A Study on Strong Strategic Alliance Model in Express Courier Service Network

Ki Ho Chung
Department of Management Information Systems, Kyungsung University

Jae Jeung Rho
Department of IT Business, Korea Advanced Institute of Science and Technology

Chang Seong Ko
Department of Industrial & Management Engineering, Kyungsung University

ABSTRACT. Since the 1990s, the demand for the direct shipment of purchased goods by express couriers has increased, which has led to the proliferation of express courier companies during the past two decades. As a result, the courier service industry has been characterized by an increase in the number of facilities such as service centers and terminals and delivery vehicles. So there are severe competition particularly among small and medium enterprises (SMEs), and inefficient use of national resources. Furthermore, it is often the case that the operations of facilities owned by individual companies are characterized by low rates of utilization. Especially the service center has poor utilization if daily demand for shipment is very low. Hence, it has been suggested that cooperative strategic alliances in the operation of service centers may benefit participating companies. Also sharing the terminals may be beneficial to the companies. Such a strategic alliance may help these companies improve their declining profitability by reducing the total operating cost and eliminating overlapped investments. This study proposes a network design model for strategic alliances among small and medium size express courier service companies that places the companies in a win-win alliance relationship. An integer programming model and its solution procedure based on a maxmin criterion are also developed. To illustrate the efficiency of the model, we present a numerical example and test it by applying the model to the example.

Keywords: Strong Strategic Alliance, Express Courier Service Network, Consolidation Terminal, Service Center,

1. Introduction

The demand for the direct shipment of purchased goods by couriers will be increasing more than ever as a result of an explosive growth in e-tailing, telemarketing, and IPTV home shopping. Even though factors such as economic prosperity and growth of online business activity drive the express courier market, increased competition resulting from deregulation and globalization has made today’s express courier industry extremely vulnerable to any increase in distribution costs. These competitive rivalry and price pressure have made market conditions tough and margins under severe pressure.

The Korean express service market is experiencing similar market conditions and behavior. Despite a constantly increasing delivery amounts in the Korean express service market, the market has suddenly become saturated because large size companies have entered the market through acquisition of existing delivery service companies. More than 80% of the market is occupied by only 4 to 5 major companies (Cho,
This saturated market situation leads to severe competitions among SMEs. Since delivery services may gain competitive advantages by reducing the total operating costs, and their delivery and distribution times, most SMEs are disadvantaged because of severe price competition in the market, and lack of country-wide terminals. Unlike the major companies, the SMEs in express courier service are financially constrained hence are not able to expand their facilities. This is one of the main causes of poor delivery service of SMEs.

Therefore, to cope with these substantial competition pressures, we propose strategic alliance as an effective solution to the challenges faced by SMEs in express courier service, more so for those of them in competition relationships. By forming strategic alliances, the partners can pool their resources and strengths together in order to achieve their respective goals, share risks, gain knowledge, and gain access to new markets (Büyüközkan et al., 1998).

In the express courier service industry, strategic alliances among SMEs can create economies of scale which leads to the reduction of the total operation cost. Moreover, through cooperative operation of service centers, participating companies may realize an increase in net profit under a win-win alliance relationship. Also they provide better service to the customers and gain more profit by cooperatively utilizing their existing facilities like terminals. Therefore SMEs may efficiently compete for expanding their market share without further investment.

In this paper, we propose a network design conceptual model, the Strategic Alliance Model, to facilitate strategic alliance among small and medium express courier service companies. The model places participating companies in a win-win alliance relationship, and suggests how to increase the net profit of each company by harnessing their low demand and under-utilized service centers, and sharing consolidation terminals with available processing capacity. We also developed and provided an integer programming model and its solution procedure based on maxmin criterion. To verify the applicability of the model to the real world problems, we presented a numerical example of the model using the data set collected from service centers and terminals of an express courier service company in Korea. The values for parameters are generated randomly for the purpose of simulation.

2. Literature Review

Not many studies directly related to the design of service network for express parcel delivery, have so far been undertaken. However, the issue of freight consolidation has widely been investigated in numerous analytical studies. In general, freight consolidation refers to a transportation option that combines a number of frequent, small shipments destined for a similar geographical region into a single large shipment in an effort to reduce shipping cost per unit and to capitalize on various freight-rate discount programs (Min, 1996). Consolidation can be cost-effective especially when substantial freight-rate differentials exist between small (LTL; less-than-truckload) and large (TL; truckload) shipments. To exploit consolidation opportunities, Powell and Sheffi (1983) initiated a load planning model linking a number of consolidation terminals. However, they did not consider links between terminals and customers. Similarly, Powell (1986) formulated the load planning problem for LTL motor carriers as a fixed charge network design problem. Hall (1987) laid a conceptual foundation for analyzing the consolidation tradeoffs between the benefits of lower transportation cost and the penalties of increased inventory carrying costs, longer vehicle routes, and added terminal operation costs. On the other hand, Schneider et al. (1972) were among the first to determine the minimum cost location of