8 Management of Variable Production Networks

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A close cooperation between companies in which resources are shared is referred to as a production network. Such production networks offer the opportunity to increase flexibility by subcontracting orders to other partners in the network. This paper will describe interfaces within a production network and mechanisms of subcontracting. In order to control production networks and to manage orders through the network, partners need detailed information regarding the logistical situation of the other partners.

The article presents the results of a research project on network-oriented production management at the Institute of Production Systems of the University of Hanover, Germany.

8.1 Introduction

The image of a stand-alone company that is linked to its customers and suppliers only by delivery and procurement of products is no longer valid. Since companies are confronted with constant structural changes in society and the manufacturing industry, enterprises have undertaken several innovative activities to optimize their processes. One approach enabling an extremely fast adaptation to quickly changing constraints involves building up a variable production network. This is a dynamic co-operation system or network of companies put in place for a limited period. As a part of a current research project on network-oriented production management, a number of theoretical methods from the fields of production planning and control - such as the funnel model, throughput diagrams and logistic operating curves - have been adopted for production management in a network of several partners (WIENDAHL ET AL. 1998a).
8.2 Production Networks

On the one hand, products are becoming increasingly complex and, on the other hand, successful enterprises are trying to reduce the content of own manufacture. Hence, companies decide to focus on core competencies. This has forced enterprises to co-operate closely with their suppliers as well as with their customers in order to improve business performance. Originally, this led to the forming of supply chains, which are characterized rather by the sharing of information between suppliers and producers than between the suppliers themselves (see Chapter 7). In a continuation of this trend, production networks or supply nets are emerging (WIENDAHL ET AL. 1999a). They are characterized by intense communication between the participating companies even though they might represent the same level of value adding. This means that companies in a production network exchange detailed data with suppliers and customers. In addition, however, the particular suppliers of a company also need to communicate with each other. This means that a manufacturer co-operates with other suppliers of his customer, i.e. his own competitors, a practice that is sometimes referred to as “coopetition”. This leads to an intensive flow of information between all participants in a production network, as depicted in Figure 8-1.

The information shared in a production net – according to the individual demands of the participating companies – may concern such things as the actual and future loading of machines, the availability of resources amongst the net partners, order