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ALGORITHM FOR OVERCOMING PERSONNEL SHORTAGE AT THE MICRO

ALGORITMO PARA SUPERAR A ESCASSEZ DE PESSOAL NO MICRO

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ABSTRACT

Objective: This research focuses on developing a general algorithm for solving the problem of workforce shortages at the micro level. Labor scarcity is currently an issue for companies and the economy.

Methods: A neoclassical labor market model was used to analyze existing methods of addressing workforce shortages.

Results: This article presents workforce shortages as a multifaceted phenomenon with economic and broader social characteristics. Based on this understanding, a methodological foundation was established to develop an effective algorithm for reducing workforce deficits. The proposed structure includes several components with descriptions of the interconnections and substantiations for their importance.

Conclusions: The algorithm provides a general understanding of the logic, sequence, and effectiveness of the steps taken. This theoretically substantiated algorithm highlights the scientific and methodological novelty of this article.

Keywords: Personnel Shortage, Labor Market Equilibrium, Labor Demand, Labor Supply, Platform Employment. ALGORITMO PARA SUPERAR A ESCASSEZ DE PESSOAL NO NÍVEL MICRO

RESUMO

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Objectivo: esta investigação centra-se no desenvolvimento de um algoritmo geral para resolver o problema da escassez de mão-de-obra a nível micro. A escassez de mão-de-obra é actualmente um problema para as empresas e para a economia.

Métodos: foi utilizado um modelo neoclássico do mercado de trabalho para analisar os métodos existentes de resolução da escassez de mão-de-obra.

Resultados: este artigo apresenta a escassez de mão-de-obra como um fenómeno multifacetado com características económicas e sociais mais amplas. Com base neste entendimento, foi estabelecida uma base metodológica para desenvolver um algoritmo eficaz para reduzir os défices da mão-de-obra. A estrutura proposta inclui vários componentes com descrições das interligações e comprovações da sua importância.

Conclusões: o algoritmo fornece uma compreensão geral da lógica, sequência e eficácia das etapas tomadas. Este algoritmo teoricamente fundamentado destaca a novidade científica e metodológica deste artigo.

Palavras-chave: Escassez de pessoal, Equilíbrio do mercado de trabalho, Procura de mão-de-obra, Oferta de mão-de-obra, Emprego de plataforma.

1 INTRODUCTION

Periodic labor force shortages or surpluses are an inevitable feature of the market mechanism that balances labor demand and supply. Every organization faces these issues to some extent during its operations and develops strategies to address them. However, when workforce shortages or surpluses become chronic due to macroeconomic factors, the need arises to tackle these issues comprehensively, often with state involvement, using diverse strategies, models, and tools.

In the past decade, labor shortages of skilled professionals and unskilled workers have become a chronic issue in developed countries. This trend has been driven by sustained economic growth, improvements in living standards, and moderate unemployment levels (except during the COVID-19 recession) (Degtev et al, 2022). Russia has faced this problem relatively recently (in the past few years). The severity of labor shortages is indicated by the unemployed-to-vacancy ratio, which reflects the potential to fill open positions by employing unemployed citizens (Table 1).

Table 1. The number of unemployed per vacancy in the USA, Germany, and Russia in 2012-2023

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Year	USA	Germany	Russia
2012	3.3	4.7	4.5
2013	2.8	4.8	4.0
2014	2.0	4.3	4.1
2015	1.5	3.4	5.3
2016	1.3	2.7	5.2
2017	1.1	2.2	4.5
2018	0.9	1.8	3.8
2019	0.8	1.8	3.3
2020	2.0	2.7	3.1
2021	0.9	2.2	2.0
2022	0.5	1.6	1.5
2023	0.6	1.8	-

Source: calculated based on data from (OECD, standard documentation; World Bank, standard documentation; Federal Service of State Statistics, 2013; Federal Service of State Statistics, 2015; Federal Service of State Statistics, 2017; Federal Service of State Statistics, 2019; Federal Service of State Statistics, 2021; Federal Service of State Statistics, 2023)

Since 2012, the unemployed-to-vacancy ratio in the USA and Germany has consistently declined, indicating an intensification of labor shortages in both countries. In the USA, vacancy coverage was approximately twice as low as in Germany. The year 2020, affected by the COVID-19 recession, was an exception. Due to rising unemployment, the ratio increased slightly but still did not reach the 2012 level.

In Russia, this indicator reached its peak in 2015 due to recession and rising unemployment and then steadily declined from 2018, reaching a critically low level (1.5) in 2022.

The worsening labor shortage in Russia has been driven by a combination of social, macroeconomic, and global factors.

First, Russia has not emerged from the demographic slump caused by the crisis of the 1990s. The population continued to decline until 2011, reaching a low of 142.9 million. Due to significant measures to improve the demographic situation, negative trends were temporarily halted between 2012 and 2015, aided by the addition of new

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territories. In 2018, the population peaked at 146.9 million. The decline resumed, with the demographic forecast of the Federal Service of State Statistics indicating that Russia's population will decrease by approximately 0.5 million annually over the next decade (Population Distribution by Age Groups, standard documentation).

The working-age population has been in a long-term decline since 2007, a trend that persisted through 2012-2023 (Table 2).

Table 2. Dynamics of the working-age population in Russia in 2012-2023

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Change in the working-age population, % to the previous year	99.2	98.9	98.8	100.3	98.6	98.8	98.9	98.9	101.6	99.0	103.1	98.8

Sources: calculated based on data from (Population distribution by age groups, standard documentation)

This indicator showed positive dynamics only three times:

– In 2015, when the population of new territories began to be included in Russian statistics;

– In 2020, as the upper limit of working age was raised by one year in statistical calculations;

– In 2022, when the upper working-age limit was further increased to 61 for men and 56 for women.

The impact of demographic factors on workforce shortages is becoming evident to employers. According to a 2023 survey by HeadHunter Group of over 500 executives from key business sectors, 31% of company owners and 56% of HR department heads identified demographic trends as one of the three most significant external causes of the growing labor shortage, ranking just after geopolitical factors and a lack of specialists with the required skills. Demographic reasons gained 9% compared to a similar survey in 2022 (Semenov, 2023).

In 2022, labor shortages worsened due to a group of geopolitical factors:

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– Shifts in migration flows (outflow of the working-age population after the beginning of the war and departure of labor migrants);

– Participation of some working-age population in the war;

– Sharp increases in production and employment within the defense industry.

The limited ability to raise wages in Russia, especially in the public sector (Rybakov et al, 2022), along with mismatches in secondary vocational and higher education, which make it difficult for graduates to find jobs in their fields, have further prevented a reduction in labor shortages.

The combination of these processes has led to a labor market imbalance, with demand for workers exceeding supply across many economic sectors. Addressing labor shortages at the enterprise (organization) level has become increasingly difficult.

According to data from the HH.ru online recruitment platform, around 85% of employers considered workforce shortages a top priority in August 2024. This concern spanned various industries: transportation, construction, manufacturing, education, healthcare, and sales all felt labor shortages to some extent. However, some sectors experience the shortages more acutely, particularly those requiring specific skills and education. The unemployment rate is projected to be below the natural level (2.6-3%), suggesting that workforce shortages are likely to worsen in the near future.

The study aims to identify the main problems and contradictions in the current algorithm (sequence of steps) for addressing labor shortages at the company level.

The main questions of this study can be formulated as follows:

– What is the general algorithm for addressing workforce shortages at the company level in Russia?

– What are the current priorities and sequence for applying methods to address workforce shortages?

– What are the effectiveness criteria for the main methods used by enterprises (organizations) to resolve labor shortages?

– What is the role and position of the government in the algorithm for addressing workforce shortages at the enterprise (organization) level?

2 LITERATURE REVIEW

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The issue of workforce shortages has become a more widely discussed topic not only recently. It has been studied during different periods of economic development, under the influence of various factors, at different levels of research (micro, meso, macro, and global), and in various fields of activity and sectors of the economy (Labor Market in Specific Sectors of the Russian Economy, 2024; Tavokin, 2024; Evseeva, 2022; Shishkin et al., 2024; Bellmann & Hübler, 2014).

There is no standard definition of workforce shortages in labor economics, as this term is not widely used. To describe this phenomenon, Handel (2024) suggests using the key characteristics of labor shortages. Methods to measure and the driving forces behind workforce shortages are discussed, and whether all shortages, including current ones, should be considered (Handel, 2024). Barnow et al. (2013) define workforce shortages as follows: “a persistent market imbalance between supply and demand, where the number of required workers exceeds the supply available and willing to work for the prevailing wages and working conditions in a particular location and at a particular point in time” (Barnow et al, 2013).

Since crises are taking on a permanent form from economic, social, and political perspectives, the aggregated term “permacrisis” has emerged, combining “permanent” and “crisis”, which comprehensively reflects the current situation affecting the labor market (Turnbull, 2022; Giousmpasoglou, standard documentation). Labor shortages are explained by several reasons and are influenced by a range of factors. These factors are studied at three levels based on their manageability. The micro level is represented by enterprises, where wage levels, working conditions, automation and robotization, career and professional growth prospects, and family circumstances are evaluated. The employee level focuses on personal factors, including age, education, health, work experience, etc. At the macro level, factors affecting companies include the geopolitical situation, competition in the market, etc. Within each group, factors can be identified that differ in the strength and nature of their impact on worker mobility.

During the COVID-19 pandemic, the tourism industry experienced a shift in workforce activity, highlighting a factor of labor shortages, i.e., career changes (Kwok, 2022). The migration of workers from the tourism industry to legal, accounting, and engineering firms and sectors such as transportation, construction, and warehousing, especially among younger employees, was linked to unpopular working conditions: long hours, shift work, and limited career advancement opportunities. There were cases where entire departments or teams left for other organizations. As a result, donor

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companies suffered losses, became nearly paralyzed, and had to bear the costs of recruiting and training new employees (Bhattarai & Penman, 2023). Other reasons for the reduction in labor supply related to workers included early retirement or cessation of work to reduce health risks (Forsythe et al, 2022). The most concerning factor is the aging population and high mortality rates in some countries during the COVID-19 pandemic. The analysis of demographic characteristics in Romania showed a negative trend in overall population size and net migration, an increase in the average and median age of the population, and rising demographic and economic dependency ratios. Some scholars highlight the dependence of labor shortages in the short, medium, and long term on the green transition in Romania (Chivu et al, 2024; Winter et al, 2020).

The sharp decline in the number of migrants across all sectors of activity is not a phenomenon exclusive to Russia. Similar trends are observed in Europe, the UK, and the USA (Kapelyushnikov, 2023; Bhattarai & Penman, 2023). The consequences of labor shortages also affect related industries. Significant disruptions in the operations of major European, American, and British airports in the summer of 2022, caused by staff shortages, led to passenger flow disruptions (Pole, 2022). The primary direction of migration flows of healthcare professionals is toward more developed countries. Migration flows from developing countries to developed ones cause considerable harm to public health in donor countries (Chekmarev et al, 2023; Kopylova, 2013; Zheng & Kurnikova, 2018).

Labor shortages are also caused by gender and age biases in the labor market. Considering these factors, a labor market model was based on a large dataset of job vacancies and applicants in Singapore. For each labor market, supply and demand are determined by the salaries offered by employers and the responses from applicants (Sugiarto et al, 2019; Maslova et al, 2022; Podolnaya, 2015). At the macro level, a long-standing generalized factor contributing to labor market imbalances was globalization, driven by technological changes, immigration, declining union membership, falling real minimum wages, and a reduction in the number of workers with higher education (Blanchflower, 2000). The opposite trend in the global economy is deglobalization, which could solidify labor market imbalances, primarily through reduced labor mobility.

Given that labor is considered a commodity, labor market imbalances are theoretically temporary and can be smoothed through labor prices and the quantity of

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labor offered. However, unlike typical goods, labor, both past and present, remains in demand even as its supply fails to match. Thus, labor market imbalances are more persistent and long-lasting, accompanied by simultaneous increases in wages, job vacancies, and employment.

For measuring and assessing labor shortages, there is a wide variety of tools available in both literature and practice, often tailored to specific sectors and levels of analysis (Kutaitseva et al, 2024; Abdullayev et al, 2023).

At the company level, a labor shortage impact index is suggested to gauge labor market strain. This index reflects the intensity of workforce shortages. Companies often compensate for labor deficits by investing more in capital, R&D, and patents. However, this approach proves effective only in the short term (Harford et al, 2024). Labor shortages in specific professions can be assessed using predictive machine models. Scholars consider workforce shortages within the broader issue of skills mismatches, exemplified by analyses of the Australian workforce across various professions from 2012 to 2018 (Williams, 2020; Brunello & Wruuck, 2019).

Labor shortages related to epidemics cause damage to agricultural production and trade, which ultimately leads to price increases, and have negative consequences for food security. The results of modeling scenarios for potential damage from labor shortages in these areas depend significantly on local control of the epidemiological situation, the state of healthcare, and the availability of medical personnel (Liang et al, 2021). The role of labor shortages in accelerating wage growth for long-haul truck drivers and freight rates for agricultural products from the USA is assessed by Richardson et al. (2024).

The main contributions of this article are as follows:

- We examined and provided an overview of the existing problems and factors that determine labor shortages and methods for measuring workforce deficits;
- We proposed a general step-by-step algorithm for addressing workforce shortages at the enterprise level;
- We discussed the role of the government in mitigating workforce shortages and resolving this issue.

3 MATERIALS AND METHODS

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To analyze existing methods for addressing workforce shortages, we used the neoclassical labor market model. According to this model (Figure 1), labor shortages occur when the demand for labor exceeds its supply, resulting in wages being set below the equilibrium level.

In this labor market model, D_L represents the labor demand curve and S_L is the labor supply curve. At equilibrium, where $D_L = S_L$, the number of employed individuals is L_e, and the average real wage is w_e. When wages exceed the equilibrium level (w_1), disequilibrium unemployment occurs (illustrated by the green segment). Conversely, when wages fall below the equilibrium level (w_2), a labor shortage arises (shown by the red segment).

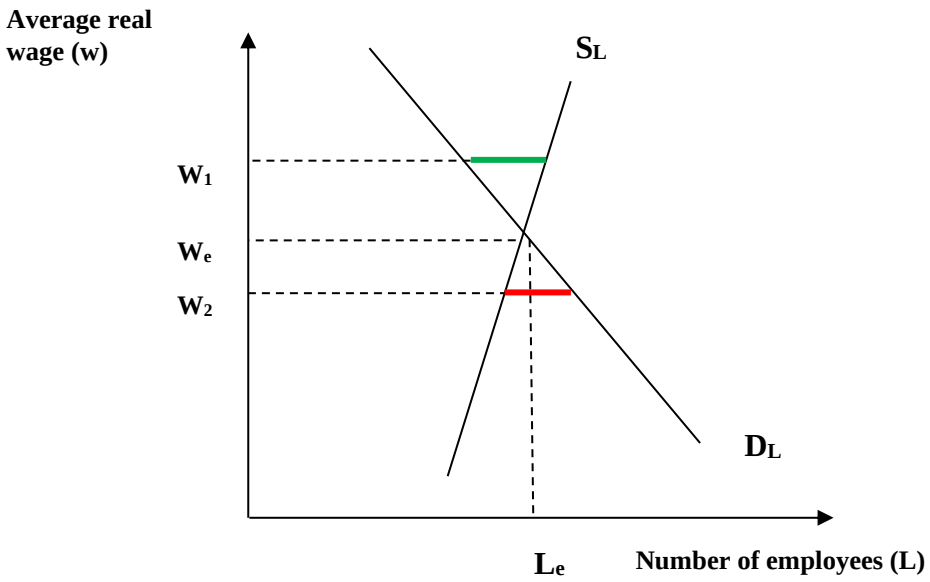

Figure 1. Labor shortage in the labor market

Theoretically, in the long term, a free labor market can restore the balance between labor supply and demand through price adjustments, namely by decreasing or increasing market wages. However, two main factors hinder this equilibrium restoration:

First, labor demand and supply constantly shift under various economic and non-economic factors. While the labor market may be working to correct an initial imbalance, it can encounter new, often contradictory, conditions. For example, escalating geopolitical tensions can significantly reduce labor supply, while easing

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tensions might increase it. In a market economy, companies remain vulnerable to periodic labor shortages, regardless of such adjustments.

Second, in today's market economies, wages are notably rigid (both downward and upward). Legislation, government wage policies, and, in some industries, union activity, limit wage decreases. Large companies often voluntarily maintain high wages under the efficiency wage model to attract and retain top talent, ensuring productivity and loyalty. On the contrary, wage increases are restricted by factors like company financial instability, low minimum wage levels, and weak union influence or absence.

Amid economic turbulence and restructuring of trade relationships, many Russian enterprises lack the financial resources to address labor shortages by raising wages, making wage increases a last-resort strategy for attracting employees. Budget-funded organizations are constrained by state-mandated pay scales and tariffs. These limitations drive enterprises and organizations to explore alternative, non-wage solutions to labor shortages (Kuznetsova et al, 2020).

Labor market models suggest that at a given wage level, labor shortages can be addressed in two ways: reducing labor demand and/or increasing labor supply. While market demand for labor is formed collectively by all employers and the labor supply remains an external factor for individual employers, each enterprise can *directly* influence labor demand and, to some extent, *indirectly* expand the available labor pool.

Thus, each enterprise generally begins addressing labor shortages by analyzing its internal labor demand through an internal review of its workforce capacity. This review often allows the organization to reduce its need for additional labor.

The next step in tackling labor shortages involves actively working on supply, using various methods for recruiting, attracting, and training personnel.

Each method for addressing labor shortages must be evaluated for its effectiveness. The effectiveness of each method is assessed based on the following criteria:

– Ensuring continuity of production at its current volume and creating a future talent reserve;

– Maintaining and improving the quality of labor and its outcomes;

– Preserving the financial stability of the enterprise.

Ideally, any enterprise would fill all vacancies with highly qualified, enthusiastic employees willing to work for modest wages. However, this is rarely achievable. The recruited personnel may not possess the required qualifications, and attracting and

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retaining skilled specialists increases payroll costs. Conversely, filling vacancies with unskilled workers or assigning unskilled tasks to professionals can lead to a decline in labor quality and productivity.

In situations of acute labor shortages, adhering to one set of criteria inevitably brings alternative costs, meaning losses in other areas. For example, employing migrants in roles that require specific skills often results in a decline in work quality (Shubenkova & Shichkin, 2021).

Under these conditions, each enterprise must define acceptable alternative costs that will allow it to maintain viability. These boundaries can be expressed as threshold indicators, with values varying based on industry, production specifics, competition levels, regional operating conditions, and the enterprise's size.

Solving the labor shortage problem ultimately comes down to selecting methods that minimize alternative costs.

4 RESULTS

The analysis allows us to present a general algorithm for solving the workforce shortage problem at the micro level, as applied in Russian enterprises (Figure 2). The methods (measures) listed in the algorithm do not cover all possible ways of addressing labor shortages used by Russian enterprises. However, the algorithm provides an overall understanding of the logic, sequence, and evaluation of the effectiveness of the steps taken.

To address labor shortages, companies primarily attempt to leverage internal resources, avoiding entering the external labor market and reducing their demand for additional employees. The most common approach is internal multitasking, which includes overtime and having employees perform more than one role. While this strategy is productive and cost-effective, it inevitably incurs alternative costs, such as reduced quality of work, lower product standards, and workforce deterioration. Accumulated fatigue, burnout, and declining employee health can reduce labor supply and exacerbate future labor shortages. This measure is an immediate, short-term solution that carries risks if relied upon long-term.

Mentorship and on-the-job training represent a more sustainable, long-term solution to the labor shortage problem. However, the alternative costs of this approach

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include diverting a portion of highly skilled employees (mentors) from their primary responsibilities, which may negatively impact productivity levels and work quality.

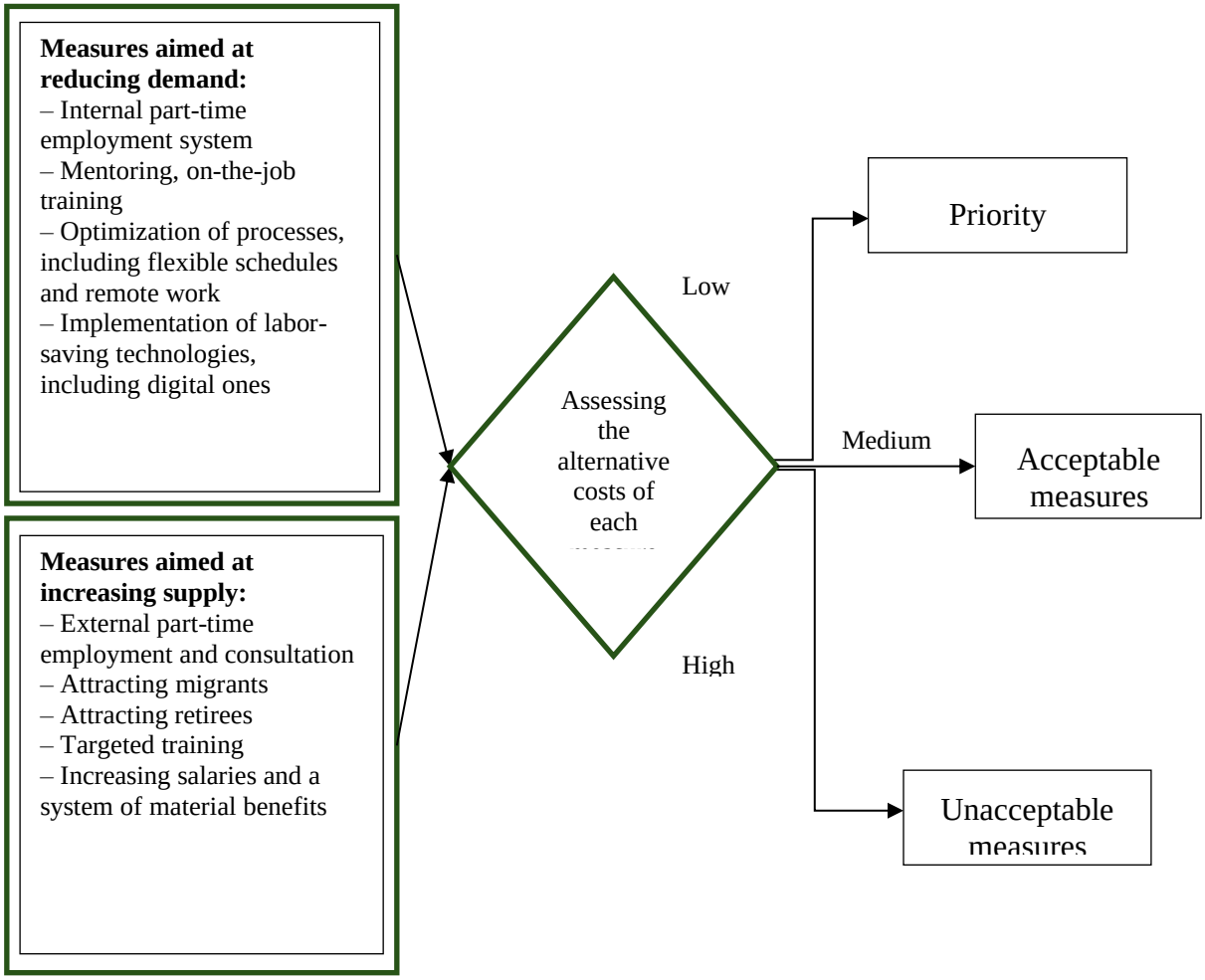

Figure 2. General algorithm for overcoming personnel shortage at the enterprise level

Optimizing labor processes can significantly reduce the need for employees and overall labor costs while potentially boosting productivity. However, this labor-saving method also entails alternative costs. Companies may experience opportunistic behaviors from their employees as they are pushed out of their comfort zones, leading to increased turnover. Flexible schedules and remote work formats demand extra management efforts to adhere to work-rest routines and maintain work quality (Bayazitova et al, 2023).

The costliest method of reducing demand for labor is the implementation of labor-saving technologies, including digital solutions (Nosova et al, 2018; Abdullaev et al, 2023; Matvienko et al, 2022). Companies typically resort to these technologies

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when labor shortages become chronic and they have sufficient financial resources for acquiring, implementing, and maintaining these technologies. However, labor-saving technologies come with alternative costs: an extended transition period and the need for workforce retraining. During this transition, companies may experience a decrease in production volumes and growth momentum. The initial labor shortage may shift to a new shortage of employees with the skills to operate and maintain the new technologies (Kassenova et al, 2020).

If internal measures to reduce labor demand are insufficient, unfeasible, or ineffective, companies are compelled to turn to the labor market. This involves a thorough analysis of the industry and regional labor markets, considering the labor supply and the demand from competitors, to identify diverse options for workforce recruitment.

One of the most popular methods for attracting employees is partial engagement through external part-time contracts or consulting services. In this case, labor costs are not constant or significant, and the quality of work is often assured by the reputation of the contracted employees at their primary workplaces. This approach has its alternative costs, notably in terms of reliability and stability, as other companies are also likely to compete for high-quality specialists under similar arrangements. This "specialist hunt" can lead to excessive workloads for these employees, which may adversely affect their productivity and the quality of their work.

Attracting foreign labor, primarily from developing countries, is also a common approach to addressing workforce shortages in Russia and other developed economies. The main incentive is cost savings on wages. However, when low-cost labor is utilized, issues with the quality of that labor inevitably arise, which affects the quality of the goods and services produced (Karachurina, 2024). In recent years, Russian companies have increasingly turned to employing retirees. While retirees may have limited physical capabilities, their competence and experience enable companies to maintain high production standards without significantly increasing labor costs. The alternative costs associated with hiring retirees mainly involve the need to provide additional leave and cover medical leave expenses.

Targeted training for employees is a long-term approach to retaining and enhancing a skilled workforce and is commercially viable mainly for large enterprises. High costs, delayed impact (with no immediate effect on current production), and the

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risk of trained employees being poached by competitors are the alternative costs associated with this method of addressing workforce shortages.

Raising wages is typically a last-resort solution for attracting talent when other short-term measures fail to rectify the labor shortage. This measure can sharply increase production costs for private companies, while in public sector organizations, due to strict wage regulations, it is often impossible without special government intervention. Although budgetary organizations can sometimes increase compensation through bonuses, internal and external grants, and extrabudgetary funds, these methods are generally less attractive to employees than guaranteed salaries.

Raising wages might not necessarily attract more job applicants if most employers do the same. In such cases, a company may offer various financial incentives for prospective employees, such as providing or subsidizing housing, covering transportation costs, reimbursing part of mortgage interest payments, etc. However, increased wages and material benefits could significantly strain the company's financial health.

The list of methods for addressing workforce shortages in Russian enterprises is constantly growing. One popular approach is temporary or platform-based employment. According to research by the VentraGo! digital flexible employment platform, the number of orders on temporary employment platforms in Russia has increased by 2.5 times over the past year. This employment form allows workers to gain experience in new fields, offers hiring flexibility, the chance to work on specific projects, and provides additional legal income. However, it has significant downsides, including income instability, lack of social benefits, and limited career advancement opportunities. Companies save on costs and avoid adding such employees to their permanent staff. For example, the Familia store model is based not on a set number of employees but on scheduled person-hours, where employees can mix and match shifts to work at specific times. Temporary services are in high demand, especially for SMM specialists (+65%), marketers (+54%), accountants (+48%), web designers (+47%), lawyers (+38%), developers (+35%), and copywriters (+28%). In 2024, Russia became a leading country in platform-based employment (How Workforce Shortages Affect the Economy, 2024).

Russian companies also address workforce shortages through "training from scratch". For example, Rostelecom launched the Growth Point program to identify and train employees without relevant experience. Segezha Group retrains employees from

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various professions to work at its plywood plant, while Magnit trains its staff in truck driving with trailers.

Another innovative approach to reducing labor demand is deliberately decreasing the demand for services provided by scarce personnel. Some retail companies reduce the workload on limited courier staff by encouraging customers to pick up online orders through discounts. Samokat offers a 10% discount, Yandex Lavka provides a 20% discount, and the Lenta hypermarket explains the benefits of self-pickup for groceries to its customers.

In Russia, companies are also adopting unconventional methods to address workforce shortages, such as hiring teenagers. In 2024, Russian businesses hired 28% more teenagers than the previous year. The Ozon online marketplace has offered work opportunities in its warehouses to individuals with criminal records.

Despite the wide range of approaches to workforce shortages, one feature is common: companies tend to select short-term and cost-effective solutions after evaluating and comparing the alternative costs of each method. In the process, they often compromise on product and service quality to remain competitive. Given wage rigidity and other factors, most businesses are unlikely to resolve labor shortages in the medium to long term. Government intervention and support are essential, particularly for systemically important and socially significant sectors.

The Russian government is focusing on the volume and structure of labor supply. In response to workforce shortages, it has raised quotas for labor migrants and foreign specialists on work visas by 26%, reaching 155,000 individuals. Central Asian countries remain the main source of migrant labor. Immigration from Africa, India, and China is also increasing, along with new donor countries like Kenya and Algeria (Migration of the Past Won't Catch Up, 2024).

Since 2022, the state has been implementing the Professionalitet project to train young specialists in forestry, agriculture, and fuel and energy. In 2025, the government will launch the Kadry national project to train personnel from scratch and retrain workers to meet specific industry needs.

Amidst a severe labor shortage, all economically active segments of the population (non-working retirees, people with disabilities, schoolchildren and students, and those engaged in household work or caregiving) have become valuable resources. The government is enhancing the role of retirees as a labor resource. Starting in 2025,

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it will resume pension indexation for working retirees, a practice paused in 2016, and it will lift the cap on maximum pension points.

The government is working to reduce labor demand by promoting labor-saving technologies, such as robotics. It actively supports the production and adoption of robots in key industries, leading companies, courier services, cargo and baggage transportation, autonomous forklifts, warehousing, unmanned transport, and welding and painting of manufactured equipment.

The state's role in addressing labor shortages extends beyond direct influence on labor supply and demand. It can also help reduce alternative costs by providing financial support and monitoring the quality of goods and services, particularly in socially significant sectors like public catering, healthcare, education, and public transportation.

Thus, government support adjusts the approach to resolving workforce shortages at the enterprise level, specifically impacting the Assessment of Alternative Costs for Each Measure stage in the problem-solving algorithm. By overseeing labor quality and providing full or partial funding for training, retraining, and retention efforts, the state reduces alternative costs for businesses. This enables enterprises to select the most effective short-term and long-term measures. This algorithm stage could be reformulated as Evaluation of Alternative Costs for Each Measure Considering Government Control and Financial Support.

5 CONCLUSIONS

The article demonstrates that the current exacerbation of workforce shortages in Russia is driven by economic trends, demographic features, and geopolitical factors. A general algorithm for addressing workforce shortages at Russian enterprises is presented, highlighting that resolving this issue is nearly impossible without state support and oversight. By studying the factors influencing labor shortages and the overall solution algorithm, these approaches can be applied at the level of government bodies, industries, individual enterprises, and sectors to:

– Assess the scale of workforce shortages;

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– Forecast labor shortages in the short, medium and long term;

– Select the most effective methods for reducing the shortage;

– Develop key directions for government policies to regulate the labor market by industry and region.

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