CONTROLLING PRODUCTION AS AN INSTRUMENT TO SUPPORT PRODUCTION MANAGEMENT IN THE ORGANIZATION – LITERATURE REVIEW

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Abstract: The purpose of this article is to describe production controlling as a tool to support production management in a modern company, the purpose of which is to guarantee the correct and most efficient course of the production process. The work indicates the functions that controlling production should perform in the company, the tasks of controlling production and the possible placement of production controllers in the organizational structure of the company.

Keywords: controlling, management, production, literature review

CONTROLLING PRODUKCJI JAKO INSTRUMENT WSPOMAGANIA ZARZĄDZANIA PRODUKCJĄ W PRZEDSIĘBIORSTWIE – PRZGLĄD LITERATURY

Streszczenie: Celem niniejszego artykułu jest opisanie controllingu produkcji jako narzędzia wspomagania zarządzania produkcją w nowoczesnym przedsiębiorstwie, którego celem jest gwarancja prawidłowego i jak najefektywniejszego przebiegu procesu produkcyjnego. Praca wskazuje na funkcje jakie controlling produkcji powinien pełnić w przedsiębiorstwie, zadania controllingu produkcji oraz możliwe umiejscowienie controllerów produkcji w strukturze organizacyjnej przedsiębiorstwa.

Słowa kluczowe: controlling, zarządzanie, produkcja, przegląd literatury

1. Introduction

Today, companies operate in markets whose turbulent social and economic environment forces them to use modern management instruments. The system that responds to these changes by assisting the company's management in making strategic and operational decisions is controlling (Jarosz, 2021).

Operations processes in production is one of the most important driver of customer service and competitive advantage in many industries. Consequently, the management of production processes has attracted the attention of researchers for many years (Sgarbossa, et al., 2020).

Controlling production should be considered as a holistic, functionally, institutionally and personally integrated concept supporting the management of production processes. Controlling production complements the shaping and day-to-day operation of the company's production management system (Nowosielski, 2004)

The purpose of this article is to describe production controlling as a tool to support production management in a modern company, the purpose of which is to guarantee the correct and most efficient course of the production process. The work indicates the functions that controlling production should perform in the company, the tasks of controlling production and the possible placement of production controllers in the organizational structure of the company.

2. Enterprise production controlling functions

The basic functions of controlling production in an enterprise are, first, planning and controlling productivity. People in the production controlling department must ensure that the input-output relationship in the production process is as efficient as possible and that the efficiency measured as the relationship of the results achieved to the expenditure incurred is as high as possible (Sierpińska & Niedbała, 2003).

In addition, production controlling must optimize the production program due to cost, duration and storage. In this function, production control specialists can manage production constant costs, production volumes or the amount of retouch. Determining capital engagement is also an important function of controlling production. Production controllers need to analyse the use of their fixed assets and ultimately minimise capital needs to production. In addition, in the analysis of the production control function, we can be helped by the negligent production control objectives proposed by Maria Sierpińska and Bogusław Niedbała (2003):

– Financial (high coverage, maximum capacity utilisation)

- Time (short delivery times and mileage)
- Quantitative and qualitative (low waste, high standard and production quality)
- Flexibility (improving workers' skills and adapting to change)
- Social security (fair division of labour, job security, ergonomics of work)
- Ecological (low environmental burden and use of its resources)

Janusz Nesterak and Viktoria Bobáková, on the other hand, reduce production control functions, on the one hand, to prepare short- and medium-term production plans, to create cost budgets for individual production parts of the company (branches, subsidiaries, divisions, production sections, production centres), and on the other hand to control their implementation (Nesterak & Bobáková, 2004). The division of the controlling production functions by Renata Biadacz is shown in Figure 1.

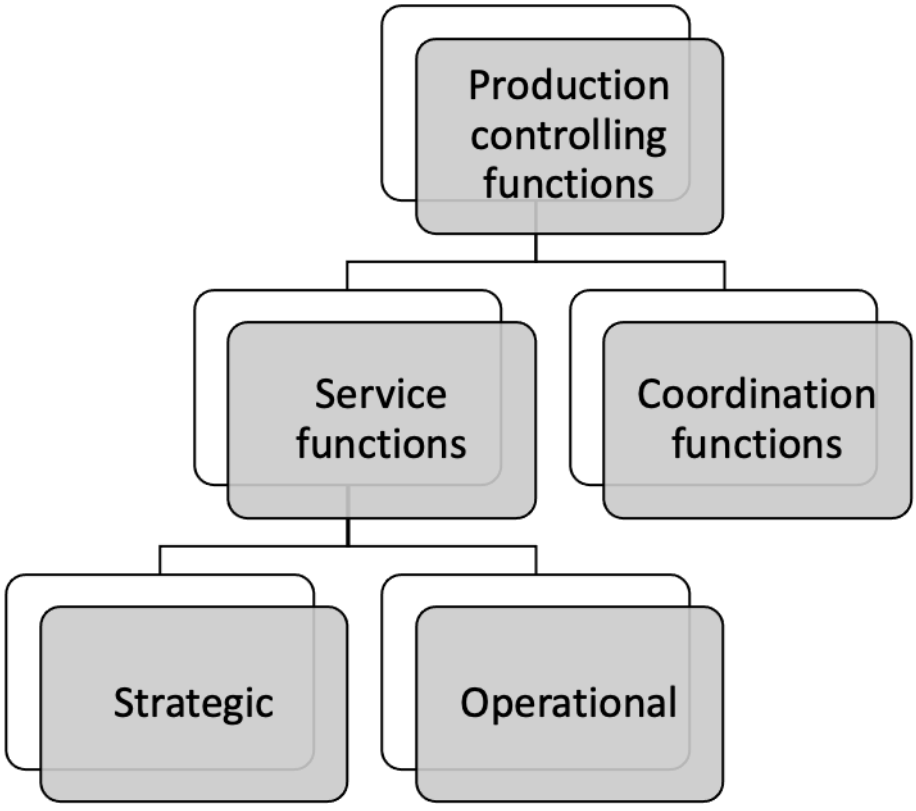

Figure 1. The division of the control function, Own study, based on: Renata Biadacz (2005), *Funkcjonowanie controllingu produkcji w przedsiębiorstwach przemysłu cementowego*. Controlling i rachunkowość zarządcza, nr 2/2005

The main coordination functions included coordination of individual production plans, strategic and operational production planning, production planning and control, production

planning with other parts of the company's plans, production plan assumptions (e.g., comparing different production technologies) and the development and implementation of incentive schemes.

However, the main service functions of production control were:

- **strategic functions at company level:** providing information on alternatives (variants) of production technology, providing and using instruments to help identify the advantages of individual alternatives (variants) of production technology,
- **operational functions:** mainly development, implementation, maintenance and maintenance of computer-assisted production planning and control systems (Biadacz, 2005).

3. Production controlling tasks

One of the main tasks of controlling production is to analyse the volume of orders for the company's products. The production controller must analyse whether the structure and volume of orders will ensure the success of the company, based on the results of the analysis and evaluation of deviations of the measures characterising the level of production costs or the use of capacity. For example, too many small orders can burden the production process and reduce machine productivity by frequently repositioning them.

Another task set by controlling production is to optimize the involvement of capital in the production process. The Production Controller coordinates production sub-plans (program, method and production processes) by introducing rules and procedures for the use of various production management tools. Coordination can also be considered as determining and supervising the correctness of the application of uniform methods, tools and techniques: planning, forecasting, monitoring, recording, analysis, evaluation and reporting at all stages of the production process.

Production controlling tasks are also to compare the plan with the result and the resulting analysis of the causes of deviations. Analysis of the causes of deviations is crucial in improving the production process and provides management staff with management information to help them make process decisions.

It should also be remembered that production is not only technology, raw materials and machines, but also the people participating in it. Production controlling should assist human services in creating an incentive system based on the performance of individual production units of the company and the whole organization (Głodziński, 2010). The arrangement of the objectives of production controlling created by Janusz Nesterak and Viktoria Bobákova includes the objectives of production control as support for the management of production activities through coordination in the field of planning, control and in terms of information processes. Key in these objectives is the construction and adaptation of the production

planning, control and control system in terms of the structure and functions of the management system, the organisation of centres and employees, and management methods, techniques and tools. The construction and adaptation of the operational information system controlling production activities should include the acquisition, analysis and transmission of information. It is crucial as an improved production management with fast reaction times requires reduced cycle times for the collection of actual data (Emdanat et al. 2016). The collection of actual data is a vital step towards informed management systems and serves as a prerequisite for further successful production planning and controlling (von Heyl & Teizer, 2017).

Wojciech Czakon, on the other hand, believes that the main task of controlling production is to support decision-making and coordination functions in the company. Production management is a decision-making process that consists in setting task targets for the production cells of the company and in order to ensure that the decisions and actions taken ensure the highest possible level of achievement of the assumptions made (Czakon, 2008).

According to Renata Biadacz (2005), the controlling related to the production, when it comes to its tasks, has a twofold form. Economic Control is engaged in the development of production budgets and their analysis, calculation of proportional costs per product, economic analysis, preparation of monthly reports in spreadsheets for each product, annual budget with simultaneous analysis of deviations from the established plan, setting coverage margins. Technical Controlling, on the other hand, focuses mainly on the analysis of production costs, renovations, investments and energy consumption. It verifies production volume, material consumption standards, efficiency, energy consumption indicators, etc., with departments being accounted for by unit production, fixed and renovation costs. It also includes the preparation of analyses and reports for the management, as well as daily reports on production and sales, discussed at production managers' meetings (Biadacz, 2005). In summary, the overarching task of controlling production process is to guarantee the proper course of the production process.

Controlling production can be placed in the structure of the enterprise as a vertical cell for economic issues. This ensures efficiency by providing management with economic information to help them decide the effectiveness of individual production processes in the company.

In large companies, according to the models proposed by Janusz Nestreak (2004), production controllers could be located in individual production departments (as the third level of the structure), subordinated to the production control cell located in the economic and financial division (Nesterak, 2004).

Production Controlling is an instrument supporting production management. In view of the considerations previously presented regarding the functions and tasks of controlling production, the literature of the subject proposes three areas to be dealt with by controlling production (Głodziński, 2010):

- **Personal area:** This area deals with people who participate directly in the production process. This area, together with the human resources services, is responsible for developing an incentive system based on the performance of individual production units of the company and the whole organization, improving the qualifications of employees, fair division of labour, ergonomic design of the workplace or sense of job security, good working conditions, aspirations for co-management, motivating employees, providing jobs.
- **Logistics area:** this area deals with logistics in activities directly related to logistics. It would be responsible for short and timely production-related delivery times.
- **Manufacturing area:** would be associated with high coverage margins, maximum capacity utilisation, high production standard, deviation analysis or environmental issues related to production, minimization of production costs, high productivity of production factors, high quality of products, timeliness of supply, production of specific product ranges, reduction of dust emissions.

4. Conclusions

The literature review provides us with an overall picture of production control as a management instrument, whose function is mainly based on supporting production management in the company. In the age of digitalisation, production managers increasingly have at their disposal an unlimited amount of information that is available in real time (Gracel & Makowiec, 2018).

According to Industry 4.0, Intelligent Factories (Factories 4.0) are designed where cyber-physical systems control physical processes, create virtual (digital) copies of the real world and make decentralized decisions, and through the Internet of Things communicate and cooperate with each other and with employees in real time, while cloud computing offers and uses internal and interoperable services (Soldaty, 2016). La Paz et al. (2020) indicate that the current market reality is dynamic and therefore companies' approaches to controlling may also change with the development of the technological environment, the growth and development of the organisation, its maturity or the legal and normative environment in which it operates. Digitalisation puts enormous pressure on controlling, in particular the pressure of continuous change. New technologies are changing the rules of the game, and these processes reinforce additional factors such as the volatility of core business models and the globalization of value creation (Schäffer, 2019)

In these circumstances, efficient production management and the most efficient use of information in terms of production processes in the company take on an even greater role (Jarosz et al., 2020). Future research on the issue of production control should move towards identifying changes in the role and control functions of production that will be caused by the adaptation of the solutions of the Fourth Industrial Revolution.

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