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Lean Order Management

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ABSTRACT

Many small and medium sized companies introduce new management initiatives such as lean, outsourcing and Vendor Managed Inventory to reduce stock and manufacturing costs, to shorten lead-time and to improve customer orientation. However, lean ideas have primarily been implemented in the production to reduce setup-time, stock and work-in-process whereas the flow and resource consumption in the administration has had little focus. This paper deals mainly with improving the business processes by use of lean order management and Vendor Managed Inventory.

INTRODUCTION

Since the 90's many companies have implemented lean ideas in the production to reduce setup-time, stock, work-in-process etc. [1]. But the shift towards customization has increased the need to control the order through the administrative business processes as more departments are involved in order processing [2].

Through projects made in cooperation with industry a number of general problems in the order producing companies have been identified. Lack of drawings in production and lack of materials in the final assembly are general problems in customized production. Many companies accept all kinds of customer specific changes without charging the actual costs of the desired product changes, even if this means rework or dispose of previously produced or purchased items. A growing number of people in e.g. product development, purchase, planning and production are occupied with customer specific changes. Furthermore the number of production orders are growing as batch sizes are reduced. In total man-hours are increased due to changes caused by customization. Also we have experienced too many changes of responsibility in the order flow which causes errors and an increased workload. The individual links in the order chain are not aware of demands from the rest of the chain. This situation is also intensified by a missing functionality in the information systems.

Williams [3] conclude that "companies need to operate within effective and efficient supply networks that are highly flexible, innovative and dynamic to respond to pressures such as cost reductions, product development, high quality, value adding products, and frequent, on time deliveries".

ACTIVITY CHAIN MODEL

The purpose of the Activity Chain Model is to form activities and chains of activities (business processes) which comply with the increased influence that customers exert on the development and adjustment of products, processes and operations [4]. The Model are closely related to Business Process Reengineering [5] and Value Stream Mapping [1]. The Activity Chain Model unites the customer order activities and at the same time it illustrates the connection with the development and production activities. The objective of the model is to improve the relations between tasks and organizational functions by changing the view of the business processes in the company from the traditional functional orientation (se figure 1) towards a flow orientation (se figure 2). Further, the Activity Chain Model aims at removing all information and activities which are either not used in the order process or not necessary when a more efficient organizing of the work is employed.

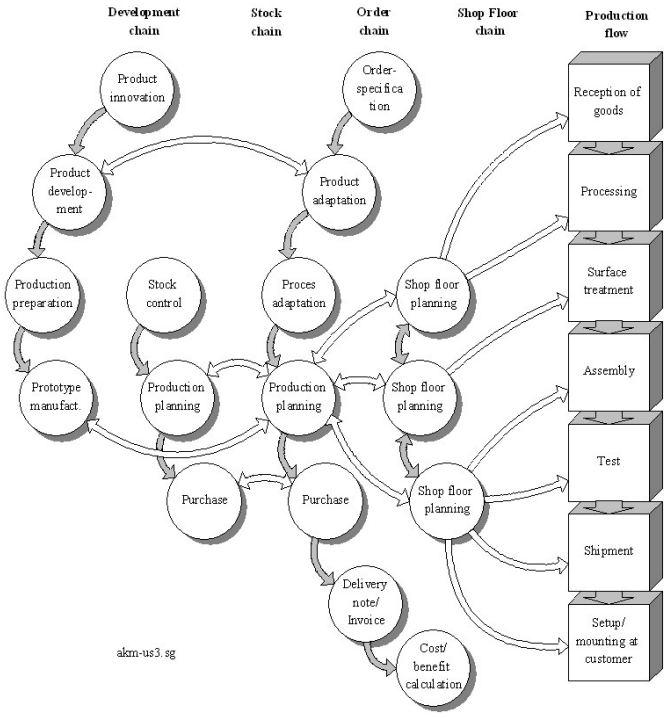
Figure 1. A functional view of the business processes in a company

The Activity Chain Model consists basically of four chains of activities - the Product Development Chain, the Stock Chain, the (Customer) Order Chain and the Shop Floor Chain. Furthermore, the model includes the physical production and flow of materials.

The Product Development Chain contains identified activities in the development of new products. Some of the resources might be shared with the product adaptation activity in the customer order chain. The Stock Chain contains activities controlling the purchase and/or production of standard components in the company. Resources for planning and purchasing are normally shared with the customer order chain. The Customer Order Chain contains all activities in connection with handling of customer orders such as specification, pre-calculation, adaptation, planning, purchase, production, delivery and finally invoicing and post-calculation. Finally the Shop Floor Chain contains activities controlling the production and assembly of standard components and customer specific items in the production facilities (units/ plants).

The model is generic and should be adjusted to the individual company by adding / removing chains and activities. Because of the increased

Figure 2. The flow-oriented Activity Chain model



number of customer specific orders the design department is often involved in the order process. Furthermore, production will be involved in the development phase through production of components and prototypes. This is why the development activities influencing the order process are included in the model. Most of these companies produce a number of semi-finished goods to stock. This is to reduce set-up costs by increasing the batch size and/or to reduce the lead-time. Depending on the ratio between stock and customized production a number of activities are attached to the production for stock and a number of activities are attached to the customer specific production.

The idea to consider the business processes as a chain is not new. In 1985, Porter [6] introduced his "Generic Value Chain" consisting of five primary activities and four support activities as illustrated in figure 3.

The Generic Value Chain is related to the Order Chain in the Activity Chain Model which though has a broader view of the business processes in the company

CUSTOMER ORDER PROCESSES

As discussed in section one, customized production involves a large number of departments in a functional organized company. This makes it very difficult for the company in general and for individual employees to obtain the actual knowledge of customer order processes. One purpose of modeling customer order processes by use of activity chains is to analyze and communicate the obtained knowledge throughout the company. Subsequent the model is used to improve current business processes.

To analyze the customer order processes we recommend a bottom-up approach where all subtasks, tasks and information processing performed in connection with customer orders are described. This is done by pursuing orders right from customer contact until delivery and payment. It is important to distinguish among the different types of orders in the company such as standard orders, special orders, urgent orders and spare part orders. Also a distinction between customer specific tasks and general/basic tasks is relevant in most companies, especially to identify the relevance (value) of tasks and the cost of customer specific order processes.

It is often relevant to supply the analysis of order processes with the analysis of tasks and information processing regarding the materials flow from reception of raw materials and components through production and assembly to the delivery of final products. This analysis focuses on information controlling the materials flow (such as requisitions, production orders etc.) and on activities (such as receipt and dispatch of materials to/from suppliers and customers, receipt and delivery of materials inside the company). This analysis also gives a thorough knowledge of production processes and of planning procedures on the shop floor. We have observed different objectives in the central planning and in the shop floor planning in many companies, e.g. where central planning focuses on customer orders whereas shop floor planning focuses on utilisation of capacities.

Based on the analysis of order flow, related tasks are joined in activities which are arranged into the chains or networks according to the process. The tasks can be both parallel and serial. In some cases activities and departments will be identical (typically activities as purchase, production preparation and planning) while other activities are handled by more departments in cooperation (e.g. activities like order specification and product adaptation).

CASE STUDY

In the case company an increasing number of customer specific demands and inquiries caused more work in order management which resulted in an augmented time consumption by the 30 white-collar employees. 150 orders and the unknown number of inquiries and offers were processed each year.

The company's manual order management system was analyzed to determine the time consumption for each activity: which departments and employees were involved and how much time was spent on value adding and non-value adding activities. Inspired by Laudon & Laudon [7], detailed activity chain diagrams indicating key business processes and key measures was developed. Detailed analyses of the order flow showed that the processing of an order was unclear and involved transfer of responsibility many times. The order chain is illustrated in figure 4. Drawings were not available in time and product specifications were often completed late. Customer order changes led to much overtime work and many rush jobs. Finally, a large number of forms had been added during time, and a closer analysis of the paper based system led to a 50% reduction of the number of forms used.

The results of the analyses was among others, that too many departments and employees were involved in each activity, which means that it was necessary to restructure the business processes and the organiza-

Figure 3. The Generic Value Chain. [6,8]

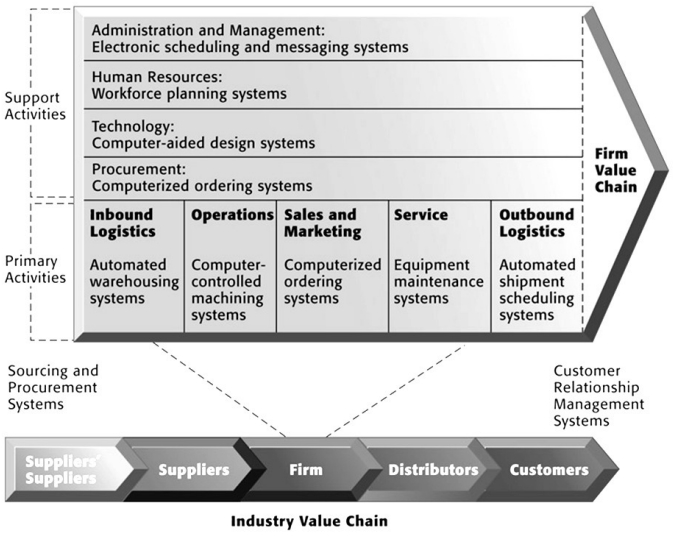


Figure 4. The order chain of the case company

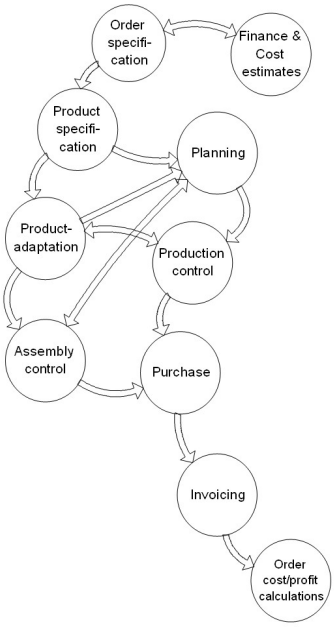


Table 1. A reduction of subtasks by 27% obtained by implementing a new order chain in the case company.

SUBTASKS:	Pur-chase	Plan-ning	Invoi-cing	Sales	Problem Solving	External relations	**Total**
Existing tasks							
Value adding	61	12	48	11	-	80	**212**
Non value adding	41	8	28	10	-	80	**167**
Total	**102**	**20**	**76**	**21**	-	**160**	**379**
Future tasks							
Value adding	59	12	46	11	8	74	**210**
Non value adding	12	0	15	2	0	37	**66**
Total	**71**	**12**	**61**	**13**	**8**	**111**	**276**

tion. Order management was split into well-defined and limited activities and subtasks. Hereafter, the activities were regrouped in other or new subtasks and activities. Through working with reorganizing order management it became evident that more employees carried out a number of subtasks which could advantageously be grouped in new tasks. Consequently, more subtasks were combined in larger tasks. The new structure reduced the number of transfers of responsibility, and at the same time it required that the individual employee had more qualifications. The result of the project was that resource consumption in the order management processes was reduced by 27% as illustrated in table 1.

CONCLUSIONS

The Activity Chain Model proved to be an excellent tool in analyzing the business processes in a company or a supply chain and revealing old routines and subsystems which are either not used any longer or carried out twice.

The tasks of order management will change radically in future. The goal will be to maintain satisfactory utilization of resources and an acceptable profit with an increased adaptation to customer specific orders and a short and precise time of delivery. Furthermore information technology tools will be widely used such as Collaborative Planning and E-business [8] and the author believe that most future improvements will be based not only on in-house improvements but also on integration in the supply chain.

The change in work means that the employees must possess various types of qualifications. A similar development has taken place in production where partly self-controlling groups comply with the new conditions. This change calls for retraining of employees, and a corresponding re-education will be necessary for employees in administration.

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