Chapter 10
Production Strategies of Companies in Machine Manufacturing Industry

Vladimir Modrak
Technical University of Kosice, Slovakia

Sorin Mihai Radu
University of Petroșani, Romania

ABSTRACT
In the portfolio of strategies of any industrial company, the production strategy occupies a central place. Preparing it is based on knowing well the technological process and its complexity. This chapter particularly studies the production strategies of the Romanian companies in the machine manufacturing industry (industrial machineries and equipment). It is recommended that the preparation of such a strategy would take into account the regional development strategy. In this context, the Advanced Production Strategies (APS) may successfully be used, which prefigure the transition to the machinist systems and then to systems based on artificial intelligence where an important role in preparing the production strategies is held by the systems based on artificial intelligence. The problem of elaborating some optimal strategic decisions is dealt with separately by using econometric models. In this context, the use of IT, respectively of expert systems, is essential in developing some very good strategies for industrial companies.

COMPLEXITY OF PRODUCTION PROCESS IN MACHINE MANUFACTURING INDUSTRY
The companies in the machine manufacturing industry have the object to manufacture machines, machineries and work equipment. The manufacturing process is all the employees’ conscious activities carried out with work facilities, by means of which the objects of work are transformed into products or services. In this sector, just liked in the other industrial sectors, the production process is the organic unit of the technological processes with the work processes. The technological processes include all interdependent technological operations needed to make a product, a part of it.
or to provide a service. The main content of the production process is however the labour processes which are the performers’ actions, carried out on the work objects in order to transform them into finished products. Carrying out the production processes in a number of industrial sectors, including the machine constructions require the involvement of some natural processes wherein the objects of work undergo physical or chemical transformations as consequence of the direct influence of the natural factors (for example, cooling the cast and forged components or naturally drying the paint that protects the finished products).

The production process is the major component of the production system that designates the organised assembly of carrying out a production activity consisting of interdependent productive factors that ensure a certain level of economic efficiency. In a simplified form where production is assimilated to a process of transforming the input elements into a specific set of output elements, the productive system of machine manufacturing companies may be described by its three components, such as: inputs, outputs and the production process itself. The materials, labour-force, power, financial and informational resources are the basic elements of the inputs into the productive system, and the outputs are all the final products and services. Thus, the production process involves the use of buildings, plants, industrial equipment and other work facilities during the activities to transform the input vectors into products and/or services. Obviously, the configuration of each production system can be characterised by subjectively establishing the elements of an objective reality based on the precepts of the general theory of systems. The selected components shall be interconnected in a mechanism that would ensure the main function of production, meaning the transformation of raw matters and materials into finished products. A variant for structuring the production system for the machine manufacturing companies is given in Figure 1.

The main component of the production system is therefore the manufacturing subsystem, related to the most important segment of manufacturing the goods that consists of those partial processes that provide the desired configuration and final properties to the final products. The typological analysis of the manufacturing systems in the machinery manufacturing industry enables the systematisation of the lower subsystems shown in Table 1.

As an object of the scientific investigation in the management field, the systemic approach of the production processes in the machine manufacturing industry needs comparative analyses regarding: all factors that condition the efficient performance of the manufacturing process in a number of industrial sectors, such as the heterogeneity degree of the economic destination of products; the constructive and technological complexity of products and services, space dispersion of the technological process and machinery fleet; the degree of continuity in performing the production process over time; the stability of the production process factors over time.

In relation to the intensity of the influences exerted by each of these factors in various industrial sectors, specific requirements and hence particularities of the management of the production processes in those sectors can be drawn (Table 2).

Undoubtedly, the discrete nature of the production processes in the machine manufacturing industry (determined mainly by the space dispersion of machines and jobs) in conjunction with the discontinuity of performing the operations of the technological processes over time, the constructive and technological complexity of products or the production heterogeneity exercise direct implications on the nature and characteristics of the manufacturing flows in this industrial sector.

The comparative approach of the production processes in different industrial sectors allows the emphasis with a plus of clarity, of the main characteristics specific to the manufacturing