

## Conference Paper

# Automation of Production Planning in the Context of Digitalization in the Aspect of Employees Continuing Education

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## Abstract

This article is devoted to continuing education and analysis of approaches to the study of the production planning automation process in the context of digitalization. The article contains the results of a survey of 40 employees of various industrial enterprises of one of the single-industry towns in the Urals. Employees combine work in the field of production and training at the university in engineering specialties. Respondents are students of evening and correspondence departments of the Ural Polytechnic Institute of the Ural Federal University named after the first President of Russia B.N. Yeltsin (a branch in the city of Kamensk-Uralsky). The aim of the research is an attempt to show that automation of operational planning of production at an industrial enterprise and the development of a system of personnel' continuing education are the requirements of the very near future.

The authors consider the initial basis the message that the establishment and development of professionalism of employees is possible when creating a system of continuous and advanced education. Theoretical research methods are the analysis of philosophical, managerial, sociological, pedagogical literature on the problem; systematic factual analysis; generalization; classification; and thought experiment. Empirical methods are the study and generalization of practical experience; questioning; qualitative and quantitative analysis of research results.

Issues of researching ways to digitalize operational production planning at industrial enterprises are becoming increasingly relevant. The digital transformation of production is considered as a tool for collecting data that will be used to solve the tasks of operational planning of production using smart systems through built-in models and algorithms.

The study has fixed that organizations need staff who are able to work in the context of digitalization and automation of the production process. Industrial enterprises create a system of continuous and advanced education. Such a system can function with the successful interaction of universities and enterprises. Employees of industrial enterprises who combine their professional activities with studying at a university are aware of the need to study during their life.

**Keywords:** continuing education, digitalization, automation, workers, production planning.

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## 1. Introduction

Today, the main trends determine the image of the workplace are all spheres of life digitalization, automation and robotics. Automation and robotization involves the development of autonomous systems capable of complex physical and cognitive actions, transforming the role of human labor in all sectors of the economy. As a result, not only the tools or materials change, but the entire logistics system and the logic of the production process control change. Automation, digitalization and robotization will lead to the creation of mass production cyber-physical systems with minimal human involvement. Human labor will be in demand in production. Workers will solve complex innovative problems without relying on their previous experience.

Modern industrial enterprises are characterized by the dynamism of the technological process associated with the continuous introduction of new processing methods, new equipment, readjustment of production in connection with the continuous change and improvement of products. Enterprises solve the problems of their operating activities increasing efficiency, which are to attract new and retain customers who have them, reduce the terms of inventory turnover, and improve the quality of their products. These efforts are mainly aimed at confronting competition and making timely and necessary decisions on changing external conditions.

Currently, the development of an industrial enterprise consists not only in the modernization of production capacities, improvement of technological processes, but also in the digitalization of production. An important part of the digital transformation of industrial enterprises is the automation of intelligent processes associated with operational planning of production. Moreover, its success is due to the choice of the optimal model of operational production planning, which provides the best result with the least use of time and computing resources. This policy of enterprises is determined by the economy and the industrial sector of the future.

With regard to the subject of economic relations — the "manager" — the situation is twofold. On the one hand, people physically remain virtually unchanged with respect to the dynamically changing technologies. On the other hand, their managerial activity has recently intensified, with the application of the same information technologies, systematization of data, formalization [2]. It should be noted that "only a network of continuing education can contribute to this — the constant development of a professional, consistent with developing modern production" [9]. Development is a mutually beneficial process for both the employee and the organization [2]. Cognitive technologies that can imitate and significantly complement human management activities, free people

from the need to carry out routine operations that support basic creative activity are becoming widely demanded. [7]

There is currently a contradiction. On the one hand, in industrial enterprises there is a need to introduce automation of operational production planning. On the other hand, experienced workers are not always ready to make fundamentally new decisions in the face of uncertainty, and young workers educated on Internet technologies experience difficulties in performing simple production operations. Studies of the situation of youth in 2015 at industrial enterprises of the Sverdlovsk region have shown the relevance of the continuing education topic for all categories of workers: workers, employees, specialists and managers. “The youth of industrial enterprises, like no other, need continuing education. At an industrial enterprise, the education, upbringing and professional training of young workers must meet modern requirements and ensure the development of not only the enterprise as a whole, but also the development of the staff itself, all its categories. This can be facilitated only by the network of continuing education — the constant development of a professional corresponding to the developing modern production” [3]. Today they are already talking about “advanced education”. The main task of advanced education is to focus not only on the production developing at this stage, but also on the expected future.

## 2. Methodology and Methods

Operational planning at domestic metallurgical enterprises is carried out manually and is considered as a historically established fact that cannot be modeled and cannot be considered as part of digitalization processes automation. A similar tradition, the dependence of enterprise performance on the skill level of individual performers and the difference in approaches to operational planning lead to a decrease in production efficiency, an increase in inventories, irrational and irregular loading of production capacities and personnel, and an increase in the time for execution of orders. Modern industrial enterprises pay considerable attention to the development of personnel. This is the process of directly transferring new professional skills or knowledge to employees of the organization. “The system of continuing corporate professional education of managers and specialists implies the following main types of training: primary training of people employed; annual training on professional activities of managers and specialists; periodic training in special professional educational programs to maintain the qualifications of the entire contingent of managers and specialists at a level sufficient for the effective performance of official duties; training of persons preparing for job

movements (appointment to a higher position or a position of a different profile) ”[8]. We examined the issues of Interaction of higher and post-university education as a factor of the formation and development of the professionalism of young specialists. [10] We examined separately in a joint article the problems of Innovations in university education in the context of modern global challenges. [4] We presented separately an analysis of corporate education in the aspect of social youth programs in organizations. [11]

The survey has investigated various types of information sources on the operational planning of production at industrial enterprises. We reviewed recognized articles by researchers on the subject of our study. We were interested in the application of modern information technologies and digitalization in industrial enterprises.

The main goal of the research is an attempt to show that automation of operational planning of production at an industrial enterprise and the development of a system of continuing education of personnel are the requirements of the very near future. The initial basis for us is the message that the formation and development of professionalism of employees is possible when creating a system of continuous and advanced education.

When conducting the study, we used a combination of complementary methods. The research methods are theoretical (analysis of philosophical, managerial, sociological, pedagogical literature on the problem; systematic factual analysis; generalization; classification; thought experiment) and empirical (study and generalization of practical experience; questionnaires; qualitative and quantitative analysis of the results), as well as the secondary method processing research results.

We conducted an express survey of 40 employees of various industrial enterprises of one of the single-industry towns in the Urals. Employees combine work in the field of production and training at the university in engineering specialties. Respondents are students of evening and correspondence departments of the Ural Polytechnic Institute of the Ural Federal University named after the first President of Russia B.N. Yeltsin (a branch in the city of Kamensk-Uralsky). Men and women aged 19 to 40 were interviewed. Among them, 6 people are over 30 years old. We asked students questions about the motives for choosing a profession for training. We invited them to evaluate their achievements in the learning process to achieve their goals. We were particularly interested in the attitude of students towards continuing education in connection with automation and digitalization.

### 3. Results and Discussion

The issue related to the description of the essence of operational production planning at an industrial enterprise has been considered in many researchers' works. It is defined as one of the main factors that determines the competitive advantages of the enterprise and is the basis of an effective production organization system. E. Sysoeva believes that operational planning of production is aimed at achieving the optimality of the production process and allows us to determine "the most effective mechanisms for realizing the industrial potential of the company." [12] M. Brazhnikov and I. Khorina draw a similar conclusion. They indicate that the production activity of the enterprise determines the financial potential of the company and its development. Operational production planning solves the following problems. They are forecasting the development of the industrial and economic situation; modeling and operational planning of the process of performing technological operations; operational regulation of the production process; optimization of production capacities; prioritization of products by the heuristic method [1]. P. Kuznetsov notes the insufficient level of automation of the operational planning processes and the low level of production efficiency, the growth of work in progress balances, failure to meet order fulfillment deadlines, unplanned downtime of equipment, and long inventory turnover periods [5]. He draws attention to the fact that in modern conditions of the rapid development of information and intellectual technologies, the solution to the problem of increasing production efficiency and unlocking the company's production potential cannot be carried out without digitalization tools for production processes.

The issue related to the formation of a system of criteria for assessing the effectiveness of operational production planning has been considered in a number of works. The authors propose various indicators of such an assessment.

Based on the tasks that operational planning of production solves, M. Brazhnikov and I. Khorina consider the choice of criteria designed to assess its effectiveness. [1] The criteria are labor productivity, the quality of products, the timing of customer orders, customer satisfaction, order support, production costs per unit of output, inventory balances. The authors studied the experience of enterprises and made the following conclusion. They argue that direct executors adapt to new conditions and direct their activities not to improve the quality of work, but to achieve established indicators in alternative ways. Criteria for assessing the effectiveness of operational production planning do not affect this situation.

An important topic of the research is related to operational planning methods. This aspect is being explored by many scientists and practitioners. The authors note an insufficient level of automation of operational planning processes and attribute the low level of production efficiency, the growth of work in progress balances, failure to meet order fulfillment deadlines, unplanned downtime of equipment, and long inventory turnover periods [6]. They draw attention to the fact that the solution to the problem of increasing production efficiency and unlocking the company's production potential cannot be carried out without digitalization tools for production processes. The rapid development of information and intellectual technologies in modern conditions determine this fact.

The personnel's competencies and skills who meet the requirements of modern production are becoming crucial in modern conditions. The model of behavior formed by the educational institution influences the professional development and development of young workers. In order to remain competitive, the employee must constantly improve his \ her skills and master new related professions. Vocational schools should give youth a profession. University staff has the task of forming a person's prerequisites for continuous, continuing education, the acquisition of new specialties and qualifications. Employees should strive for lifelong learning. Education and training are essential tools for staff development. Continuing education is the process of directly transferring new professional skills or knowledge to employees of an organization. Knowledge, skills, methods of communication (behavior) are the subject of training. To effectively solve problems, the organization is looking for suitable people for this, who must develop both as employees and as individuals. Support for trained employees, the dissemination of knowledge and best practices, and the training of young qualified employees are necessary for the successful development of staff. Management personnel must be aware of the importance of employee development

The survey has indicated that among the motives for deciding to continue their education, those associated with career advancement prevail. Respondents want to work as a production manager (80%). More than half of the respondents (55%) note that they want to receive higher technical education in order to fulfill their professional duties in accordance with the position held at the enterprise. The same number of respondents want to study, because they want to improve their knowledge. They are interested in their future profession. 52% of students intend to maintain their professional achievements and their position. Less than a third of students (30%) indicated that they began their studies after discussing this issue with members of their families (husband,

wife, children). Absolutely all respondents note the presence of automation processes at their enterprises.

The study has fixed that students are aware of the relevance of automating operational production planning at enterprises. Respondents consider digitalization as an integral part of all spheres of life (95%). Respondents note the following problems due to digitalization. They are a decrease in the number of jobs (38%), violation of a person's private life (28%), an increase in the level of complexity of doing business and interaction schemes of business partners (23%) are them. Respondents rated their academic achievement. Three quarters of respondents say that studying at a university helps them to solve their problems and apply information technology (75%). More than a third of respondents (35%) note that they acquired critical thinking during their studies at the university. The same number of respondents notes that they began to better manage themselves. The majority of respondents (88%) note the need for lifelong learning in order to be competitive in the labor market. 25% of students indicate that they are studying in accordance with a tripartite university-student-enterprise agreement in accordance with social partnership programs. Such programs are implemented at some large industrial enterprises.

Indeed, the organization of vocational training has become an integral part of personnel development and one of the main functions of personnel management. It should be noted that enterprises implement corporate youth social projects and programs aimed at attracting, retaining in a team and developing young workers in order to ensure the sustainability and economic security of enterprises. The introduction of new technologies and the release of new types of products in the era of digitalization, automation and robotization necessitate special training of existing personnel in the enterprise. This, of course, applies to all categories of personnel, but to a greater extent — to young workers under the age of 30–35 years. Young workers are precisely that category of personnel that requires special attention when managing personnel in enterprises. This is especially important for enterprises of the industrial Urals. The professional formation of young workers, their socialization at industrial enterprises can be considered as a part of the youth's programs implementation aimed at attracting, retaining and developing youth in order to ensure economic stability and security. Corporate educational programs are aimed at introducing young people to corporate values and culture, as well as motivating prospective employees to professional development and career progress. A new tendency has been revealed for corporations and large enterprises of Russia in creating a system of continuous and rapid development. This is the creation of corporate universities, whose activities are related to in-house training.

## 4. Conclusions

Digitalization, automation and robotization have become an integral characteristic of modern society around the world. Jobs are changing. Personnel requirements are changing, too. Skills that help people become competitive are acquired in close collaboration between universities and industrial enterprises. This is possible when concluding agreements on social partnership of enterprises and universities on the issues of joint research and scientific and applied research. Digitalization of an industrial enterprise should be carried out comprehensively. It can be a tool of introducing new and modern technologies. A person can apply these technologies on the basis of artificial intelligence, provided that all personnel are trained in the techniques of working with implemented equipment.

Our theoretical analysis allows us to formulate the following conclusions. Issues of researching ways to digitalize operational production planning at industrial enterprises are becoming increasingly relevant. The digital transformation of production is considered as a tool for collecting data that will be used to solve the tasks of operational planning of production using smart systems through built-in models and algorithms.

Our study has fixed that industrial workers are aware of the need to learn throughout their lives. Motives for admission to an educational institution for employees of enterprises are different. First of all, young workers want to make a professional and managerial career. The desire for self-development and self-improvement is an integral feature of modern students who combine production activities with training in an engineering specialty. They recognize the importance of operational production planning and seek to gain knowledge in order to be competitive in the labor market. young people consider digitalization, automation a necessity of the modern world and a reality that forces continuous learning. Continuing education is a condition for both personal and professional development, as well as the development of industrial enterprises.

The issues of training the personnel reserve for the development and maintenance of the functioning of the automated production planning system in the context of digitalization require detailed consideration. The problems of young workers' motivation to activities in the field of operational planning are of particular interest to us and are the subject of further research.



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