing mathematical models. After applying those methods for a medium size company, they have showed that a 3PL company can reduce a significant part from its logistic cost. But optimizing and consolidating order quantity have received very low attention in literature, authors are tried to close that gap from this paper.

III. METHODOLOGY

Authors have taken Sri Lankan leading 3pl company to do the investigations of this research. They have thoroughly studied about its logistic function and identified that once the company got an order from its client to pick up goods there are four ways to fulfil it. The main two methods of fulfilling orders are using 20ft truck, which has approximately 25 cubic meter (cbm), and 40ft truck with 50 cbms. If the pick-up order is less than 25 cbms then the logistic department send 25ft truck directly, if the order is within 25 and 50 cbms then it is 40ft truck and sometimes the company have to send more than one vehicle to the client. At that time, they can use additional 40ft truck or 20ft truck with totally utilized 40ft trucks.
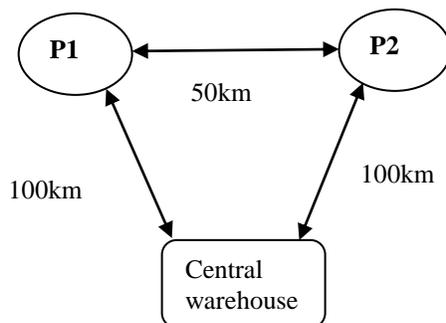

Figure 2-network design that authors used to conduct the simulation.

Authors used ARENA simulation software to simulate the real process and emphasize the difference between the cluster method and proposed pick up consolidating method. **Basically pick up order consolidating method is when the company got and two pick-up orders from two plants managers can decide the possibility of consolidating those orders and if it save cost go ahead and consolidate them**. First, the authors model the existing scenario with uniform distribution for pick up orders and came up with cost. Based on the diagram shown in figure 2, then modeled the proposed method to find the cost, by comparing those costs authors have showed significant cost saving in this paper.

Figure 3-Costs raised from simulating the existing method by ARENA

As shown in figure 3 there are 4 kinds of costs occurred and the total cost for fulfil the pick-up orders of two plants (P1 and P2) within two months period is 5,256,000.00 RS when the rates for 20ft is Rs 120.00 and 40ft Rs 180.00 and distance are as shown in the figure 2. After that authors have done the simulation for proposed model and got results from ARENA.

By generating 30 orders from two plants which situated like the network in figure 2 authors have got costs for fulfilling all the orders of two plants under 6 categories. The total of these costs is Rs 4,308,000.00, so that a company can save Rs

948,000.00 monthly by using pick-up orders consolidating method.

V. CONCLUSION

In this paper, the authors have shown that third party logistic providing companies can save significant amount from its operating cost. By simulating, the existing cluster method and the proposed pick-up order consolidating method authors have emphasize the saving of approximately 15% monthly.

VI. ACKNOWLEDGMENT

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