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Decision Making and its Importance in Production Planning within the Woodprocessing Company, Respectively in the Whole Supply Chain

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Abstract

We can say that planning is the first and one of the most important managerial function because of its specification the business goals and description of relevant tasks to meet those goals. Within the all managerial functions but mainly in planning, there is also necessary to deal with the decision making process and its elements. We have done an investigation of decision making and planning processes in particular wood processing company in Slovakia. We have found that this company doesn't use appropriate decision making methods what results in complications in other related processes and finally in complaints from the customers. Production can be characterised as a system with inputs and outputs. Transformation process is the most effective when it runs under optimal costs, under optimal amount of consumed inputs and by spending optimal time. It must be chosen suitable decision making, monitoring and calculating methods which allow to quantify and to compare particular alternatives and to choose the best one. All these above mentioned is very topical just now, in the time of financial and economic crisis.

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1. Introduction

Process management refers to aligning processes with an organization's strategic goals, designing and implementing process architectures, establishing process measurement systems that align with organizational goals, and educating and organizing managers so that they will manage processes effectively.

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Production must be mentioned as a system with inputs and outputs. In the system, there are transformed inputs into outputs by the application of suitable technology, organizational and managerial processes. Feedback represents possible corrections in outputs, technology, managerial decisions and inputs choice (Aláč and Rašner 2004). It is a reaction on customers complaints and demand and it must result in appropriate solutions and decisions made (Fig. 1) (Demoč 1996).

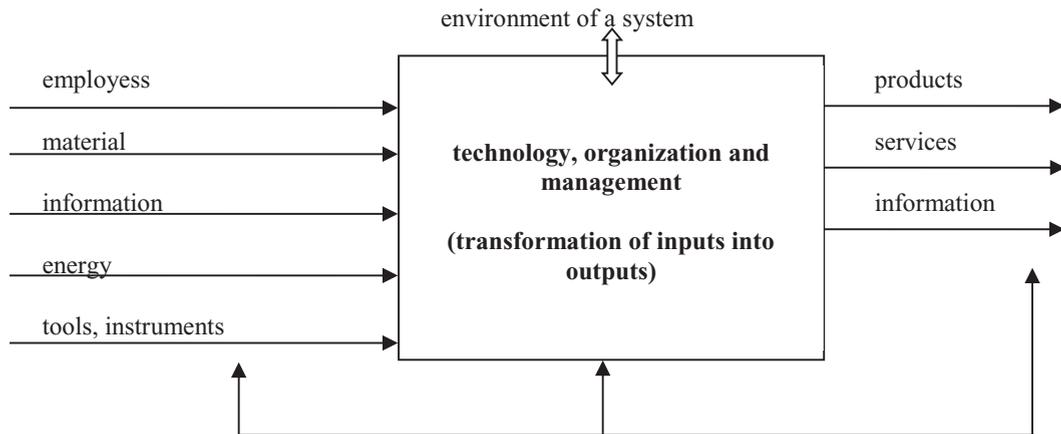


Fig. 1. Production as a system (Demoč, 1996).

A goal of production is not whatever product or service but only such one which will be successfully realised in the market, which satisfies customer's demands and which brings adequate (optimal) profit and market share. Transformation process should be the most effective as it runs under optimal costs and under optimal consumption of inputs (Matuzsewski 2003).

Each component must be precisely specified and characterised in order to choose the most suitable for particular type of production and for determined goals. This paper deals with the proposal and design of relevant decision-making model for the production planning and also for the whole supply chain. Our results and proposals were made in the particular chosen woodprocessing company.

What does have an impact on production?

There are several criterions which have decisive impact on each production process.

For the specification of production type it is necessary to evaluate:

- Universal character of machinery
- Amount of producing products for particular time period
- Number of products types
- Demands for employees' qualification
- Time of production cycle (process)
- Character of labour division etc.

2. Material and Methods

2.1. Planning as a managerial activity

Planning can be considered as one of the oldest human activities and mentioned as one of the basic and the most important managerial activity which allows to define company's goals and activities leading to meet these goals (Rajnoha 2005).

According to company's departments we can speak about: production planning (or planns), personal planning, investment planning, R&D planning, marketing planning, financial planning etc. Fig. 2 describes basic managerial functions.

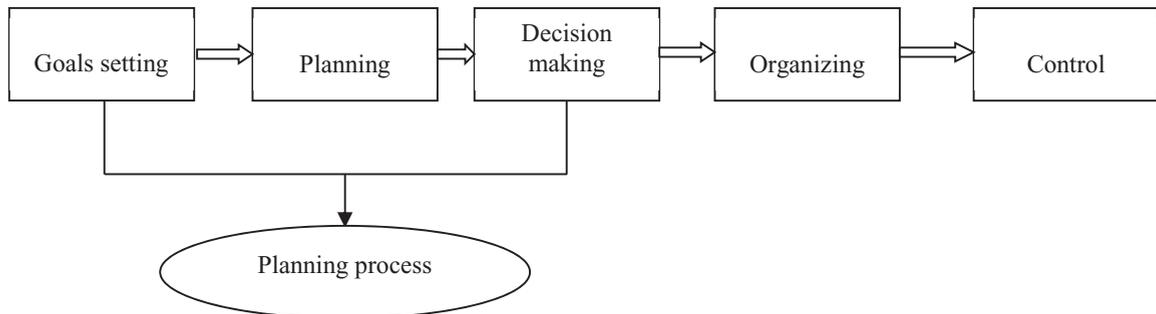


Fig. 2. Managerial functions and specification of planning process (Robbins, Coulter, 2004).

The planning includes goals definition and determining appropriate methods to achieve specified goals. The necessity of planning follows from the nature of organizations as goal-seeking subjects. When we want to create plans we need various information from the environment, from the market and also from the inside of particular company. More detailed and latest information mean more accurate plans and goals (Kokles 2000 and Molnár 1992).

Some interesting ideas about planning:

- Planning is not a description of that what will happen but that what we want to happen
- Those who do not plan never will know where they failed
- Probability of accidental events is higher when planning process is only general and not concrete, but at the same time...
- When the planning is too detailed and exact, impact of accidental events is less expected
- Planning process should be only such detailed as it is necessary and not as it is possible

Content of planning process relates not only on departments where the planning is done but also on specified goals which must be met. Each activity, each process should run under optimal costs, it should be finished on demanded time and desired quality must be reached. So, plans should follow some particular managerial objectives (Rajnoha 2005):

- Customer satisfaction: profits and growth depend on meeting customer's demands. Product must be built according to customers specification, taking into account qualitative standards, it must be delivered to him at promised time and in agreed price.
- Continual material flow: costs and time of production rise if planned production schedules are interrupted for lack of materials, employees or for any other reason.
- Optimum inventory levels: the minimum inventory levels to assure continuous material flow may not be the most economic levels. When purchased order quantities increase (demand factors and lead times remaining unchanged), ordering costs are decreased but inventory cost are increased. When ordering costs decrease more than inventory costs increase, optimum inventory level will rise.
- Increased productivity: working process must be so planned and controlled that production time and costs will be held at or below predetermined limits (levels). Productivity can be increased by shortening production times or by increased volumes of semi-products.

8 steps of planning process

Generally and very briefly we can say that planning process estimates - what should be done, in what sequence and under which costs. Depth and details of planning depend on concrete planned situation, on its complexity and scale. But each planning process should contain 8 basic steps:

1st step – what is a goal of planning process?; what, why and how should be reached?

➤ Precisely defined goals and strategy leading to its reaching are two basic steps which determine success of each planning process. If responsible managers or employees do not find relevant and adequate answers on the above mentioned questions (what, why, how?) it is necessary to reevaluate assessed goals and strategy.

2nd step – what must be done?

➤ In this step must be identified and specified (characterized) all activities (for example by brainstorming method). Then these activities must be arranged in logical sequence – e.g. according to technology line or material flow. Last but not least, it must be taken into account relationship among activities.

3rd step – who will perform (realise) given activities?

➤ This step contains planning and definition of functions, description of job tasks for particular employees. Each activity must be bound with an employee (or technology device) who will be responsible for its performance.

4th step – who and for what will be responsible?

➤ Each employee should be competent and responsible for his/her performance. These competences and responsibilities can be transparently presented in so called matrix of responsibility.

5th step – when will particular activities be realized?

➤ In this phase of planning process all activities should be arranged according to logic sequence and relationships. It is also assigned time required for its performance and then it is elaborated time plan.

6th step – which costs and resources are demanded?

➤ For each activity it should be planned appropriate costs and resources. Amounts of costs and resources can come from past periods, could be forecasted by various analysis or calculation methods. Resources and working time can be estimated and planned from standards of consumed materials and standards of consumed work performance.

7th step – how to control?

➤ It must be assessed how often and by what method will be activities monitored and controlled. In this phase it is also necessary to specify communication channels (meetings, e-mail) for effective information gathering, transfer and evaluation.

8th step – what will happen if...?

➤ Planning process should take into account also possible alternatives of consequences arisen by accepted decisions. Therefore it is necessary to analyse external and internal environment in order to prevent negative impacts. This final step can be considered as a feedback within the planning process.

2.2. Managerial tools and methods in planning and decision-making

It should be recognized that in any individual company, the functions and responsibilities of Production Planning may be divided between various departments or individuals and will not necessarily be organized into a Production Planning division. Centralization of the planning function into a Production Planning division improves and facilitates a co-ordinated and properly executed planning operations.

The functional duties of Production Planning will generally include (Matuzsewski 2003):

- Sales forecasting or active participation in sales forecasting
- The determination of production requirements (specification and quantification of raw materials, other inputs, machinery in order to effectively utilize capacities in a company and to meet sales forecast)
- Inventory management (both input and output stock optimization)
- Labour requirements (criteria for the choice of most suitable employees and necessary amount of employees)

Every day, managers must make decisions without knowing precisely what will happen in the future. Decision making requires making forecasts about the future, so managers must often rely on their subjective feelings and best

forecasts as they plan. The more accurate these feelings, the better prepared managers will be (Aláč and Rašner 2004). Experience tends to improve managers' judgments and ability to forecast events. Several quantitative methods are available to help managers forecast events. The best managers combine intuition and **quantitative tools**.

Basic quantitative tools:

- Break - even analysis
- Time series analysis
- Causal modeling (regression analysis)

Qualitative tools of forecasting help to generate information, ideas and judgements that managers need for planning and decision making. Whereas quantitative techniques are focused on selecting the most desirable from a set of options, qualitative tools focus most heavily on identifying options. The following is a list of some qualitative tools:

- Decision tree
- PERT
- Petri Nets
- Decision matrix
- Brainstorming
- Delphi technique
- Nominal group technique

A goal of this paper lies in the description the whole supply chain and in identification of decision making knots and situations by appropriate managerial tools and methods. All these should lead not only to concrete improvement of particular company's goals but mainly it should lead to identification of possible problems and assessment of adequate steps, criteria and alternatives for the solutions.

3. Results and Discussion

It begins by the identification of customers' demands. According to that it is necessary to identify and purchase resources, materials, semi-products which are necessary for the production. Identification of customer's demands or identification of particular customer can represent only given situation without decision making (stochastic view) or decision-making process (deterministic view). This first knot (step) will be stochastic in the case when the company would like to meet demands of all possible customers (of course taking into account structure and capacity of own production and technology). In this case, company accepts and registers every customer's order and it tries to meet all these orders. The second situation (the first knot) will occur in that case when the company chooses some particular customer for whom its products will be produced and other customers will be left for the competitors. It can be said that not every customer should be interested for the company to meet his/her demand. So, this first knot could be deterministic in such a case. This can be determined mainly by the production capacity, costs of additional capacity in order to meet increasing demand of particular product or to launch new product on new assembly lines, costs on logistics and other services. Of course it must be mentioned also cost of research and development (R&D) related with new products.

Following knot of supply chain represents purchasing of inputs. This knot should be deterministic and there were mentioned two basic alternatives – the first is purchasing from external suppliers and the second one is own self-supply by own capacity. This decision-making is highly dependent on particular input. There are typical “make or buy” questions and solutions. External inputs cover more than 80% of all inputs what involve primary costs. The rest 20% of inputs come from own capacity and these inputs are covered by secondary costs. Decisive criteria for the choice between own internal inputs and external supplies are the following: costs, quality, flexibility, demanded volume of inputs. As an optimum methodology for such a decisions can be used “make or buy”.

The knot “choice of the supplier” is very important part of the whole supply chain because when this step is failed, consequences can be expressed in the further processes and finally in bad quality of final product what can lead to customer’s dissatisfaction. Except of quality, flexibility is another important criterion what impacts total time of product launched in the market. Supplied amount of inputs affects costs of storage and transportation costs.

Together with the choice of supplier it is necessary to deal with the choice and evaluation of methods of transport. This decision-making is not necessary when inputs come from own capacity. External inputs can be carried by three alternatives – transport by own vehicles, transport by supplier’s vehicles and transport ordered from the 3rd party. Further, these alternatives can be divided into three kinds of transport-railways, road and combined transport. As the criterions there are considered-costs, flexibility, transport capacity, transported material, technological equipment of warehouses and routes disposal.

Inputs should be stored. Technology, production process and delivery conditions do not allow to eliminate inventory into zero level and therefore it is necessary to deal with warehouses, its capacity and managing. There are two alternatives – to use own warehouses or outsourced it. Basic criterions for the decision-making between these two alternatives are the following-costs, flexibility of supplies, capacity of warehouses.

The next phase (knot) of the supply chain is “production“. This knot can be as deterministic as stochastic. Of course, one of the basic assumption in managerial work is to think in alternatives and to be prepared for various alternatives and therefore the most suitable it is to analyse this knot as deterministic. Three alternatives can be mentioned here – production by own capacity, the whole production is outsourced, part of the production is outsourced. It is questionable and it must be analysed whether those last two alternatives are profitable for the particular company because production is the core business for analysed woodprocessing company. There should be analysed the following criterions – profitability of a production, costs, capacity utilization, time demand, flexibility of a production, quality, lost of know how.

Sale is the last knot in supply chain. Some years ago company had been using two alternatives of sale – through own sales department and also through external sales institutions. We can mention the following criterions for this knot - ability to increase or at least to keep contemporary market share, costs on sale, feedback from the customer (market).

Supply chain ends as it begun – in a customer. But supply chain doesn’t finish by the sale of a particular product to the customer. Nowadays, high emphasis is given not only to product but also to aftersale services and communication with the customer, related to particular product. Proposed model of supply chain is presented below in Figure 3 by the method of decision tree. After this chart proposal it is necessary to describe all knots (nodes) and transitions.

4. Conclusion

Both production planning and decision-making have a great impact on the company’s flexibility to meet the market demands. And it is not only planning and forecasting of final products but also problems and decisions about production capacities and technology assemblies. All production factors must be spent in the supply chain under optimal costs and time and this is the task of planning. It is dynamic process which must highly take into account economic cycles.

Analyses of value chains should be focused on specification of so called bottle necks which mention those activities that disable to increase business margin. At the same time, these analyses show the inefficiency caused by oversized of some activities regarding to lower level of assurance and lower performance of other business activities. Importance of multicriterion decision-making methods for evaluation of alternatives doesn’t lie in definite increasing of particular indicators but it should lead to that by application of various models and methods. It allows managers to arrange alternatives according to extensive file of criterions, it describes particular steps of solution and its logical sequence. All this process of solution is transparent, repeatable and there are evident starting assumptions and also how these assumptions, situations, criterions and incidents affect reached results.

Real managerial work in particular companies shows the subjective evaluation of particular criterion importance. This importance depends on value patterns of particular decision-maker (manager) or particular company’s value system. The above mentioned methods should help to minimise subjective evaluation and thus subjective results from planning and decision-making process within managerial work.

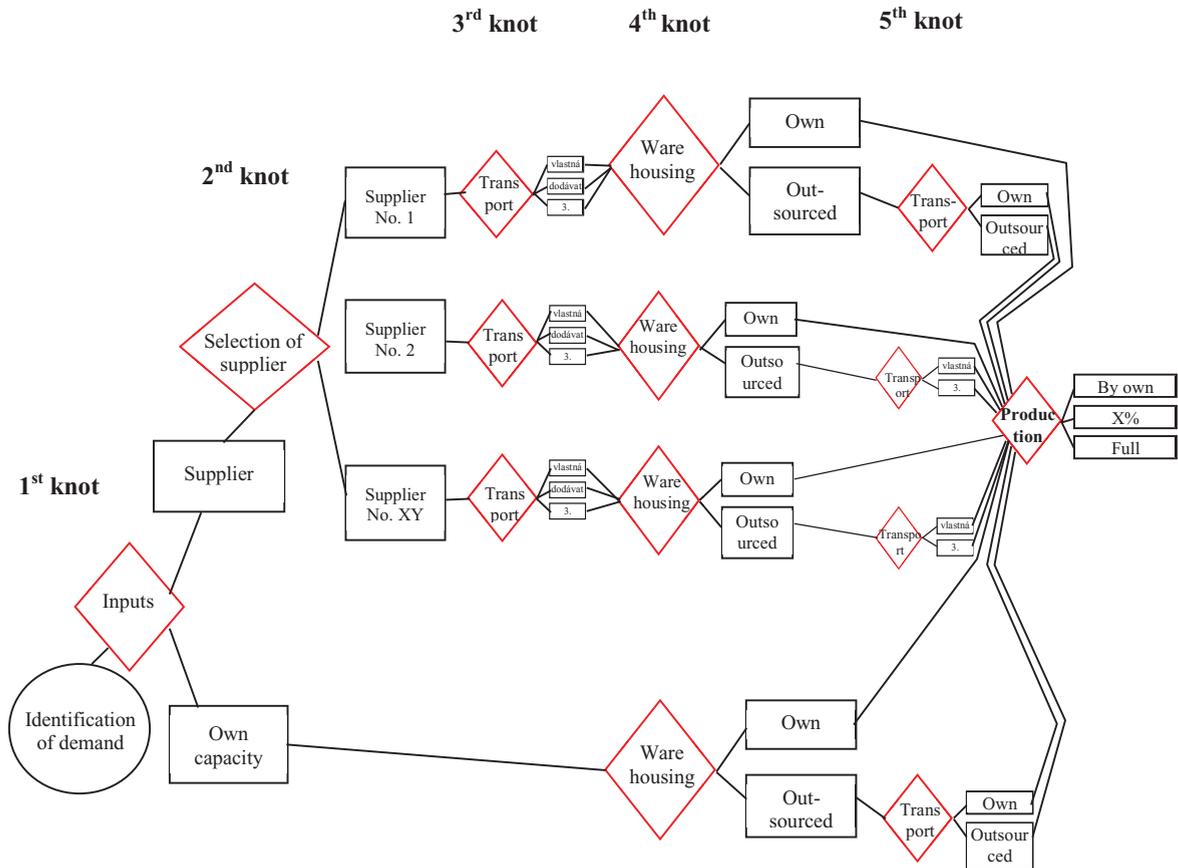


Fig. 3. Model of decision tree describing the material flow of particular woodprocessing company.

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