

DIGITALIZATION OF SYSTEMIC LABOUR MANAGEMENT

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Abstract. The *purpose* of the paper is to substantiate the areas, directions, and tools of further complex digitalization of the labour management within the framework of HR engineering technologies, which allow for the systematic improvement of the quality of professional and qualification potential, the level of productive employment and social protection of personnel of business entities as key factors in increasing their economic efficiency and sustainable development in the face of a spectrum of national and global socio-economic challenges. The study's *methodology* is based on the generalization, comparison, synthesis and analysis of traditional and innovative objectives, functions, tools and areas of application of digital technologies and complex HR engineering in the context of ensuring its multi-faceted effective impact on systemic labour management, economic efficiency and sustainable development of enterprises (in particular, in terms of their profitability, competitiveness, innovativeness, qualitative regulation of social aspects of labour relations, balanced civic responsibility). In unstable and adverse socio-economic conditions of the national and global origins, the set of approaches and technologies to improve labour management through the systemic HR engineering *results* in balancing and consistent increasing in both the efficiency of economic activities and the solution of a range of social problems in the development of the workforce and the enterprise as a whole. The systemic nature of labour management based on digitalized HR engineering is ensured by combining its traditional business functions (economic, organizational and administrative, socio-psychological) with strategic, innovative and wide social functions (in particular, regarding monitoring the level of capitalization and improvement of employees' talents, skills and abilities, stimulating their career growth, team building, optimizing cooperation and mechanisms of interaction between employees and an enterprise's heads, implementing social initiatives of an economic entity regarding its personnel and external environment), which are carried out through modern information and analytical, accounting and financial, recruiting and educational technologies. *Practical implications* of the digitalized HR engineering involves: balancing an enterprise's human resources according to the consistently improved job description and required professional competencies in the ratio of hard, soft and digital skills; productive employment; optimizing capitalization of personnel professional and qualification qualities, his working and extra-working conditions. Thus, business profitability increases in accordance with the criteria of its sustainable development and resilience, which have broad social and individual value. *Value / originality* of this approach to substantiate the goals, tasks, functions, and areas of application of digitalized HR engineering will increase the complexity and effectiveness of systemic measures for stimulating the sustainable development of an enterprise based on improving its organizational and process model, systematizing and increasing the efficiency of management and business activities, ensuring productive employment, advancing the professional and qualification potential of personnel.

Keywords: labour, human resources, systemic management of an enterprise, HR engineering, digitalization, socio-economic challenges.

JEL Classification: J24, J31, J53, J80, O32

1. Introduction

The rapid spread of electronic resources and databases has contributed to the acceleration and systematization of labour management

activities (in particular, in the aspects of personnel recruitment, management of economic entities' human resources and their wages, formation of corporate systems for recognizing qualifications

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and justifying labour remuneration) on the basis of digitalization.

Such processes became the result and response to the request of the sum of technological modes that make up the content of neo- and post-industrial economies. Modern technological modes are characterized by increased requirements for the professional and qualification, innovative, knowledge- and rent-generating potential of human resources. This manifests itself through the increase in the requirements of business entities for the relevant qualities, abilities and skills of employees, the invigoration of competition not only among applicants on the labour market, but also among employers for personnel with desired qualifications. Optimization of staffing, employees' professional and qualification characteristics, labour and organizational processes, ensuring productive employment have become integral factors of the sustainability and resilience of an economic entity (with signs of profitability, competitiveness, innovativeness, efficiency of mechanisms for regulating social aspects of labour relations, balanced civic responsibility) in the environment of numerous national and global socio-economic challenges.

On the other hand, the growing role of the workforce as a production factor of neo- and post-industrial economies strengthens the position of employees in struggling for decent working and extra-working conditions, remuneration for labour, establishing production and organizational spaces of business, as well as for constructive interaction with employers on the related issues. While accompanying the development of technological modes and production factors, the global increase in standards of living and consumption supports the requirements of applicants on the labour market not only for its remuneration, but also for professional and creative self-realization, individualization of employment strategies. The impact of these processes on the efficiency and resilience of economic entities (enterprises, companies, corporations), their brunch and inter-brunch associations and clusters has intensified the transformation of personnel management activities according to the methodology of systemic HR engineering.

The purpose of the paper is to substantiate the areas, directions, and tools of further complex digitalization of the labour management within the framework of HR engineering technologies,

which allow for the systematic improvement of the quality of professional and qualification potential, the level of productive employment and social protection of personnel of business entities as key factors in increasing their economic efficiency, sustainable development and resilience in the face of a spectrum of socio-economic challenges at the national and global levels. This involves: the study of the methodology for implementing systemic HR engineering that uses a range of digital technologies and tools; determination of the expected results of their application in the process for further structuring and balancing organizational, economic, innovation-stimulating, and socio-psychological aspects of the labour management in enterprises' current and strategic functioning.

2. Methodological Approaches to Systematization of Labour Management Through Digital Technologies

The most widespread processes of digitization in the sphere of labor management are currently manifested through (Smolinets, Levkiv, 2021; Kozak, Kopytova, 2021; Zlenko, Liashchenko, 2024; Kravchuk, Varis, Rubel, 2024; Shalenyi, Zelenyak, Fadeev, 2024):

- communicating with applicants, adapting new employees (due to the systems of their search and assessment, including through the development of a personal cognitive interface, as well as marketing on job sites, platforms, social networks, conducting online open days, corporate chat-bots, video interviews, gamification of recruiting and adaptation, etc.);
- advanced training for applicants and employees in a number of large companies specializing in IT, software, various electronic gadgets;
- routine operations in personnel management and procedures for analyzing the results of both management and labour activities, including within the framework of monitoring and adjusting business processes, corporate accounting, online decision-making, evaluating personnel work according to certain indices and qualitative indicators, forming thematic reports;
- creating virtual workplaces (for remote, part-time employees and freelancers); organizing machine and other forms of e-learning for personnel;
- development and self-service of employees according to production and extra-

production needs (thematic information and recommendation systems, automation of applications – for internships, advanced training, obtaining relevant benefits);

– templates of reports with the features of simplicity, clarity, accountability, comparison (dashboards, benchmarking, etc.), as well as activities for storing personal data and protecting information (for example, in cloud resources);

– cooperation (organization of the working environment, places and process, official meetings, feedback, etc., for example, for regular remote work, collective brainstorming sessions with a wide range of remote specialists, periodic reporting);

– strategic and personnel planning, HR branding (corporate websites and platforms, including ones using Big Data);

– monitoring moods in the work team, assessing employees' motivations, identifying sources of discomfort in the workplace (surveys, questionnaires, etc.).

In general, the digitalization of labour management allows for a significant increase in the efficiency of the production process for both personnel and the enterprise's heads in three key dimensions – monitoring, informing administration, and tracking problem areas (Smolinets, Levkiv, 2021).

Promising areas of digitalization of systemic labour management (along with a digital workplace – that is, creation of a working environment that ensures high labour productivity, abilities to collect information on tasks' performance through supporting access to numerous electronic databases, platforms, applications, modern means of communication and feedback with employees, as well as digital HR) are considered to be the formation and development of the so-called digital workforce (personnel with an innovative way of thinking, thorough digital skills, motivation and access to resources for continuous improvement of knowledge, abilities, professional and qualification potential as a whole with the help of modern technologies) (Kozak, Kopytova, 2021).

At the same time, the consistent digital transformation of labour management is focused not only on the use of digital technologies to improve ongoing business processes and HR activities, but also on the optimization of business strategies and business transformations in general (Kravchuk, Varis, Rubel, 2024), since the digital

labour management model better corresponds to the complex and largely uncertain conditions of enterprises' functioning and is more adapted for online and remotely work in such conditions (Shalenyi, Zelenyak, Fadeev, 2024).

Important aspects and components of systemic HR engineering and corresponding HR management are revealed in papers where:

– their methodology is substantiated as a systemic activity in the organization of human resources management based on the technologies of recruiting, business engineering, management and marketing, information and PR-support, social psychology, etc. (Hlushko, Kaminsky, 2022; Drymalovska, 2022; Kushneryk, 2020; Pochtovyuk, Semenikhina, 2020);

– HR-engineering and HR-management toolkit for economic entities' management is developed and systematized (Kladova, Zachosova, 2024; Korolenko, Kutova, 2023; Orel, Smahliuk, 2023; Kyfyak, Zapukhlyak, 2021; Kushneryk, 2020; Fitz-enz, Davison, 2002); HR engineering technologies for assessing and improving the professional and qualification qualities and abilities of applicants and already hired personnel are elaborated (Baksalova, Koshonko, Hlushko, Horbatiuk, 2023; Orel, Smahliuk, 2023; Hlushko, Kaminsky, 2022; Kyfyak, Zapukhlyak, 2021; Pochtovyuk, Semenikhina, 2020; Fitz-enz, Davison, 2002);

– the potential of digitalized HR engineering in overcoming a range of socio-economic challenges and force majeure events (for example, restrictions in targeted national, regional, local measures to suppress sanitary and epidemic threats, consequences of natural and man-made disasters, military actions, etc.) at the micro- and meso-levels are studied (Kladova, Zachosova, 2024; Baksalova, Koshonko, Hlushko, Horbatiuk, 2023; Korolenko, Kutova, 2023; Hlushko, Kaminsky, 2022; Drymalovska, 2022; Pochtovyuk, Semenikhina, 2020; Fitz-enz, Davison, 2002).

Along with the methods of business engineering, management and marketing of enterprises, technologies for labour standardization and organization, assessment and correction of personal and team competence levels, social psychology, PR, the methodological basis of digitalized HR engineering and its results in the form of systemic labour management and productive employment covers tools and means for automating relevant processes and databases,

optimizing their structure and analysis, as well as software for business modelling and efficiency management in a range of economic specializations (Baksalova, Koshonko, Hlushko, Horbatiuk, 2023; Orel, Smahliuk, 2023; Hlushko, Kaminsky, 2022; Kyfyak, Zapukhlyak, 2021; Pochtovyuk, Semenikhina, 2020; Fitz-enz, Davison, 2002).

3. HR Engineering as the Systemic Technology for Labour Management

The main directions of modern labour management include: talent management (their search, development, application), the so-called internal marketing as a function that fundamentally affects the paradigm of HR managers and HR departments activities, and therefore the organizational structure of labour management; a human-centric approach in the organization of business processes in order to stimulate the initiative and responsibility of personnel for the results and synergistic effects of an enterprise's functioning; the urgent need for continuous improvement of staff qualifications and competence; strengthening the role of a clear management strategy, which involves the substantiation of multi-variant perspectives of entrepreneurship and labour activity itself (in particular, through a combination of economic, administrative, socio-psychological methods of influencing and interacting with personnel); shifting the epicentre of management efforts from automatic processes to productive ones (that is, from automating the spectrum of management processes in the areas of payroll, personnel accounting, creating systems for its selection, training, evaluation, etc. to increasing labour productivity, improving organizational and process models of enterprises and labour conditions, structuring and uniting work teams in the course of implementing business development strategies); the spread of holacracy management structures (i.e. systems of management organization where power and decision-making are not carried out hierarchically, but are distributed functionally between self-organizing teams) (Kladova, Zachosova, 2024; Orel, Smahliuk, 2023; Kyfyak, Zapukhlyak, 2021; Kushneryk, 2020; Pochtovyuk, Semenikhina, 2020).

The systemic integration of the highlighted areas of labour management in response to the needs of correcting turbulent external socio-

economic conditions at the meso- and micro-levels of economic functioning caused the modernization of the methodology and practice of managing human resources of an enterprise (company), which has been called HR engineering. It's a relatively new methodology for Ukraine, but a relevant and widespread one in the European macro-region and developed countries of the world, both effective for recruiting at the request of economic entities and corporate business networks, and for optimizing the set of their production processes and increasing profitability due to the balancing the labour potential, motivations and working capacity of employees (Kladova, Zachosova, 2024; Korolenko, Kutova, 2023; Drymalovska, 2022; Kyfyak, Zapukhlyak, 2021; Kushneryk, 2020). On the other hand, while meeting the needs of economic entities in personnel, optimizing their labour processes and productivity, HR engineering ensures the most complete implementation of the professional and qualification characteristics and worldview orientations of each employee, harmonize the mechanisms and practices of his career growth in work teams, as well as the working and non-production interests of work teams themselves (in particular, through mechanisms of decent material, moral and ethical motivation of personnel for coordinated productive work) (Baksalova, Koshonko, Hlushko, Horbatiuk, 2023; Hlushko, Kaminsky, 2022; Pochtovyuk, Semenikhina, 2020; Fitz-enz, Davison, 2002).

Therefore, the practice of labour management based on HR engineering involves the implementation of both traditional and a number of innovative functions (Kladova, Zachosova, 2024; Baksalova, Koshonko, Hlushko, Horbatiuk, 2023; Hlushko, Kaminsky, 2022; Kushneryk, 2020; Pochtovyuk, Semenikhina, 2020). Among the traditional functions of systemic labour management are economic (calculation of wages, material incentives, penalties), organizational and administrative (establishment, implementation, regulatory and documentary support of the staffing list, office work and correspondence in a range of core and auxiliary areas of the enterprise's functioning, control over the implementation of work and vacation schedules, maintenance of discipline), socio-psychological (moral encouragement, documentation and justification of information regarding socially vulnerable employees and their needs to the administration).

The mentioned traditional labour management functions are enhanced by multifaceted activities of tracking the level of capitalization and improvement of personal talents, skills and abilities, team building, optimizing cooperation and mechanisms of interaction between hired personnel and company heads, stimulating career growth, implementing social initiatives of an economic entity regarding its own personnel and the external environment (target audience, territorial community, etc.), based on modern information and analytical, accounting, recruiting, educational technologies. As a result, the systemic nature of labour management is ensured by combining its current business functions with strategic, innovative and social ones (Drymalovska, 2022).

The basic technology of HR engineering, which primarily implements the economic, organizational and administrative functions of HR management, is quantitative assessments of employees' abilities to labour in order to establish an individual workload for each of them, which a certain employee, under certain organizational and technical production conditions, is able to perform systematically within a set time in exchange for wages; this quantitative assessments objectify the formation of the value of labour as a phenomenal market commodity (Baksalova, Koshonko, Hlushko, Horbatiuk, 2023). At the same time, the systematization of quantitative assessments of workers and applicants abilities allows to form the portraits (models) of the competencies of the company's personnel (Kyfyak, Zapukhlyak, 2021).

Currently, researchers used to interpret HR engineering as the methodology and practice of systemic labour management, which integrates the needs and capabilities of an individual (employee or job seeker), corporate tasks, goals and architecture, as well as the range of technologies used by business structures (including within the framework of automated enterprise management systems functioning), subjects of recruitment itself, provision of other services for employment and support in the labour market, so as professional education (including the achievements of marketing, technologies in PR and a number of social psychology areas). The main goals of HR engineering combine:

- implementation of a well-founded strategy for selecting, developing, evaluating and maintaining

staff, integrated into the business strategy of productive functioning, which involves activities for creating and fulfilling personnel management policies and procedures;

- effective team building within the framework of mechanisms for using the potential of professional, leadership, communication abilities and skills of employees, their improvement and development;

- fulfilment of business economics tasks related to personnel and career in the field of resource management, marketing, profitability increase and company's logistics through the means for effective recruitment and capitalization of employees' professional and qualification, comprehensive, worldview potential.

The intra-corporate architecture of HR engineering and labour management depends on the organizational structure of an economic entity and, along with its HR, accounting and finance departments, can be formed by the planning and analytical, advertising and marketing, PR units of the enterprise itself, the corresponding separate structures of a corporate level (including in the stakeholders' status), as well as by external consulting, auditing, and recruiting organizations.

4. Areas, Tools, and Results of Applying Digitalized HR Engineering in Systemic Labour Management

The main tasks of digitalized HR engineering in the context of setting up, maintaining and optimizing effective labour management consistently cover:

- the development of an organizational and process (functional) model of the enterprise, which structures its organization, practices of business and personnel work activities. In this case: a hierarchical list of business processes and functions by structural units and positions is developed and agreed; matrices of powers' distribution in the hierarchical organizational structure are described; job responsibilities and models of personnel skills and competencies are approved; a system of labour remuneration and motivation to increase its productivity is formed; key strategic indicators of the economic efficiency for structural units and employees by positions are developed;

- calculation of costs and corporate labour standards, as well as staffing needs, formation of HR transformations' budget. In this case:

quantitative and qualitative indicators of performing business processes and functions by structural units and positions are determined; time and costs (labour, financial) for performing business processes and functions in the context of the enterprise's business guidelines are monitoring and assessing; models and ways for optimizing the work schedule, as well as ensuring flexible employment and personnel replacement on the basis of functional responsibilities' integration and organizational structure's improvement are substantiated;

– control, investigation, analysis of processes and the level of implementation of the specified job and competency instructions, as well as key strategic indicators of economic efficiency of structural units and employees by position. In this case: the variable components of job and competency instructions, as well as the possibilities of their integration within the framework of the specialized business economy's optimizing are determined; templates of reports by positions and organizational units are developed; the system for recording personnel, drawing up and implementing staffing tables and work schedules is created and periodically checked; the effectiveness of measures to reduce labour costs is assessed; the automation of a range of production processes and functions is carried out;

– the design of approaches to enhancing the organizational structure, increasing labour productivity and personnel assignments. In this case: the search for job and functional imbalances and areas of irresponsibility is periodically conducted; approaches and ways to reduce the organizational fragmentation of the specialized business economy through optimizing hierarchical management levels, eliminating duplication and centralizing similar business processes and functions, equalizing the workload of personnel in similar positions are substantiated; mechanisms for using the results of monitoring key strategic indicators of economic efficiency of structural units and employees by positions in order to improve the system of labour remuneration and motivation are implemented.

The basic digital technologies in labour management based on HR engineering are:

– development and monitoring of a system of an enterprise's strategic goals and key indicators, creation of labour motivation and remuneration system based on them;

– construction of a functional system for assessing the professional and qualification characteristics of applicants and already hired employees, as well as the level of fulfilment of a range of job and competency instructions (including measuring the effectiveness of personnel planning and recruiting, in particular, on the outsourcing basis);

– functional and cost analysis of organizational structuring process, as well as a set of business processes (including calculation of labour costs and corresponding corporate standards, number and labour productivity of personnel);

– analysis of the remuneration system efficiency (including through profitability – comparison of profitability and costs, measurement of the effectiveness of the corporate strategy of material incentives, bonuses, compensations and benefits);

– comparative study of business results (in particular, labour productivity by divisions, positions, employees' categories), shifts in the organizational and process structure, results of using of assets of intellectual potential, leadership and career growth stimulation;

– development and study of the effectiveness of the corporate strategy for relations with employees (including assessment of: a volume and causes of staff turnover, labour discipline violations; the quality of socio-labour relations from the perspective of their participants; programs for workplace orientation and adaptation, related counselling and mentoring; mechanisms and a level of implementation of employees' business ideas; the moral climate in the work team);

– assessment of the effectiveness of the system of formal and informal education and self-education with and without separation from production (including in aspects of: the effectiveness of education and knowledge management in the work team, in particular, through the costs for relevant electronic tools and programs; costs and results from encouraging distance and self-education; dynamics and efficiency of intellectual assets' using);

– implementation of procedures for productive communication between owners, administration, and personnel of an enterprise on the list of the mentioned issues.

Innovative HR engineering on a competency-based approach to the processes of recruitment, professional and career growth of personnel

without separation from production involves a creative combination of digitalized methods, such as (Baksalova, Koshonko, Hlushko, Horbatiuk, 2023; Orel, Smahliuk, 2023; Hlushko, Kaminsky, 2022; Kyfyak, Zapukhlyak, 2021): training (teaching effective models of work behaviour with verification of their application); coaching and mentoring (assistance of a qualified and experienced trainer in revealing an employee's abilities and skills through solving certain tasks), including by means of NL programming; secondment (internal business trip, i.e. rotation of an employee for a certain period within the enterprise's organizational structure with subsequent return to the main duties); e-learning (distance learning using electronic network resources, technologies of artificial intelligence and augmented reality, or VR technologies, performing tasks and exercises on a computer equipment offline); basket method (identifying the basic skills and abilities required by a potential employee for a certain position by simulating "management activity" situations); case studies (analysing real situations of the labour practice, identifying and discussing options for their solution); self-study (independent decision-making, stimulated by the use of various educational materials); arrangement of interviews, training, and workplace adaptation programs using the potential of social networks, mobile applications, corporate chat-bots, feedback surveys, etc.

The set of HR engineering methods and technologies ensures the balancing of an enterprise's human resources by the most demanded professional competencies in the ratio of hard, soft and digital skills (i.e. general, professional, digital competencies), as a result, contributing consistently to the improvement of the personnel number and job descriptions, adjustment of labour remuneration.

5. Conclusions

Digitalized HR-engineering has developed in response to the requests of the global business environment and civil society regarding increasing the role of human resources as a production factor, a stimulus and a consumer of the scientific and technical progress results, as well as individualizing strategies for professional self-realization, formation, reproduction and improvement of aggregate labour and qualification potential. HR engineering is recognized as

a methodology for systemic labour management, capable to balance the needs and goals of an average employee, a work team, enterprise's owners and a corporate environment of a specialized economic sector in general through implementing a consistent business strategy for effective capitalization of workforce professional and qualification characteristics along with improving both the relevant personnel potential, organizational and production conditions and incentives for productive employment.

The systemic nature of digitalized HR engineering and the corresponding labour management is achieved primarily through: balancing the enterprise's organizational and process structure, the administrative, operational and strategic contours of its management, as well as formal and informal interactions within the work team and between employees, administration and owners (in particular, on issues of compliance with socio-labour and human rights, guarantees of decent working conditions); using an up-to-date package of organizational and administrative documentation and software tools for assessing the professional and qualification qualities of applicants and personnel, the level and quality of performing job and competency instructions; harmonizing approaches to the employees' selection, assessment, stimulation and development, substantiated by current and strategic guidelines for the socio-economic efficiency of competitive economic activity. Ensuring productive employment and increasing labour productivity within the framework of the mechanisms for administrative and operational management of the enterprise and its human resources should focus on effective recruitment and improvement of employees' competencies, justification and dynamics of personnel appointments, systemic material and moral incentives recognized in the work team.

The competitiveness of an enterprise's organizational structure and management system in the conditions of rapid development of electronic technologies, information and accounting systems, first of all, requires: the automation of processes for personnel records, performing staff tables and work schedules, as well as structural units reporting on the fulfilment of economic tasks, job descriptions and instructions; implementation of software products for specialized business modelling and efficiency management.

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