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Production Planning and Control

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Abstract: *Production planning and control is involved with implementation of the plans, i.e. detailed job scheduling, assignment of workloads to machines (and people), and actual work flow through the system. Production is an organized activity whereby row materials are converted into useful products. Production work is carried out in a broad range of production and service sectors. Production system involves the optimum use of natural resources such as people, energy, machinery, materials and time. Coordinate production planning and monitoring with the different departments: like manufacturing, marketing, distribution, warehouse and other divisions depending on the organizational design. Production preparation and control collects data from marketing departments relating to orders. Production plan is prepared in production planning and control, based on marketing and production data. The business plan gives a clear picture of industrial tools being used for production. The approved development schedule is submitted to the Department of Business. Department of Production produces goods under that plan.*

Keywords: *Control, Manufacturing network, Production planning.*

I. INTRODUCTION

Production planning and control may be seen as the production operation's nervous system. The purpose of this task is to make efficient use of material resources, staff and facilities in any undertaking by preparing, organizing and managing production activities that turn raw materials into finished products or components in the most optimal way[1]. All manufacturing or production cycle activities have to be planned, coordinated, organized and controlled to their goals. Planning and control of production as a department plays a vital role in manufacturing organizations. It is obvious from name that preparation is something[2]. The idea of planning is setting goals. Production planning and control provides the different departments with different kinds of information. It provides Marketing department with information on available manufacturing tools. According to that information the marketing department receives orders. It co-ordinates with other departments as well as provides relevant information. 21st century manufacturing firms are subjected to competitive market trends. On the one side, customers expect high-quality individual and complex goods at low cost and with a limited delivery time. On the other side, market globalization accompanied by a higher supply of comparable products intensifies the competitive pressure on businesses[3].

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II. OBJECTIVES OF PRODUCTION PLANNING AND CONTROL

II.I. Nature of Inputs: Various types of inputs are used to create a component. Product quality depends on the nature of the inputs being used. Therefore the preparation is carried out to determine the nature of the different types of inputs which is a complicated process.

II.II. Quantity of Inputs: Determining the quantity of the inputs and their composition is very important to achieving a production level[4]. A product can only be prepared when the necessary composition of the inputs is estimated.

II.III. Proper Coordination*:* It ensures that the workforce, machines and machinery coordinate properly. This contributes to wastage prevention and the smooth output flow.

II.IV. Better Control*:* Production planning is the control method. The preparation is a precondition for a better control. Only then can one compare the performance and quantify the deviations that lead manufacturing control[5].

II.V. Ensure Uninterrupted Production*:* Materials planning ensures the daily availability of raw materials and other elements. Daily materials and supplies flow is helpful in the continuous production process.

II.VI. Capacity Utilization*:* There is a need to make effective use of the available resources. It's helpful in reducing different production costs.

II.VII. Timely Delivered: If good production planning and control is in place, timely production will take place and the finished product will be rushed onto the market in time. That also ensures better customer relationships[6].

II.VII. Production planning and control: The goal for production planning and control is to optimize the order fulfillment process to ensure that the products ordered by the customers are delivered on time. PPC's core function is to plan and continuously supervise any assembly and manufacturing process in terms of quantities, dates and capacities. According to the VDI (Association of German Engineers), the objective of production planning (PP) is to identify production-relevant goals and the tasks necessary to achieve them. The logistics targets followed are:

- Heavy scheduling commitment.
- Short processing times.
- High usage.
- Low levels of inventory.

Logistics performance can be assigned to both Heavy scheduling commitment and Short processing times, while utilization and inventory levels can be seen as logistics cost dimensions. Various planning and control tasks have to be carried out to achieve these (partially competing) targets. Core tasks within the PP include manufacturing program planning, primary, secondary, and tertiary demands, and external procurement. An order schedule followed

by an arrangement of the needed and available resource capacities is also necessary in order to formulate a comprehensive production plan. Production control (PC) is responsible for implementing and controlling the planned processes once the production plan has been set up. Development management has to activate counteractive steps in the event of deviations from the target logistics system[7].

II.VIII. Value-adding networks*:* Industries have reduced their real net production ratios significantly in recent decades. As early as 1985, one researcher emphasized the cost advantage of specialization. Typical explanations and priorities of specialization and collaboration are:

- Effects of curve learning and economies of scale.
- Entering new markets.
- Increasing order fulfillment efficiency and effectiveness.
- Economic advantages for all partners.

In short, businesses are hoping to benefit from the efficiency, time and cost of specialization. As regards the declining real net production ratios, companies are forced to collaborate with supply chains partners on respective value-adding networks in order to produce goods that can be sold to end consumers[8].

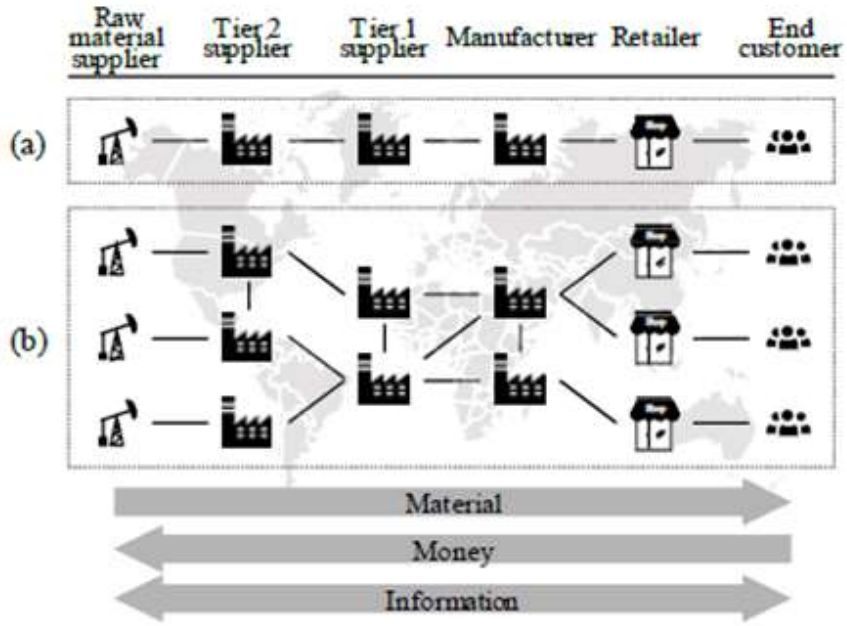

Fig. 1: (a) Supply chain; (b) Value-adding network.

To illustrate the similarities between conventional supply chains and innovative value-adding networks, it is necessary to distinguish between the two terms:

A typical supplier (see Fig. 1 (a)) extends from the supply source, the suppliers of raw materials, to the end customers, to the point of consumption. Supply chain management (SCM) takes into account the interoperate design, preparation, and control of products, information, and money flows across the entire supply chain. SCM's core aspect is early-stage, consumer-oriented synchronization of supply and demand. Coordinating partner's procurement and production plans leads to lower bullwhip effects and fewer inventories. Cooperation, also leads to high interdependencies among partners, and complexity in connected value streams. The supply chain operations guide (SCOR) model provides a Supply Chain Event Management (SCEM) for managing sudden short-term events. The SCEM is based on rules defined by the supply chain clients and applied in the event that the conditions are met. However, the volatility of customer-supplier relationships increases, due to shortening product life cycles. Companies are forced to associate to new value-adding systems and collaborate within a short time with unknown partners.

III. ELEMENTS AFFECTING PRODUCTION PLANNING AND CONTROL

- ***Use of Computers****:* Modern mills use office automation devices such as PCs, punch cards etc. This allows accurate calculation of people and computer requirements.
- ***Seasonal Variations****:* Seasons, for example umbrellas and raincoats, influence the market for certain goods during the monsoons and outputs. Production planning and control shall take account of such changes while planning and controlling input and output activities[9].
- ***Test Marketing:*** New products are to be sold in an aggressive marketing campaign to check and learn the trends. This process is a short period, sporadic in nature and often upsets daily development.
- ***After Sales Service:*** This has developed into an important success parameter. Many items are returned for repair in after sale services. These are unscheduled work and the production line is also overloaded.
- ***Losses due to Unpredictable Factors****:* Losses arise from incidents, explosion, and theft of manufacturing products, mainly materials and components. Those are unforeseeable. Supply shortages due to such factors disrupted the timing and quantity of the expected production schedule.
- ***Losses due to Predictable Factors****:* Due to natural engineering phenomena such as output losses and changes in material use and incidence of defects there are losses of inputs.
- ***Production of Order:*** There are times where current orders are prioritized by last minute due to external demand. Such target shifts are often determined by sufficiently high management levels.
- ***Design Changes:*** R&D and engineering department can issue design changes. This will necessarily force control over production planning to change the materials and process inputs.
- ***Rejection and Replacement:*** During stage or final inspection, there are occasions when subassemblies or finished goods are refused. Planning and control of production must take care of contingent plans to carry out the rework without affecting the scheduled quality.

IV. FUNCTIONS OF PRODUCTION PLANNING AND CONTROL

IV.I. Production Planning Functions:

a) Estimating*:* Estimating means determining the amount of goods to be produced and the costs associated with it based on sales forecast. The main tasks before resource budgeting are to estimate the personnel, machine capability and materials required to meet the projected production targets[10].

b) Routing*:* Routing means, deciding the direction or route on which manufacturing operations should proceed, setting out the sequence of operations to be followed in the manufacture of a specific product. This route direction is ahead of time calculated. Product or process engineering feature provides routing information, and it is useful to prepare charts and schedules for machine loading.

c) Scheduling: Scheduling involves setting priorities for each job and determining the start and finish time for each operation, the start and finish dates for each part, sub-assembly and final assembly. Scheduling sets out a production time table, showing the total time needed for the manufacture of a component, and also time required performing the process on each machine or equipment for each item.

d) Loading: Loading facilities involves loading facilities or work centers, and choosing which jobs to delegate to which work center or computer. Loading is the mechanism whereby service schedules are translated into practice. Loading makes maximum possible use of efficient equipment and prevents output bottlenecks[11].

IV.II. Production Control Functions:

a) Dispatching: The routing and scheduling functions as discussed above are paper work only. No actual production has yet commenced. Dispatching is the aspect of production management that converts paper work into actual production according to the specifics of routing and scheduling functions worked out. Dispatching deals with putting production activities in action by issuing orders and instructions in compliance with the timings previously scheduled as expressed in production schedules.

b) Expediting/ Follow-up/ Progressing*:* Expediting or advancing means that, the work is taken out as per the schedule and production deadlines are met. Expediting incorporates exercises, for example, status announcing, taking care of bottlenecks or burglaries in generation evacuating the equivalent, controlling varieties or deviations from arranged execution levels, following up and checking progress of work through all phases of generation, planning with buy, stores, instrument room and upkeep divisions and altering the creation plans and rethink if vital.

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c) Inspection: Inspection is the method by which an object is inspected for identification or verified for quality and quantity verification in any of its features. It is an important tool for ascertain and controlling the quality of a product. Inspection is an appraisal practice, measuring goods or services to a standard.

V. CONCLUSION

Production planning and control provides the different departments with different kinds of information. It provides Marketing department with information on available manufacturing resources. According to that information the marketing department receives orders. Employment in planning and controlling the production depends on education and experience. Working in planning and controlling production is challenging task. It needs analytical skills and understanding of the method of fabrication. Production planning and management is an important part of running every company on the market since it can influence product quality.

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