

Profit sharing approaches for freight forwarders: An overview

Marta Anna Krajewska & Herbert Kopfer^{*}

Chair of Logistics, Dept. of Economics, University of Bremen, Germany

Wilhelm-Herbst-Strasse 5, 28359 Bremen

{makr,kopfer}@logistik.uni-bremen.de

1 Introduction

The idea of collaborative planning processes is to directly connect the resources and exchange relevant data in order to create a common and mutually agreed upon plan [Kilger et al.(2002)]. The collaboration process itself assumes reaching goals that cannot be achieved acting singly [Bruner(1991)]. An additional profit which is generated in the collaboration process should be split among the coalition members as defined in the profit sharing concept for such a coalition. Profit sharing concepts in practice depend on proportions of power among partners, on their level of independency and willingness for compromises as well as on the situation on the market where partners operate.

In each collaboration process not only overall coalition profit should improve but first of all a preservation of interests for each single partner, contained in profit sharing model, should be maintained. The basis for an incentive to join the coalition is an additional profit from participation in the collaboration. Thus, a proper profit sharing model is of crucial importance.

In the modern, highly competitive transportation branch freight forwarders reduce their fulfilment costs by exploiting different execution modes. For self-fulfilment they use their own vehicles to execute the requests and for subcontracting they forward the orders to external freight carriers. Further enhancement of competitiveness can be achieved if freight forwarders collaborate in order to balance their request portfolios. Particularly for the freight forwarding branch, [Kopfer et al.(1999)] define a *groupage* system as a logistic interorganisational system which exchanges information and manages capacity balancing by using the cooperation between several independent carriers. *Groupage* systems enable a request interchange between several forwarding companies to achieve an equilibrium between demanded and available transport resources. The increased number of disposable requests for each individual freight forwarder results in economies of scale. Economies of scope are created due to better capacity utilisation. An additional advantage

^{*} This work was supported by the Deutsche Forschungsgemeinschaft (DFG) within the SFB637 and by Bremer Innovationsagentur (BIA) sponsored from the EU-fond (project number 2FUE0342B)

results from the considerably lower costs of arrangement than in case of external processing of orders.

Different structures of collaboration among freight forwarders, that propose diverse profit sharing models, have been presented in the literature.

2 Profit sharing models

There exist a few profit sharing models for the transportation branch, defining exchange mechanisms and splitting additional gains among the coalition members. They all assume similar proportions of power and similar market positions of the partners and focus on the short-term planning.

[Schönsleben et al.(2004)] propose to divide the gains uniformly among the partners. This idea is included in the approach of [Schönberger(2005)]. However, [Schönberger(2005)] proposes the loss sharing, not the profit sharing model. It is assumed, that for the requests that were not chosen by any partner an external carrier service is engaged, which is always unprofitable. Thus, a central entity assigns the controversial requests and their bundles in line with the principles of combinatorial auction by minimizing the negative sum of avoided carrier costs. The arising costs for engaging an external forwarder are distributed uniformly among the partners. Each request which has been assigned to one partner is shifted from the offering to the serving partner together with the entire corresponding revenues. The offering partner receives no payment for the shifting of the request. Such a profit sharing concept does not correspond to the rules of fairness as it does not preserve interests of a single partner. Therefore, the incentives for partners to attend such cooperation are low.

In [Gomber et al. (1997)] a profit sharing model based on multi-agent-auctions is proposed. Partners quote prices for each request offered to the coalition: bids are positive if a request fulfilment should generate profit or negative if they expect losses from the request fulfilment. The bidder with the best price is chosen to execute a request. If a request is shifted among partners, the fulfilling partner is paid the amount of the second “best” bidder price, hence, generating profit. The payment comes from the offering participant who has acquired the request. The highest price that can be paid is the one quoted by the offering participant himself, while he keeps the payment from the customer. Thus, the offering enterprise cannot generate losses. As each partner has to specify bids for all requests, there remain no unfulfilled orders. The problem is generalized so that the request bundles and not single requests are the subject of consideration, but the profit sharing model remains unchanged.

[Krajewska et al.(2006)] propose the most complex profit sharing model, based on operations research game theory and combinatorial auctions. In the preprocessing phase each partner specifies the lowest costs of fulfilment for each self-acquired request that is offered to the partners. This amount is called potential self-fulfilment costs of a request. In the profit optimisation phase it is aimed to generate a mapping of requests to the partners, such that the profit of

the entire coalition is maximized. At first, each partner defines potential fulfilment costs only for each bundle of interest as well as for each single request in such a bundle. Next, the combinatorial auction theory is introduced to specify a set of optimal bundles based on fulfilment and self-fulfilment costs. In the profit sharing phase the profit from request fulfilment is divided among the coalition members such that the financial situation of each partner is at least maintained. The offering partner holds the payment from the customer and pays the amount of potential self-fulfilment costs to the coalition. The serving partner receives the transfer price for the request execution, which corresponds to sum up the lowest potential (self-)fulfilment costs of all single requests from the bundle. The residual profit, which is the difference between the payment of the offering enterprise and the transfer price, is additionally divided among the coalition members according so called collaboration-advantage-indexes. The division corresponds to the benefit that each partner brings to the coalition.

3 Conclusions

Collaboration is a powerful measure to improve the operational freight carrier planning of cooperating partners. Theoretically, the horizontal cooperation presents the ideal logistic model of joint market forces [Bretzke(1999)]. In order to assure long-term functioning of collaboration structures among independent freight forwarders, the decentralisation of the collaboration process should introduce positive incentives for the partners that make them participate in the cooperation willingly. This can be achieved by proper profit sharing concepts that guarantee maximal possible improving of the financial situation not only for the entire coalition but also for each single partner.

In the era of globalisation, where medium and small enterprises are forced to compete with large international freight forwarders, the problem seems to be of high practical relevance. However, there exist only a few theoretical frames for collaborative freight carrier planning that we presented above. Instead, vertical cooperations among the enterprises from different levels of supply chain are widely discussed.

4 References

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