Chapter 5
Collaborative Planning

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ABSTRACT

The collaborative planning (CP) process contains multiple planning domains which shape a part of supply chain and the related planning processes. The goal of collaboration between planning domains is to use a mutually agreed-on plan. By sharing information, more accurate planning results are obtained. Useful for the planning processes are CP concepts such as sales planning, which communicate with customers and production planning, which communicate with suppliers (Kilger and Reuter, 2005).

This chapter is organized as follows. After a brief introduction, the authors describe the collaboration process and types of collaboration. Collaborative Planning, Forecasting and Replenishment is then explained. The chapter also explains quantitative models and software application, and ends with a case study.

INTRODUCTION

Supply chain management (SCM) is related to the coordination of communication elements such as material, information, and financial transactions within and between various organizations. Plans adjustment at different levels of supply chain is necessary for this kind of coordination. A coordination scheme is used for matching the plans of some decision-making units. Adapted individual plans in the process of decision making with other organizations constitute a CP scheme (Stadtler, 2007).

"Collaborative" means "to work jointly with others or together especially in an intellectual endeavor" (http://www.webster.com). In other words, collaboration can be defined as a process of reaching goals which are not achieved by acting alone. Three steps can be considered for collaboration: taking the agreement of all collaboration partners on a set of joint targets and directions,

dividing responsibility for reaching the targets, and joint work to achieve the targets using the abilities of all partners (Kilger and Reuter, 2005).

In summary, collaborative planning can be defined as a process of joint decision making for adjusting plans of supply chain members to achieve coordination.

COLLABORATION PROCESS

The general collaboration process can be completed in six phases: "definition, local domain planning, plan exchange, negotiation and exception handling, execution, performance measurement" (Kilger and Reuter, 2005, p.270).

Definition: Formal agreement is necessary for incorporating the target of joint work in predefined ways between business partners in a collaborative relationship.

Each partner makes a contribution to the collaboration such as money or knowledge, and the specific gains of partners contributing in the collaboration such as broader market access should also be determined in this step. Issues related to the collaboration items such as products with long lead-times should be also considered. Duration of the collaboration has to be determined in this step. The last important issue is to consider the conflict situations and different mechanisms that may be useful for resolving these disagreements.

Local domain planning: Future activities are organized in a local domain plan. For example, Components of planned activities of supply chain's members are uncertain without collaboration. So, these should be planned in local domain planning.

Plan exchange: In this process, the partners want to improve planning level by interchanging information.

Negotiation and exception handling: Partners obtain a general view of the planning situation by exchanging plans. In this way, they can also figure out the improvement of achieving the predefined goals.

Dudek and Stadtler (2005) have proposed a negotiation-based scheme for collaborative planning between two partners. They used this scheme to extend the simple coordination form planning by affording an opportunity for the partners to modify their planned order or supply in an iterative way. Mathematical models were used to show the reduction of total supply chain's costs.

Execution: An organized plan fulfills the goals and is then executed.

Performance measurement: After the execution of a plan, an analysis of the current situation and aimed situation is done to measure the results of execution of the master plan.

TYPES OF COLLABORATION

The structure of the collaboration network, objects, and leadership can be considered as three aspects of collaborations.

Usually, one partner is leading the process, and the others are followers. The leader starts and conducts the collaboration process, whereas a follower supports the process. In the CP process, a supplier can be the leader or a consumer can also have this role.

The consumer uses the items, which the supplier prepared, and collaborations are done regarding this relationship. Information related to demand and supply of those items is exchanged between supplier and consumer. According to this aspect, collaboration can be classified into two types: material-related collaboration and service-related collaboration. In the former information is related to the item, and in the latter information is related to capacity or services needed to make the item or to transport it, for example.

Network structure is formed by a collection of collaborations. The suppliers and the consumers are represented by nodes in this network and their relationships are shown by arcs. In a two-tier collaboration network whose length of any path is less than three, each node can be a supplier

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