

PROPOSAL FOR A JOINT PRODUCTION PLANNING IN NETWORK ORGANIZATIONS

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Abstract: The actual world-market situation forms permanent competitive pressure for manufacturing business companies. One of the ways of advancing competitive abilities is cooperating and associating to network organizations. Within these organizations may also cooperate in manufacturing process, where the cooperation brings advantages of enlarging their production base. The content of this supply is description of cooperation, mainly the planning and management of this complex system. Transition to this form is not in fact easy. This paper then may serve as a basic help at the joint planning and management of production. Starting points are withdrawn to the evaluation of manufacturing processes, providing logistics between businesses and identify processes for joint planning.

Key words: process, cooperation, planning, production management, logistics

1. INTRODUCTION

Currently, by the time a customer is getting stronger and stronger in comparison with the market, it is important that industrial enterprises subordinate to market requirements. The market requires a large diversity of products, quick delivery time, low prices, frequent innovation, all at once with retaining high quality of products. While the market is usually dominated by big companies, it is necessary for smaller companies to cooperate and thus compensate for their disadvantages to enable themselves to compete in this environment. For this reason various types of network organizations (eg. clusters) arise. Within this cooperation it is efficient to work on the production process of their products closely together and profit from this cooperation. This production is so interdependent and complex that it leads to higher demands on coordination of all parts of the production. For this reason, the demands on the planning and management of this networked manufacturing system increase. If we want to create a suitable procedure for joint planning, we firstly have to understand the ways of planning in individual companies.

2. CURRENT APPROACH TO PLANNING

Planning itself makes an assessment of the future state of business and also ways to achieve it. The basic factors of influence are the product and market. The product means number of different manufactured products and the type of production (routine, serial, etc.). The market means how good we know our customers, whether we produce for a known customer or the anonymous market (Gregor et al., 2005).

The most common way of dividing the business plan is based on the hierarchical structure of the company. There are different levels of organizational structure in different companies, and also there are different levels of planning in different companies.

Therefore, the planning itself can be divided according to time perspective (Fig. 1):

- Long-term planning

- Medium-term planning
- Short-term production planning and control (Pinedo, 2009).

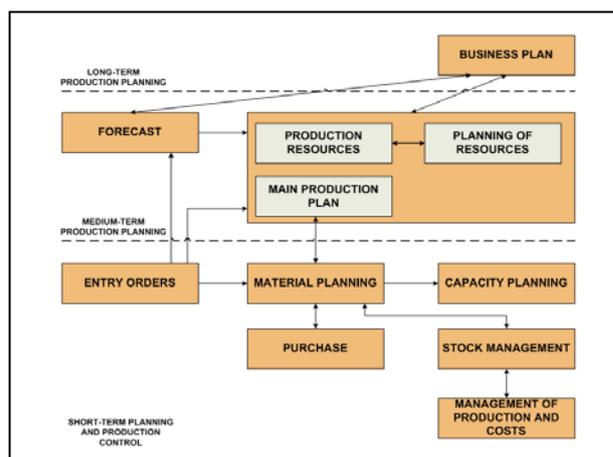


Fig. 1. The planning stage (Gregor et al., 2005)

3. PLANNING IN BUSINESS NETWORKS

If we consider the interconnection of production systems within a network organization, we must count with the fact that such linked production systems are gaining in complexity, and it still leads to higher requirements for coordinating all activities related to production. For this reason, the demands on the planning and management of this networked manufacturing system increase. So if we talk about a joint practice in production we should also consider joint planning and close cooperation in production management.

In the draft plan of working together as a network within the organization it is important to evaluate all production processes (work) in business process maps with regard to planning and to find a place to analyze the possibilities of interconnection and inter-company logistics.

3.1 Evaluation of manufacturing processes

One of the first steps is to analyze the production process, aiming to find an individually comparable process and identify appropriate criteria for their evaluation. Evaluation of manufacturing processes works on the basis of standard methods of assessment (Stevenson, 2009). These processes assess and propose the most appropriate procedure for the product through these processes. The main criteria for the further work are primarily:

- Quality of process
- Time-consumption of process
- Economic evaluation of the process - the costs
- Usability of resources (capacity - equipment, manpower, materials, offices, etc.)

After evaluation of these processes (eg milling, turning...) we look for the best routes of the products through the manufacturing system (Fig. 2). Passage through these processes

must be planned to take into account the already mentioned criteria, eg process quality, process costs, capacity, process - based on the current production needs and more. An example might be (Fig. 2) the situation when product 1 and 2a passes through the best evaluated process 2, which was the capacity overload. Then you can change the flow of product 2a through the designated product 2b. It is therefore clear that there is a need to balance the possibility of some processes (eg. capacity) gains and losses of linking manufacturing systems.

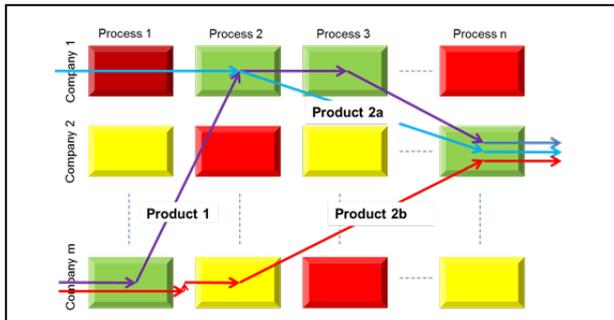


Fig. 2. Scheme of production processes in many manufacturing companies

The example outlines the procedure for short-term planning and production management, but it should work in other levels of planning, both medium-and long-term. An example might be a common approach in technology development and reconstruction, long-term plans for production expansion into new markets, namely the search for new customers or developing of new products. If this area was ignored, a situation would arise in such situation, where companies buy the same technologies and will not be able to well utilize production processes.

3.2 Process identification for common produce planning

The next step in the accession to the joint planning and management processes is the analysis of individual companies in the network organization (Grasseova, 2008). It is important to focus on processes directly and indirectly related to the planning and production control in this analysis. Through these processes should process maps of individual companies connect themselves. To differ these connections three levels (degrees) of cooperation were chosen:

- Communication
- Cooperation
- Fusion

The communication is realized only if strictly necessary for the forwarding of information between enterprises for the effective functioning of these companies. This information should be forwarded automatically. At this stage interconnection is considered such as a link between businesses when the request is send (for example, they want to produce a certain number of units of particular type) and a partner in the network processes accepts request and sends back information about the possibility of receiving the request for production. The examples of corporate link-level communications are processing orders, during production, etc.

In cooperation sharing any information takes place within these linking processes. Companies collected the material from the information for themselves without any need of asking for any request or initiating any action. Examples are the production base development plans. The companies cooperate in the development, to avoid duplicate purchases of technology.

The last link is considered the complete fusion process, where it is not clear to us that the process belongs to and serves all the companies together. Of course sharing of all information is necessary for the process to function properly. The idea is to

deliver the highest degree of interconnectedness - fusion, so companies need to have the process as a shared process and jointly participate in its creation, maintenance and development. As an example here may serve the process of "inter-enterprise distribution." Companies can have only one intercompany distribution and it is up to them to agree about the responsibility and management of this process.

Connection is then made by these levels of connection, transformation and rationalization of process maps and process so that it could be link production system and especially in this case the effective planning and management.

3.3 Inter-company logistics and production planning

The last important stage of preparing the joint production planning is to provide services between businesses. We should not only monitor the capacity utilization facilities, time-consuming processes and delivery dates, but also the actual flow of material between different production systems. The interconnection system is more productive in the organization where the importance of logistics network still increases, because this is the overcoming of larger distances and thus higher costs for transportation. This should be noticed already when planning. At this stage of production it is necessary to work with transportation capacity so that the use of these capacities was as optimal as possible. And so the shipments of material flow between production systems along with the quantity and size of production batches could be proposed on the basis of information on the possibilities (Wannenwetsch, 2010).

4. CONCLUSION

The content of this paper is part of the whole issue of partial joint coordination in the planning production systems connected with a network organization. This phase was followed by specific selection of points (processes) the connection process maps and establishing the methodology of planning and production control. The potential benefits are evident now, the cooperation can be better utilized production capacity, improve product quality, expand the technological base - thus offering a broader product portfolio, better capacity utilization and reduce delivery time of production itself, etc. If companies use this potential in this way, they may increase their competitiveness in today's global marketplace.

5. ACKNOWLEDGEMENTS

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6. REFERENCES

- Grasseova, M. (2008). *Procesni rizeni*, Computer Press, ISBN 978-80-251-1987-7, Brno Czech Republic
- Gregor, M., Micieta, B. & Bubenik, P. (2005), *Planovanie vyroby*, Zilinska univerzita v Ziline, ISBN 80-8070-427-9, Zilina Slovak Republic
- Pinedo, M., L. (2009), *Planning and Scheduling in Manufacturing and Services*, Springer, ISBN 978-1-4419-0909-1, Dordrecht Nethrhlands
- Stevenson, W., J. (2009), *Operations management*, McGraw-Hill, ISBN 978-0-07-337784-1, Columbus USA
- Wannenwetsch, H. (2010), *Integrierte Materialwirtschaft und Logistik*, Springer, ISBN 978-3-540-89772-9, Heidelberg Germany