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LABOR PRODUCTIVITY INCREASE ON THE BASIS OF TIME RESOURCE MANAGEMENT: NEW APPROACHES

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Abstract

The paper is devoted to the study of labor productivity growth on the basis of labor hours management as a key resource of any company. Achieving the strategic goals that face the Russian economy requires the formation and implementation of new approaches to solve the problems of labor productivity growth. One of these approaches is effective time resource management. In this regard, the purpose of the study is to develop guidelines to improve productivity, taking into account the digital economy requirements on the basis of time resource management. The results of the paper were based on the study of national and foreign scientific literature on labor productivity and efficiency of time resource use, and the analysis of best practices of working time management and modern software use for its accounting and evaluation. The research used methods of quantitative, qualitative and logical analysis, and graphical method. Data collection monitoring and information study on the use of time resources in the surveyed enterprises, structure of labor hours costs and causes of losses allowed the authors to obtain reliable results of the study and to formulate reasonable conclusions. The authors developed a setup diagram of labor productivity increase due to the effective use of time resource. They determined the sequence of stages, specificated them, and established their relationship. The paper presents the algorithm to evaluate the impact of the company's time resource on the employees' productivity and structures software products to account, analyze and evaluate the company's time resource with their functionality description.

Keywords: Labor hours, labor productivity, reserves of labor productivity growth, time losses, time resource.

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1. Introduction

The long-term strategy of the Russian economy development sets high parameters of economic growth rates not less than 5% of gross domestic product annually that depend on growth rates of labor productivity. However, the existing potential is not fully used. In recent years, there has been a slowdown in economic growth. In 2017, the labor productivity level in the Russian economy, from the corresponding US indicator, was about 36%, Germany – 37%, Luxembourg – 27%, Japan – 54% (Bogatyreva, Simonova, & Privorotskaya, 2019). Thus, the growth rate of labor productivity is on average no more than 1.3 % per year, which is quite low. This rate cannot provide the necessary economic growth in Russia.

Under the conditions of financial resources, there is updating and modernization restraint of production material and technical that is the main growth driver of labor productivity. Nevertheless, productivity growth can be achieved not only through technical and technological innovations, but also through other low-cost but no less important mechanisms that can give a significant effect when using existing productive assets. The question is about activation of socio-economic and organizational factors of labor productivity. The activity of the socio-economic group of factors is aimed at effective management of the human component of production, and organizational factors should lead to improve the labor organization and regulation including time losses reduction. The implementation of all these factors allows to increase the workers' productivity in a short term without any additional funding. Effective time management, as one of the most important resources of the company, is a key mechanism to meet strategic challenges in the Russian economy, such as labor productivity growth in Russian enterprises by at least 30% in 2025. Under current economic conditions of the Russian economy development, the most urgent issues are the formation of new approaches to solve problems of labor productivity on the basis of time resource management, using modern information systems and software products.

2. Problem Statement

Among the factors and conditions that determine the labor productivity level and dynamics, an important role belongs to labor hours management as the main resource of the company. The analysis of time resource use and labor productivity correlation is of interest to national and foreign scientists (Bogatyreva, Ilyukhina, Simonova, & Kozhukhova, 2019; Espinosa-Garza, Loera-Hernández, & Antonyan, 2017). Reduction of any kind of losses including time leads to minimize production costs, add value to the company, and increase its activities efficiency. This is one of the well-known principles of the lean production concept that still has not lost its relevance. This is confirmed by numerous scientific studies in this area (Martínez-Jurado & Moyano-Fuentes, 2014; Pearce, Pons, & Neitzert, 2018; Schonberger, 2019; Belysh, 2018).

The analysis of the surveyed companies shows that undisciplined employees and poor work organization are frequent causes of time losses in national enterprises. It is obvious that with a decrease in labor misconduct and rationalization in labor processes and practices, staff productive time increases. This leads to labor productivity growth.

Some studies show the negative impact of working hours lengthening on human performance (Collewet & Sauermann, 2017), human health (Cygan-Rehm & Wunder, 2018), and occupational injury rates (Lee &

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Lee, 2016). This can be neutralized by the introduction of flexible labor hours, when the employee can independently determine the working hours in shifts (Beckmann, Cornelissen, & Kräkel, 2017).

Collecting information on the time resources use in the company and its processing is quite time-consuming process. Therefore, today, foreign and domestic IT-companies offer a large variety of automated directory and documentation systems and software products to collect and process information. Unfortunately, they all have their advantages and disadvantages. A universal information system for effective time resources management has not yet been developed. Thus, despite the great importance of researches on the theory and practice of time resource management, many issues remain poorly researched and unresolved.

3. Research Questions

The development of new information technologies and their implementation in the labor rating, including evaluation of the efficiency of the labor hours use in the organization, impose new requirements to solve problems associated with the labor productivity growth on the basis of time resource management. In this regard, the subject of the study is the formation of methodic positions to increase productivity in the digital economic modernization, based on the efficiency of the time resources use. Despite the fact that the scientific literature pays enough attention to these problems, there is no consensus among practitioners to solve them. Therefore, the following questions are of our particular interest: are there any universal methodic approaches to solve the problems of labor productivity growth on the basis of effective management of the enterprise's time resource under new economic conditions in the Russian economy; what is the sequence of a comprehensive assessment of the impact of the labor hours use, as the most important resource of the company, on labor productivity; what kinds of information technologies and software products can reduce the activity content to account, analyse and evaluate the company's time resource?

4. Purpose of the Study

The purpose of the study is to develop methodical guidelines to solve the problems of labor productivity increase, taking into account the requirements of the digital economy on the basis of time resource management. To achieve this goal, the following tasks were solved in the study: the authors developed a setup diagram of labor productivity increase through better use of the time resource, presented the algorithm to evaluate the impact of the company's time resource on the employees' productivity, and structured modern domestic information systems and software products for accounting, analysis and evaluation of the company's time resource.

5. Research Methods

Scientific works and results of Russian, European and American researchers, devoted to problems of labor productivity increase and efficiency of the labor hours use, serve as a basis for the information analysis and development of the methodical recommendations that are presented in the paper. The study is based on the application of quantitative, qualitative and logical analysis using the graphical method.

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Data collection monitoring and the study of information on the time resources use in the surveyed enterprises, the structure of labor hours costs, and the causes of losses allowed the authors to obtain reliable results of the study and to formulate reasonable conclusions.

6. Findings

Labor productivity increase on the basis of time resource management involves the study of the content, sequence of stages of the process under study, determining of their relationship, as well as the analysis and evaluation of the time use by the company's personnel. All these items are reflected in the authors setup diagram to increase labor productivity through better use of time resources (Fig. 01).

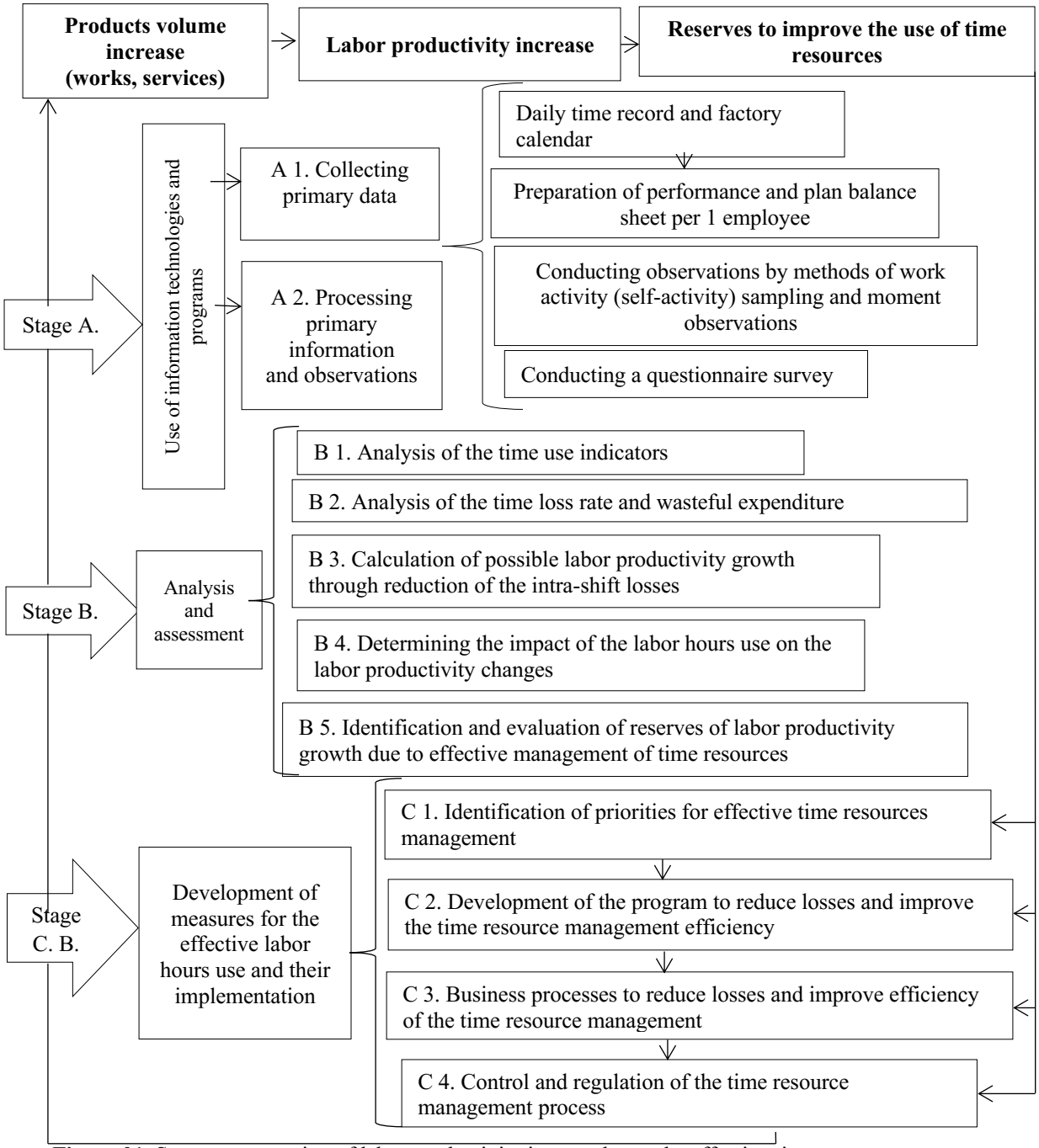

Figure 01. Stage segmentation of labor productivity inrease due to the effective time resource use

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The first stage consists of collecting and processing primary data and observations on the labor hours elements, costs, and its losses. In order to identify reserves that can maximize labor productivity, timelines are made up, and they serve as information sources for further analysis of the time structure and characteristics of its elements. In the practice of domestic enterprises, the balance method is supplemented by the work activity or self-activity sampling for a more complete and detailed study of labor hours.

At the stage of collecting and processing the observation results, the use of complex automated systems operating in a single information space of the enterprise can significantly reduce time spending on processing, develop the qualitative analysis of the work activity or self-activity sampling, and identify reserves. There are modern software products for daily performance record in foreign and domestic practice (Table 01).

Table 01. Characteristics of the modern software products to evaluate labor hours

Item	Characteristics	Price
StaffCop	The program has the surveillance over employees function. It analyzes, blocks and alerts of unproductive activities. It can prohibit (allow) downloading files to external media. The service takes screenshots of desktops and correspondence, and notifies the head of violations.	Perpetual license for 5-25 computers, 4 200 rubles per 1 user
Time Doctor	Online program monitors the employees' behavior at the PC. There is a function of controlling the time spent on a particular job (payroll function).	$10 subscription per 1 user
Yaware Time Tracker	The program includes monitoring of programs, sites and productivity analysis, and keeps record of working hours. It records violations.	450 rubles for monthly subscription per 1 user
Kickidler	The program controls employee's performance. Time tracker allows to control "open windows" on the desktop. According to the data obtained, the program creates the employee's dynamics.	500 rubles for monthly subscription and 10,000 rubles for perpetual license
Namely	The program operates by means of cloud technologies. It allows to simplify and speed up payroll and to determine the exact amount of labor hours. The personal account has a function of salary increase under certain conditions.	The price is set on a case-by-case basis

Source: authors.

The best option is to buy the program StaffCop. For a small price, the program has time control, analysis tools (report designer, threat analysis, anomaly detector, daily performance record, and printer usage time-sheet), locks (process start blocking, website access blocking, and USB device blocking), keylogger function, and online tracing. To connect, simply select the computer in the list and click "remote connection».

The second stage includes the analysis and evaluation of the indicators of the labor hours use, time losses and wasteful expenditure (Fig. 02). The third stage is devoted to the development of practical recommendations for the effective labor hours use and their implementation. When developing specific measures to improve the labor hours use, it is necessary to take into account the specifics of the staff activities in the organization, time losses, and wasteful expenditure.

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B 1. Analysis of indicators of the labor hours use

Labor utilization rate (Kirv):

$$Kirv = \frac{Tpz+Top+Tobs+Totl}{Tsm} * 100,$$

where Tsm is daily working hours, min; Tpz (Top, Tobs) is setup time (operating time and time for workplace servicing, min); Totl is time for rest and personal needs, min.

The rate of labor hours loss due to a violation of the normal course of the organizational process (Kpnt) and labor misconduct (Kpnd):

$$Kpnt = \frac{Tpnt}{Tsm} * 100, Kpnd = \frac{Tpnd}{Tsm} * 100,$$

where Tpnt (Tpnd) is loss of time due to organizational and technical reasons (labor misconduct), min.

B 2. Analysis of the causes of loss and time wasteful expenditure

Determination of losses rate, causes, and time wasteful expenditure

B 3. Calculation of labor productivity growth due to reduction of intra-shift losses

Labor productivity growth due to elimination of intra-shift losses (ΔPT):

$$\Delta PT = \frac{Top(n) - Top(f)}{Top(f)} * 100$$

where Top (n, f) is regulatory and real values of operational time, min

B 4. Analysis of the influence degree of the labor hours use on labor productivity

B 5. Identification and evaluation of reserves of labor productivity growth due to effective time resources management

Labor productivity growth due to effective labor time reserve use (IPTfvts (IPTfvv)):

$$IPTfvts\ (IPTfvv) = \frac{Fvtsn\ (Fvvn) - Pvtspl(Pvvpl)}{Fvtsn\ (Fvvn) - Pvtsf(Pvvf)},$$

where Fvtsn (Fvvn) is day-long (intra-shift) labor time reserve for 1 employee per year, days (hours); Pvtspl (Pvvpl) is day-long (intra-shift) time losses for 1 employee per year in the planning period, days (hours); Pvtsf (Pvvf) is day-long (intra-shift) losses of labor hours for 1 employee per year in the accounting period, days (hours).

Figure 02. Evaluation of the impact of labor hours on productivity.

For example, reducing the number of absenteeism for illness reasons involves a set of measures related to the annual medical employees' examination in order to identify occupational diseases, improve sanitary-hygienic and psychophysiological working conditions, develop the work ergonomic aspects, carry out the systematic instruction on safety and labor protection, and others.

7. Conclusion

Effective time resource management is fundamental to the Russian enterprises development in the digital economy. It provides labor productivity growth in a short term by eliminating various types of

losses. It is for this reason that it is necessary to continue studying the labor hours activity and management as a key resource of any company with the broad participation of scientists and practitioners. Thus, it is important to develop a comprehensive system of labor hours management, which is an important direction to increase labor productivity in enterprises under modern conditions.

Generalization, systematization and actualization of best practices of the Research Institute of Labor and a number of domestic scientists on labor productivity growth under modern technologies are reflected in the results of the study. In the paper, the authors presented a sequence of stages to increase labor productivity through labor hours rationalization, specificated the content of each stage, determined their relationships and calculation formulae, and defined the features of modern software products that can significantly reduce the activity content on accounting and analysis of labor hours.

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