

PERSONNEL MANAGEMENT INNOVATIONS IN THE DIGITAL ERA: CASE OF RUSSIA IN COVID-19 PANDEMIC

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ABSTRACT

The article explores personnel management innovations regarding the growing general trend towards automating routine operations in the ongoing COVID-19 pandemic. The authors are trying to study the use of different digital instruments in human resource management in the Russian leading companies in their field of business. The aim of the study is to identify changes in the activities of the studied companies in the conditions of remote work for the company. The methods used in the study are applying the mathematical methods and algorithms aimed at optimizing personnel management during the COVID-19 pandemic in Russia. The results show that such kind of personnel management innovations as both e-recruitment process and remote work offer the greatest possibilities for using digital technologies in personnel management in the times of the pandemic. Advantages and disadvantages of the presented remote work were investigated taking into account the set of indicators of the enterprise: profitability, profit, reduction of the range of products, services, reduction in production volumes, closure of subsidiaries or a decrease in market share. The data accumulated allowed the authors to conclude that personnel management innovations on the basis of the digital technologies are actively used by companies around the world for recruitment, adaptation of employees and increase of labor efficiency. Russia is also no exception and is actively involved in these processes: almost all large companies who are market leaders use digital technologies in human resources management, in particular, during the pandemic.

Keywords: Personnel Management, Open Innovation, Digital Transformation, Digital Technologies COVID-19

INTRODUCTION

The term ‘digital economy’ appeared in 1995 and was associated, first of all, with rapid development of information and communication technologies. The digital economy (in the broad sense of the word) is generally defined as a system of economic, social and cultural relations based on digital information and communication technologies (Tapscott, 1996).

In 2016, the World Bank prepared a report on the state of the digital economy, Digital Dividends, which highlighted the benefits of its development, including (World Development Report, 2016: digital dividends, 2016):

- Labor productivity growth
- Increasing the competitiveness of companies
- Reduced production costs
- Creation of new jobs
- Greater satisfaction of people's needs
- Overcoming poverty and social inequality

Digital technologies play a key role in increasing the competitiveness of the economy and in stimulating economic growth in many countries. Recognizing the importance of digital technologies, many countries are taking steps to accelerate digital development. The introduction of new digital technologies increases labor productivity, reduces business costs, increases the availability of information (Cardona, Kretschmer, & Strobel, 2013; Evangelista, Guerrieri, & Meliciani, 2014; Matt, Hess, & Benlian, 2015).

At the end of 2019, the COVID-19 virus has been detected in China. In early 2020, the pandemic of the new coronavirus has spread around the world. Due to the pandemic, many countries have introduced quarantine, and Russia has introduced a self-isolation regime, which implies a ban on leaving home unless absolutely necessary. From March 30, Russian regions began to impose a widespread ban on the work of some enterprises. In June, the restrictions were gradually removed. The COVID-19 pandemic has affected diverse areas of the economy. The labor market is no exception. The pandemic and the subsequent socio-economic crisis have already irreversibly changed the economic landscape, including the principles of work organization, and are bound to carry further as yet unforeseen consequences.

Against this background, we set out to assess the role of varied digital tools for human resource management in handling the new challenges presented by the crisis. Considering Russia's leading companies, we examined the possibilities for using digital technologies offered in case of e-recruitment and remote work. Comprehensive analysis revealed the advantages and disadvantages of each technology, allowing to draw conclusions about the practices that large companies need to adopt to survive and succeed in the changing circumstances.

LITERATURE REVIEW AND METHODOLOGY

Literature Review

Large-scale programs aimed at developing the digital economy operate in the United States, China and the countries of the European Union. At the same time, in most developed countries, the size of the digital sector averages 6–7% of GDP. In France, this figure is 5.7%, in Germany 6.3%, in Great Britain 7.1%, in the USA 7.4%, in Sweden 8.6% (Feldstein, 2017; Parra, Pérez-Pons, & González, 2021; Švarc, Lažnjak, & Dabić, 2020). Over the past few years, about \$2 billion USD have been invested worldwide in digital technologies for personnel management. It is planned to increase the investments every year.

In absolute terms, the digital sector in Russia is also relatively small: in 2017, its size amounted to 2.5 trillion rubles. Russia is doing well in digitalization but lagging behind in terms of quality indicators of citizen and business engagement. The digitalization of Russia is carried out by the joint work of the state and state corporations, which have accumulated the maximum expertise, have technological and industrial resources to implement large-scale projects at the regional level (Ganichev & Koshovets, 2019).

Currently, the changes in the surrounding living conditions caused by the COVID-19 pandemic have led for the need of digitalization processes in large companies. Improvement of the branches of management must take into account new trends in the development of management technologies. One of such important areas is personnel management. The global goal of personnel management is to form, develop and implement with the greatest efficiency the human potential of the organization (Pulyaeva et al., 2019). To function effectively, modern companies need to respond in a timely manner to changing circumstances. This is impossible without innovation and innovative technologies in personnel management (Marler, Liang, & Dulebohn, 2006; Marler & Parry, 2016).

It is obvious that human capital is the main resource that is the source of growth for companies and the economy as a whole. Developing personnel skills along with new technologies evolving

is a contributor to rapid digitalization of personnel management processes (Beardwell & Claydon, 2007; Doherty, 2010). As many large companies realize this, they are increasingly introducing digital technologies which can improve their competitiveness (Marchington & Wilkinson, 2005; Vasetskaya & Gaevskaia, 2019). Open innovation is an emerging concept describing how companies use external ideas as well as internal ideas, and internal and external paths to market, as these companies look to advance their technology. Christensen et al. (Christensen, Olesen, & Kjær, 2005) address how the open innovation concept can be analyzed from an industrial dynamics perspective, considering the specific measures that different companies take to manage open innovation from the standpoint of their differential position within the innovation system in question, the nature and stage of maturity of the technological regime, and the particular value proposition pursued by companies. A concept model of open innovation built up in (Yun, Kim, & Yan, 2020) is intended for exploring the existing open innovation channels, which can be useful to motivate engineering research increasing the development of open innovation and new open business models.

The development of the COVID-19 pandemic and, as a result, widespread remote employment led to the need to search for new approaches to personnel management, as well as adapting management processes to new operating conditions of companies. According to surveys (Popkova, DeLo, & Sergi, 2021), a third of the Russian companies transferred more than 75% of employees to remote work in the first weeks of epidemiological situation.

The International Labor Organization predicts that the pandemic crisis will reduce working hours globally in the second quarter of 2020 by 6.7%, equivalent to 195 million full-time workers (ILO, 2020). However, the consequences of the pandemic are more complex and are not limited to rising unemployment. Just like our relationship, the labor market is changing under the influence of quarantine and self-isolation, for example, the teleworking regime, which many organizations have switched to, simultaneously opens up new opportunities and exposes difficulties in the current order of things. It is in fact hypothesized (Karin et al., 2020) that company-level processes will become more flexible: there can be less bureaucracy and processes will work faster.

The impending digital revolution certainly requires a revision of the rules of doing business, new management models that provide productivity, innovation, flexibility and adaptability come into competition (Mogilko et al., 2019). And the foundation for this transition is the transformation of human resources. 64% of companies in Russia describe digital transformation as a necessary process for business. Compared to 2018, awareness of the importance of digital transformation has almost doubled. About 48% of employers have already moved from words to deeds and are implementing a digital transformation strategy (Gladkova & Ragnedda, 2020).

With digital transformation, all personnel management activities are about helping businesses move from their current state to a more competitive one. personnel management technologies help automate routine processes such as document flow or selection of candidates, process large amounts of data and analyze the work of employees (Evseeva, Evseeva, & Kalinina, 2020). The key issue to be considered against the background of the rapid digital transformation combined with the ongoing pandemic are the positive and negative effects of employees' remote work for the company.

METHODOLOGY

The Basic Approach

The research methodology covered the mathematical methods and algorithms aimed at optimizing personnel management during the COVID-19 pandemic in Russia.

The use of digital technologies in personnel management during a pandemic must be supported by evidence-based recommendations. To do this, we will assess the negative impact of such measures as the transfer of workers to remote work, part-time work, staff reduction, as well as a number of other measures due to the conditions of measures to prevent and control the spread of coronavirus infection. To assess the impact of the aforementioned personnel management operations on the economic performance of a business, we use the term externalities. Taking into account that, in the general case, externalities can be both positive and negative, an integral assessment is important for us, showing the deterioration in the general case of the resulting financial indicators. Thanks to our formalized mathematical description in the form of an adequate model, we can find the optimal balance between measures to control the spread of coronavirus infection and possible economic losses, which will allow personnel managers to justify approaches to personnel management, as well as the adaptation of personnel management processes to the new operating conditions of companies.

The research (Pilipenko et al., 2019) considered the algorithm underlying the digital interaction of an automatic enterprise as a cyber-physical system. The methods of mathematical modeling in the time of uncertainty of the operational environment are studied in (Krasnov et al., 2019) with the algorithm being based on the stochastic programming method.

The mathematical model developed within the concept of digital economy in the work (Krasnov et al., 2019) considers the criterion being the functional reflection of the balance between the maximum profit, the comfort of living conditions, and the environmental conditions. The results obtained make it possible to take administrative decisions in an optimal way regarding the paradigm of a digital city, providing a stand-alone collection of economic information and a flexible response to operation conditions.

The approach implemented in (Borisoglebskaya, Provotorova & Sergeev, 2019) consists of a real-time analysis of the omni-channel interaction effectiveness on the basis of the most advanced technologies. The ability to work with arrays of clients identified up to a specific person and at the same time to work with a set of data, which includes consumer preferences with their history of acquisitions as well as age, location, movements and other important for business information, is the basis of this type of information influence.

The main emphasis of the study (Borisoglebskaya et al., 2019) is on a mathematical model of the digital interaction between key components of the flexible automated production, being adaptable to changing production and service equipped by robot with sensors for receiving the whole set of information.

The new kind of practical issues was born due to modern trend on globalization and transition to the concept of industry 4.0. These are the processes in representing the movement of goods and finance, which have specific economic indicators; migration of populations and labor resources; transference of one-parameter continuous media (diffusion effect) (Borisoglebskaya et al., 2019).

Development of information technologies at the present stage allows switching over to a higher level of interaction between business and clients. Transition to digital economy is putting forward practical tasks for the IT personnel; in order to solve them it is necessary to possess a wide range of available mathematical tools and to be able to integrate them into dynamically growing methods of interactive communication with widening range of information about goods and services as well as consumers with high degree of personification provided (Krasnov et al., 2019a).

The work (Provotorov, Sergeev & Part, 2019) investigates the weak solvability of initial-boundary value problem for the hyperbolic equation with distributed parameters on oriented limited graph: the existence of weak solutions of a third boundary value problem, the boundary conditions, which are reduced to a uniform and received the assessment of norm.

The modern concept of the developing engineering production is based on a digital interaction. At the same time, management of all related processes is possible due to a digital shadow at each stage of work (Borisoglebskaya et al., 2020).

We assessed the level of digitalization considering the international index of the digital economy and society (Figure 1).

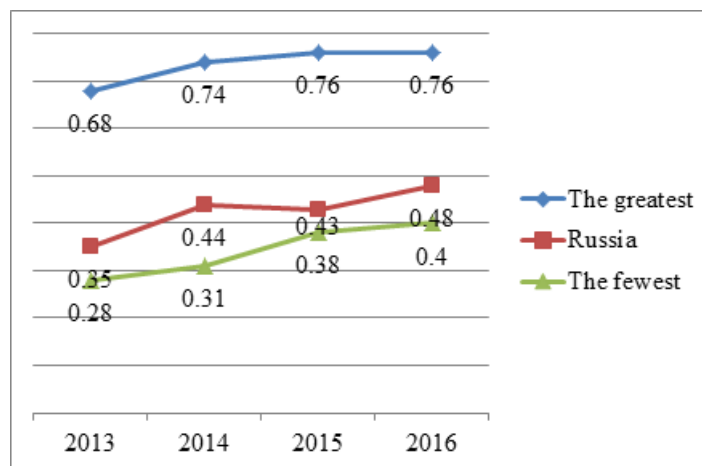


FIGURE 1

VALUE OF THE INTERNATIONAL INDEX OF THE DIGITAL ECONOMY AND SOCIETY

The coronavirus pandemic has accelerated digitalization in the labor market and forced personnel management functions in companies to urgently change approaches to personnel management. Due to the epidemiological situation in Russia, 95% of companies have transferred their employees to remote work. Only 5% indicated that the specifics of work do not imply remote work, even partially (Ford et al., 2020). Many companies both in Russia and abroad automate the work of personnel management departments.

In our research, we present the exploratory case of the digital aspects of personnel management in the companies by describing the personnel management technologies and identification of pros and cons of employees' remote work in the company.

An exploratory case study follows what is to be explored, the purpose of the exploration, and the criteria by which the exploration will be judged successful.

The Main Formalisms

A set of formalisms is needed to develop a mathematical description. In our case, this is a set of indicators of the enterprise. These are not only profitability, profit and purely economic parameters, allowing determining a decrease in the range of products and services, a decrease in production volumes, the closure of subsidiaries or a decrease in market share due to measures to prevent and control the spread of coronavirus infection.

It is also important to take into account long-term factors such as team retention, the presence of not only key managers, but also the minimum permissible recruitment of personnel positions in filling the staffing table, reasons for staff turnover at the enterprise and methods of their elimination.

We denote the total number of such indicators as n . The impact l_i (for $i = 1, \dots, n$) the changing structure of personnel on each of them depends on the total number of employees N and staff involved H and sent to remote work G .

Let us apply an extended approach of the theory of mathematical games developed to solve Hardin's problem. Reduce the entire dataset to a vector:

$$\bar{\Lambda} = (l_1, l_2, \dots, l_n)$$

(1) Let us denote the integral indicator of negative externalities as

$$L : L = \sum_{i=1}^n l_i$$

(2) To switch to economic estimates, let us designate the size of the weighted average costs U when transfer of workers to remote work and introduce a function (L) that determines the contribution of remote work to the company's net profit. Since as the negative externalities increase to a certain critical value of saturation L_0 of the opportunities of a particular business, the profitability falls, then if the condition $L > L_0$ is met, inequality $g'(L) < 0$ will be true. In addition, only negative externalities begin to be generated from the factor of limited personnel maneuver capabilities, therefore it is true: $g''(L) < 0$. The actions of the organization's management in accordance with the current principles of the implementation of personnel management processes (such as the implementation of the functions of the personnel management department, including determining the need for specialists and their adaptation in production and certification) are aimed at maintaining a balance between profit from activities and the adverse impact of the withdrawal of some employees to remote work. To do this, it is necessary to take into account the profit R_i for each of the indicators for $i = 1, \dots, n$, which is formalized as:

$$R_i = l_i g(l_1 + l_2 + \dots + l_n) - U l_i = l_i g(L) - U l_i$$

(3) According to the Nash equilibrium theorem, there must be a vector value $(l_1^*, l_2^*, \dots, l_n^*)$ that maximizes at the vector components $(l_1^*, l_2^*, \dots, l_{i-1}^*, l_{i+1}^*, \dots, l_n^*)$. The corresponding first-order condition is:

$$g(l_i + l_{-i}^*) + l_i g'(l_i + l_{-i}^*) - U = 0, \text{ where } l_{-i}^* = \sum_{k \neq i} l_k^* \text{ at } i = 1 \dots n.$$

(4) The solution will be found if the condition $\frac{\partial R_i}{\partial l_i} = 0$ is met. Using the equilibrium condition for L^* and summing the values over the index i , we get the desired result:

$$L^* = n \frac{U - g(L^*)}{g'(L^*)}$$

(5) Now it is necessary to take into account the condition of minimizing negative externalities and find the maximum from the condition of optimizing the load caused by the transfer of a part of employees to another mode of work in accordance with the current principles of the implementation of personnel management processes. In this case, at the extremum point, the following equality is fulfilled:

$$L_0 = \frac{U - g(L_0)}{g'(L_0)}$$

(6) Let's compare the results and, taking into account that always, the obvious conclusion is that $L^* > L_0$.

Next, we need to take into account external factors to the extent, as it is used in personnel management innovations, including those related to the category of G2B relationships. The initial data for making decisions on changing the personnel structure should be taken from the results of determining the critical conditions for the development of epidemics within the territory in which the business is located.

RESULTS

The Model Implementation

Model Application Conditions

For basic calculations, the «Susceptible/Infected/Removed» model is used. This allows us to take into account the potential risk group S , number of already infected I and the existing percentage of people with immunity R .

Adding the values for the considered population N , the equality should be: $S + I + R + N$. On the other hand, we can decompose N into the sum of the active part of the population H and under quarantine measures G . The indicator proportionally depends on the rate of transmission of infection to healthy people ω (N). Acquisition of immunity after healing is considered as an additional condition. In addition, the impact of preventive and quarantine measures must be taken into account. This will be an integral indicator γ , reflecting the level of effectiveness of the actions of the administration and leadership of the business territory in the form of regulations, prohibitions and restrictions, mandatory for personnel management, and other measures to prevent and control the spread of coronavirus infection. Numerically γ shows the rate of cure in a population as measured by the occurrence of positive antibody tests. Then composing the system of equations:

$$\left. \begin{aligned} S_t' &= -\omega i s \quad i_t' \\ &= \omega i s - \gamma i \\ , \quad r_t' &= \gamma i \end{aligned} \right\}$$

where it is accepted that $i = I/(H + G)$, $r = R/(H + G)$, $s = S/(H + G)$.

Thus, it is possible to mathematically simulate the dynamics of the epidemic process. Since during the period of registration of the growth of the disease, the condition $i_t' > 0$, while $s(t)$, on the contrary, is reduced due to the growth of the infected, we have the following condition: $s(0) > \gamma / \omega = \rho$. An analysis of the dynamics of the COVID-19 epidemic that began in 2020 showed that this condition was met with a margin. The reasons are, firstly, delayed preventive measures and the time to search for means of combating the epidemic, and secondly, it is associated with the mutation of viruses and non-compliance with quarantine measures. As a result of the successful application of organizations' administrative measures and, first of all, competent actions of the personnel management staff, as well as the severity of the measures to prevent and control the spread of coronavirus infection, the number of people with acquired immunity should increase and the risks for the vulnerable number S should also decrease. Note that, according to world practice, first of all, restrictions are imposed on the arrival of new citizens to the contaminated territory, which must be taken into account when adjusting the staffing table by the personnel management department and the possibility of attracting this category of citizens to work, that is, within N there is a decrease of G with a slight change of H . Then we obtain a system of equations for describing the dynamics of the development of the epidemic in the form:

$$i_t' = \omega i(1 - r - i) - \gamma i; \quad r_t' = \gamma(1 - r)$$

(7) It follows that with such a model $r(t) = 1 - e^{-\gamma t}$ from the result obtained, it is possible to construct in the first approximation forecasts of the epidemiological situation and to plan ahead of time measures to optimize the personnel policy of the enterprise. The input data for the calculation are morbidity indicators, and the controlled variables reflect the measures taken to limit the flow of people, as well as quarantine and treatment-and-prophylactic measures. The calculation shows that the passage of the outbreak threshold

depends on the ratio of the rate of infection and the rate of acquisition of immunity, which is proportional to the value. If the effect of limiting the flow of visitors is analyzed, then knowing the decrement of reducing the number of S, the dynamics of the process obeys the following relations:

$$S'_t = -\omega is - (\lambda + \alpha)S + \alpha; i'_t = \omega is - (\gamma + \alpha)i; r'_t = \gamma(1-r) - \alpha r$$

(8) and limiting measures must satisfy the relation: $s > (\lambda + \alpha) / \omega$.

It is also possible to improve this dynamic model by taking into account the influence of the incubation period, for example 14 days. After this period, the person becomes the source of the spread of the virus. For this, a relation $E = E(I)$ is introduced for complementing the presented system of equations.

Calculation Example

The abscissa shows the changes in the level of the personnel structure in the form of the ratio. Separate charts for enterprise profit (peaks at some optimal level) for profit/loss from the risk of infection spread (Figure 2).

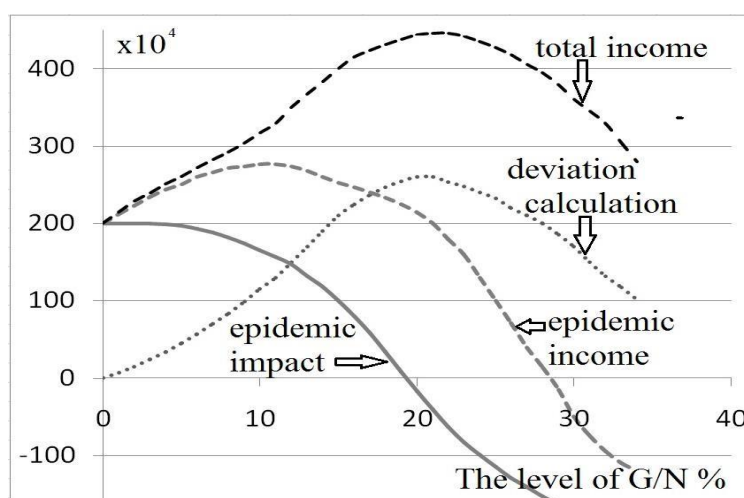


FIGURE 2
THE IMPACT OF THE LEVEL OF G/N

Also note that starting from a certain value of the G/N ratio, the chart shows a sharp decline in profit. It is expected that the peak in normal conditions is much more to the right of the abscissa than in the presence of the risk of infection spread.

The Pros and Cons of Remote Work on the Basis of the Comprehensive Analysis: The Case of Russia Covid-19

We carried out comprehensive analysis of the leading companies in the business field based on the Top-100 Ranking of the leading companies in Russia by capitalization in 2019 (Russian consumer market and FMCG retail chains rating, 2019): X5 Retail Group, Megafon, Rosatom, Sberbank, Auchan Retail Russia, KFC. The best companies were chosen based on official statistics. Considering the cases, we described the instruments that used on remote work. As a result of the analysis, we identified the pros and cons of remote work. The contents of the aspects discovered were described by qualitative comparative analysis.

Priority areas relevant for companies for the coming year are shown in Table 1.

Table 1	
PRIORITY AREAS RELEVANT FOR COMPANIES FOR THE COMING YEAR	
Priority areas	%
Optimization of personnel costs	59%
Transition to a new model of personnel management (flexible hours, remote work, online recruitment)	44%
Preservation and development of the company's personnel management brand	41%
Automation of personnel management business processes	41%
Employee retention	36%
Formation of a personnel reserve	26%

The following structures and processes will have to rebuilt in business after the pandemic (Sneader, Kevin, & Sternfels, 2020):

1. Administrative Processes and Motivation

The number one trend is the revision of the work schedule of employees. In Japan, when the workweek was shortened from five to four days, people became more efficient: it turned out that the same quantity of tasks was performed.

2. Personnel Management

Many processes will be digitized, made less dependent on the human factor.

3. It Infrastructure and Security

By the time we fully return to the offices, many IT processes will have already been formed. But they need to be constantly optimized.

4. Finance

A revision of sales plans awaits the majority. Budgets for digitalization and optimization of online processes will increase.

5. Sales and Customers

the percentage of offline and online work will change.

6. Marketing

It is necessary to revise the existing promotion channels and approaches.

7. Supply Chain

It is important to pay attention to inventory rebalancing, supplier redesign, and supply redesign and optimization.

There is evidence that even before the introduction of the self-isolation regime in Russia, around 40% of companies in Russia temporarily suspended hiring and about 10% announced planned redundancies (Chundakkadan, Raj, & Sasidharan, 2020). Also, two-thirds of the surveyed respondents planned to reduce the personnel management budget, in particular, the costs of corporate events, travel and staff training.

In early April 2020, 384 Russian employers were interviewed about their “well-being” amid the pandemic (Kiseleva & Sanginova, 2021). According to the survey results, one third (33%) of respondents assessed their position in the market as negative. This is most pronounced in small organizations. Regionally, negative sentiments prevail in Moscow, St. Petersburg and the Northwestern Federal District of Russia. At the same time, about the same number of respondents (36%) assessed the company's position as stable.

It was also revealed that at the time of the survey, 75% of respondents had no change in the size of their organization, while 20% had a decrease. In companies where the number of employees has decreased, it was noted that the first to be dismissed were rank-and-file specialists, trainees and interns. Least of all layoffs affected line managers, leading specialists

and top managers. The respondents shared their plans for changing the number in the next six months: 12% - the number will definitely decrease; 25% is likely to decrease; 22% - will not change; 16% is likely to increase; 5% - will definitely increase; 20% - found it difficult to answer. Employers in Moscow, St. Petersburg and the Northwestern Federal District of Russia planned to reduce the number of employees most of all. It turned out that at the time of the survey, the majority (62%) had no changes and only a quarter of the respondents reduced their salaries. At the same time, only 30% of the respondents do not plan to change salaries in the next six months. 27% are focused on reduction; 5% are focused on increasing and 38% found it difficult to answer.

A growing general trend towards automating routine operations (filling in databases, reminders, calls, etc.) and drawing up reports has long been identified (Zhilenkova et al., 2019). In the current situation, electronic document management is a prerequisite for the survival of any organization

The most promising personnel management innovations on the basis of digital technologies include (Evseeva et al., 2019):

1. Blockchain.
2. Artificial intelligence.
3. Virtual reality.
4. Internet of Things.
5. Software robots.
6. Chat bots.

Several key trends were identified in employee and executive surveys in April 2020 (Larsen et al., n.d.). Around 17% of employees and 15% of managers noted that the team's work efficiency has increased; half of the respondents believe that productivity has not changed, and only a quarter noted deterioration.

The respondents were also asked to answer the question: "How long is the team ready to work in this mode without losing efficiency?" It turned out that about a third (30%) of those surveyed are ready to hold out for about a month, a fifth (18%) for two to three months, a quarter (23%) from six months. About 10% of the respondents said that they were at the limit and 19% were ready to hold out for no more than a couple of weeks. In this regard, it should be assumed that in the case the extension of the self-isolation regime until August 2020, it is advisable for most companies to review their personnel management strategy. Otherwise, the productivity of most telecommuters will be minimized. Thus, the COVID-19 pandemic significantly increases the importance of personnel management activities, since successful business adaptation to new realities is impossible without competent human resource management.

Changing approaches to personnel management is based on solving the following key personnel management problems in remote employment conditions: keeping employees healthy, optimizing staff, automating personnel management processes, optimizing personnel costs, establishing internal communication in new business processes, and monitoring employees at remote work (Kavanagh & Thite, 2009).

The company «X5 Retail Group» is a leading Russian multi-format grocery retailer. Manages retail chain stores. The share of revenue in the Russian food retail market at the end of 2019 is 11.5%. The X5 Retail Group has consistently headed the list of 50 fastest growing companies in Russia in terms of revenue and net profit (Baranov & Safronov, 2019).

At the end of 2019, the group ranked 42nd in the top 250 retailers of the world Global Powers of Retailing 2020 and ranked 11th in the top 50 fastest growing retailers in the world (according to Deloitte) (Deloitte, 2020), and also took 41st place in Top 50 Global Retailers (according to Kantar Consulting) (Kantar's 2019 Top 50 Global Retailers, 2019).

X5 Retail Group weighed all the risks and opportunities and announced the launch of the Home Office project, within the framework of which about 60% of employees will be transferred to a remote work format, as well as the transformation of offices in Russia into the digital space, the press service of the company reports.

Several divisions of X5 Retail Group were involved in organizing the process of transferring employees to a remote mode of work - information technology, information security, personnel and organizational development, and administrative issues.

To organize remote work, X5 Retail Group solved a number of problems in just a few days:

- Provision of the necessary licenses and accesses.
- Expansion and configuration of communication channels and centralized infrastructure.
- Development of new schemes for remote access.
- Adaptation of information security rules.
- Additional purchase of equipment for users.
- Updating and adapting instructions.
- The introduction of teleworking into X5 Retail Group standards has transformed current personnel management processes and accelerated the digitalization of the company.
- IT communication has become one of the most important tasks for the company. In a pandemic, for effective remote work in the company, the following measures were taken (Aganbegyan, 2020; Digilina, Teslenko, & Abdullaev, 2020):
 - Communication between departments has been established
 - A hotline for remote connection issues was created
 - Operational monitoring of indicators, issued remote licenses and those who actually connected were carried out
 - Adaptation of those who have already gone to remote control has been carried out
 - Business adaptation was carried out.

The main idea of the Home Office project is to offer a large and rapidly growing team the opportunity to achieve better results with fewer restrictions.

The main positive aspects of this Home office project include:

For the employer:

1. The most obvious benefit for an employer to work remotely is the significant cost savings
2. Remote work also makes it possible to organize work for workers who would not be able to come to work every day due to the distance from work at home
3. By organizing remote workplaces close to the location of important clients of the company, you can significantly save on travel costs
4. Remote workers are 10-15% more productive
5. Reduced emissions of pollutants, decreased use of non-renewable resources, significantly reduced traffic jams

For the employee:

1. Lack of time, moral and physical costs to get to work
2. Working from home *via* the Internet can save money: less gasoline, less food costs, even clothes and shoes will wear out less
3. The employee will have more freedom and control over his work, which means that such an employee will work more productively and efficiently

The main positive aspects of this Home office project include:

For the employer:

1. Difficulty in control and management
2. It is not always possible to quickly use a remote worker
3. Mandatory availability of a modern, equipped PC for a remote worker

For the employee:

1. Lack of society, organizational environment, teamwork

2. Lack of stable download

3. In the event of a malfunction of the electronic means, the employee will not be able to receive the task on time and send the completed work on time

Both the employer and the employee have advantages and disadvantages in using remote work. The efficiency of remote work depends on the direction of the organization, the category of personnel, and the goals of the company.

DISCUSSION

The COVID-19 pandemic is becoming a kind of test for innovative management tools, the results of which will no longer be analyzed on the basis of theoretical thought experiments but taking into account the consequences of practical application. Such segments as the service sector, education and government services engaged in direct work with the population are rightfully considered the pioneers of personnel management innovations on the basis of ICT implementation.

It should be noted that the transition to a remote mode of operation has led to a rapid growth in the personnel management innovations based on automation of personnel management processes (Barykin et al., 2020). At the end of 2019, automation affected the most labor-intensive personnel management processes: recruiting, paperwork, and payroll and bonus calculation. Least of all automation was talent management (Barykin et al., 2020).

The researchers should take into account the approach of the Christensen's determinants of open innovation model associated with the industrial dynamics of an industry segment undergoing a process of radical technological innovation (Christensen et al., 2005) unraveling the Chesbrough's Open Innovation concept which was initially studied by from the company-level perspective (in contrary to the closed innovation old model). The fundamental theory was created by JinHyo Joseph Yun considering the open innovation engineering model including both open-innovation engineering channels and determining ways of operating the channels through conceptual experiments (Yun et al., 2020).

CONCLUSION

The results of surveys of managers and employees conducted before and after the introduction of the self-isolation regime in Russia are presented. Special attention is paid to automation of personnel management processes in conditions of remote employment. The most promising personnel management innovations on the basis of digital technologies are considered: software robots, chat bots, artificial intelligence, virtual reality, wearable devices, block chain.

The most common measures to help employees were: provision of personal protective equipment (73%), as well as paying for a taxi (36%) and home Internet (15%). At the same time, a quarter (24%) of the surveyed companies suspended the selection of personnel and a third (32%) suspended the training process.

The introduction of the self-isolation regime led to a change in the demand for professions in the labor market. The demand for workers in the following industries and spheres of professional activity has increased: medicine, government service, workers and household staff, security, construction, courier delivery (including contactless). At the same time, there was a significant decline in the following areas: arts and culture, entertainment, fitness clubs and beauty salons, tourism, hospitality and restaurant business.

Every year, the world undergoes changes that affect not only the life of society, but also the development of the economy and business management. In recent years, digitalization has become a priority in the development of the economies of various countries of the world. Due to the current epidemiological situation in the world and the development of the COVID-19 virus,

business digitalization processes have gained momentum. Every year in the world there are hundreds of changes and transformations in the economy. But human capital invariably remains the main resource for the successful development of companies and the economy as a whole. Therefore, people develop along with the emergence of new technologies, which contributes to the rapid digitalization of personnel management processes.

The pandemic has changed the role and meaning of personnel management innovations on the basis of digitalization. Opportunities for growth and technological renewal that businesses previously had to prepare for in a few years were realized in a matter of weeks. The pandemic has caused increased demand for the development of digital technologies.

Currently, many large companies are introducing digital technologies to improve their competitiveness. In order to organize remote work, which has become especially relevant during the pandemic, companies have actively switched to the use and development of digital technologies. The forced transition to remote work allowed many employees to try this work format for the first time. Some employees were able to realize that they could be much more effective outside the office. It is clear that remote work has its advantages and disadvantages for both the employer and the employee.

Author Contributions

All authors have contributed substantially to the entire work reported. All authors have read and approved the final manuscript. Conceptualization, K.P. and E.S.; methodology, E.S.; writing—drafting, K.P.; writing—inputs, all authors; writing—reviewing and editing, all authors.

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Conflicts of Interest

The authors declare no conflict of interest.

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