ORIGINAL PAPER

DOI: 10.26794/2304-022X-2024-14-4-77-90
UDC: 331.101.52(045)
JEL J24

Human Resource Management Ecosystem in the Context of Business Digitalization

D.S. Salin, N.V. Vittenbeck
Russian Foreign Trade Academy of the Ministry for economic development of the Russian Federation, Moscow, Russia

ABSTRACT

In the context of digital economy business is increasingly choosing the ecosystem model of development, which leads to scientific interest in the formation of new approaches to human resource management (HRM). The role of human capital within business ecosystems is growing; both internal and external participants create its value to the organization. Many stakeholders get involved in working out HRM solutions, including managers, employees, HR specialists, ecosystem partners, suppliers and HR services providers. With a view of co-creating value and enhancing business competitiveness in the market, there comes a need for the formation of HRM ecosystems integrating necessary resources. The aim of the research is to determine the characteristic features and structural model of HRM ecosystems in the context of business digitalization. Currently, HRM ecosystems are at an early stage of formation and represent technocratic models in the form of a «marketplace» of multiple HR tools, which constitutes the risk of their overloading and turning into a "patchwork" of digital technologies. The emerging transition towards human-centric HRM ecosystems shifts the focus from technologies to strategic business goals and people's well-being in the working place. The scientific result of the research is the identification of technocratic and human-centric HRM ecosystems distinctive features as well as the suggestion of a structural model-in transit, comprising humanitarian and technological components. Within the research, there were used general scientific methods of comparison, analysis, generalization, as well as scientific interpretation of the authors' theoretical and practical experience. The research outcomes may be of interest to scientific and business communities in terms of developing the methodology of the ecosystem approach to HRM in the context of business digitalization.

Keywords: ecosystem; digitalization; business ecosystem; human resource management (HRM); HRM ecosystem in the context of digitalization; technocratic ecosystem; human-centric ecosystem; digital employee experience (DEX); digital comfort

***For citation*: Salin D.S., Vittenbeck N.V. Human resource management ecosystem in the context of business digitalization. *Upravlencheskie nauki = Management Sciences.* 2024;14(4):77-90. DOI: 10.26794/2304-022X-2024-14-4-77-90**

INTRODUCTION

Ecosystems as a model of business development have become widely spread in the last decade, which has sparked natural and growing interest among researchers. The focus of analysis is on the essence of business ecosystems, their typology, advantages, risks, and development prospects [1–5].

As is well known, the concept of a "business ecosystem" was introduced at the end of the last century by American scholar J. F. Moore, who noted the analogy of coevolution (the process of mutual evolution of interdependent species) in nature and in the competitive business environment. Analyzing the latter, Moore proposed considering a company and its development prospects not within the framework of industry affiliation but as part of an ecosystem that includes multiple industries. The shift from industry competition to ecosystem cooperation creates new synergistic opportunities for businesses [6].

Large-scale geopolitical, socio-economic, and technological processes in the subsequent period have shaped and continue to create the prerequisites for the development of ecosystem models as an evolutionary stage for economic entities, based on the idea of creating unique value propositions for customer groups. This approach allows for the formation of a powerful competitive advantage with the potential to capture target markets [1]. According to a forecast by McKinsey, by 2025, business ecosystems will generate up to 30% of corporate revenue, potentially totaling $ 60 trillion [7].

One of the key drivers behind the spread and diversification of ecosystem models is the digitalization of business and society. The explosive growth of technology, the emergence of online sales channels, and digital platforms have enabled businesses to offer customers an unlimited range of products, as well as make the user the center of the business model (client-centered approach). Modern ecosystems are built on the principle of "total customer coverage", aiming to meet both current and potential needs (Client-360[1]). As a result, each user becomes a separate market segment for the ecosystem, receiving "seamless access" to a wide range of services within the ecosystem, including financial, lifestyle, transportation, education, healthcare, and others. Ecosystem participants, in turn, multiply and monetize their customer bases, enhancing technological capabilities and innovation potential. Examples of successful ecosystems include Amazon, Microsoft, Google, Apple, Baidu, Alibaba, Tencent, and major banks (JPMorgan Chase & Co., Goldman Sachs Group, Inc., etc.). Ecosystems are formed by companies with advanced technologies and strong intellectual capital [8]. Global analytical reviews indicate that "digital champions" (companies with high levels of digital maturity) are at the forefront of the process of creating business ecosystems and are maximizing their advantages.[2]

In the context of digitalization, a business ecosystem refers to the collective of a company's business units and external partners, united through a single technological platform to achieve a competitive advantage [4].

The advisory report of the Bank of Russia, "Ecosystems. Approaches to Regulation", provides a number of objective assessments of the current stage of ecosystem solutions in Russia[3]:

- Russia is characterized by strong national ecosystems in the local market, which pose significant competition to global players.
- A distinctive feature of Russia is the leading role of the financial sector in creating ecosystems.

[1] The future of the banking industry after 2023. 2023. PLUS world. URL: https://plusworld.ru/journal/2023/plus-9–2023/budushchee-bankovskoy-otrasli-posle-2023-goda/ (accessed on 07.07.2024).

[2] Digital Champions in 2025. PWC. URL: https://www.pwc.com/gx/en/industries/industrial-manufacturing/digital-supply-chain/digital-champions-2025.html (accessed on 07.07.2024).

[3] Ecosystems: approaches to regulation. Report for public consultation. Bank of Russia. 2021. URL: http://www.cbr.ru/content/document/file/119960/consultation_paper_02042021.pdf (accessed on 07.07.2024).

• The largest Russian ecosystems include Sber, Yandex, T-Bank, VK (Mail.ru), VTB, and MTS.

• Depending on the criteria for admitting participants, there are two types of ecosystem models — closed or open. The first does not publicly disclose the rules for admitting participants. A limited number of partner companies provide goods and services, and internal competition is absent. In the open model, admission to the platform is based on publicly disclosed criteria by the ecosystem, and admission is possible even for competing entities.

• An analysis of the business models of the largest global and Russian ecosystems shows that all of them operate under a hybrid model, combining open and closed segments. For example, the VTB ecosystem includes not only its own financial services but also six key development industries: technology companies, advertising services, e-commerce and retail, telecommunications, entertainment, and transportation. In the current period, the only open segment is the housing ecosystem "Metr Kvadratny" (services for searching, verifying, evaluating, and purchasing real estate, as well as planning and conducting repairs).

As noted in the Bank of Russia's report, "companies mentioned in the context of ecosystems (groups of companies) are at different stages of creating value chains within their individual business models.[4]"

Although the ecosystem as a form of business development is still in the process of formation, the approach is also extending to the subsystems of organizations, including one of the key elements in the value creation chain —human resource management (HRM) [9]. It is logical to assume that HRM ecosystems, which are crucial in the value creation chain, are predominantly implemented in large resource-intensive companies within sectors such as banking, telecommunications, or big tech, just like business ecosystems.

However, unlike business ecosystems, the ecosystem approach to HRM is only beginning to attract the attention of researchers. In the pre-pandemic period, there were rare mentions of HRM ecosystems (human resource management ecosystem), but even the surge in their popularity following the COVID-19 pandemic has drawn more interest from practitioners than from scholars. The research base on this topic is in the early stages of development and is represented by individual publications in academic journals [10, 11].

The relevance of this study is driven by the need for a scientific understanding of the ecosystem approach to human resource management, which is being shaped in the context of digitalization and the development of business ecosystems.

RESEARCH METHODS

The methodology applied by the authors is determined by the limited number of publications on the topic of HRM ecosystems in academic journals and the relatively closed nature of information regarding corporate practices, given the intense competition and stringent requirements of international and Russian legislation concerning information security (compliance). In the process of studying existing analytical materials, thematic reviews, practical case studies from banking and fintech companies, and information from various web sources (secondary research), general scientific research methods were employed: comparison, analysis, generalization, as well as scientific reflection on the theoretical and practical experience of the authors.

RESEARCH FINDINGS

1. Formation of a Technocratic (Digital) HRM Ecosystem

The widespread adoption of the concept of "ecosystem" in HRM is mainly driven by technology companies providers of digital solutions

[4] Ecosystems: approaches to regulation. Report for public consultation. Bank of Russia. 2021. URL: http://www.cbr.ru/content/document/file/119960/consultation_paper_02042021.pdf (accessed on 07.07.2024).

for working with personnel [12, 13], which are forming a rapidly growing and highly competitive HR Tech market in Russia and abroad. After the exit of foreign providers from the domestic market (such as Oracle, SAP, Cisco, SuccessFactors, Jira, Confluence, SharePoint, etc.), leading players in the Russian HR Tech sector include companies such as Mirapolis, ISpring, Verme, Molga Consulting, and WebSoft. Major IT giants in the HR sector, such as HeadHunter, Superjob, Avito Rabota, and Rabota.ru, are expanding their own ecosystems by acquiring smaller players or integrating numerous startups.[5]

According to HR Tech terminology, the HRM ecosystem is referred to as "digital" and includes a universal digital platform that integrates a set of specialized services or applications with seamless (no additional registration) access to each from a single point of entry, i.e., following the "single window" principle. Typically, such services support the basic functions of HRM, corresponding to the stages of the "employee life cycle" (ELC) — from hiring to termination.

Common technologies that form a digital ecosystem in the context of basic HRM functions include personnel management platforms such as universal (HRMS), predictive (futuristic HRMS), and recruitment platforms; mobile applications for "digital hiring"; technologies using artificial intelligence (AI), AI-based chatbots; knowledge management systems (LMS/TMS) and augmented reality (AR); mobile apps, including BYOD technologies[6]; "virtual care" services, corporate portals, and internal social networks [14–16].

HR Tech providers offer comprehensive solutions ("turnkey" ecosystems) or meet local consumer needs (microservices approach). Leading services in demand are hiring and electronic personnel document management (EDM) services.

On the one hand, the potential of HR Tech creates a wide range of opportunities for the efficient solution of HR tasks; on the other hand, researchers note that the consumption of digital solutions by client enterprises is often chaotic. To justify their many needs, clients cite the increasing volume of tasks and the complexity of internal processes and procedures, as a result of which the "employee journey map" (EJM) — the movement of an employee in the company's information space according to internal policies and procedures —becomes a long path through the labyrinths of hierarchical structures, which is characteristic, for example, of large banks. The number of modules or applications in the HRM ecosystem can reach several dozen units, with various control tools being particularly popular: time tracking, task completion, meetings with mentors, employee burnout, and so on. The "digital chaos" in Russian organizations is exacerbated by the need for import substitution due to the departure of Western software providers. According to experts, this issue has not affected only 27% of Russian companies.[7] Large domestic businesses have been consumers of expensive imported software for decades, and the transition to Russian technologies requires time and significant investment. As a result, companies are forced to engage in "firefighting" and implement new software in response to emerging problems. In the competitive HR Tech market, providers are eager to respond to any customer requests, resulting in the risk of transforming the HRM ecosystem into a "patchwork quilt" or a "zoo of software products.[8]" It is fair to note

[5] From small startups to ecosystems: the Russian HR Tech market is undergoing a transformation. HR Tech Market Overview. 2023. URL: https://www.cnews.ru/reviews/hr_tech_2023/articles/ot_malenkih_startapov_do_ekosistem (accessed on 16.07.2024).

[6] BYOD (Bring Your Own Device) — technologies that allow access to company resources from employee mobile devices.

[7] Employee digital workplace. Map of Russian IT products to replace Microsoft, Jira and Confluence. TADVISER. 2023. URL: https://clck.ru/3F84t7 (accessed on 16.07.2024).

[8] HR trends 2023. How the Russian HRM system replaced foreign analogues. 2023. TopFactor. URL: https://www.topfactor.pro/blog/hr-trendy-2023-kak-rossiyskaya-hrm-sistema-zamenila-zarubezhnye-analogi/?ysclid=m4424r9qzi702153353 (accessed on 16.07.2024).

that this "accumulation" of technical solutions is also observed in Western practices. For example, A. Jenkins, former CEO of Barclays Bank, referred to banks at this level of digitalization as "museums of technology", with a heap of "software" and "hardware.[9]"

This situation appears to be typical for technical or technocratic HRM ecosystems and corresponds to the initial level of digital maturity in HRM.

S. Strohmeier, in his fundamental research [17], identifies the following stages of digitalization in HRM:

- digitization — the technical process of converting analog HR information into digital format for automated processing;
- digitalization — the socio-technical process of using the potential of digitization for operational and strategic HR objectives;
- digital transformation — the socio-technical sub-process of digitalization, involving the application of digitization potential to achieve strategic HR goals;
- digital HRM — the socio-technical result of HR digitalization.

At the initial stage of digitalization (digitization), the priority is placed on technologies. This is why, when forming HRM ecosystems, there is currently a risk of "accumulation" of digital tools (often harmful to the human element). The main clients of these tools are HR professionals, who thus "strengthen" their traditional functions. The "harm" to the human element arises from the predominant focus on technology without considering the real needs of employees and managers, or their direct involvement in decision-making about the implementation of innovations.

[9] Banks are becoming "museums of technology" says ex-Barclays boss. Finextra. 2023. URL: https://www.finextra.com/newsarticle/42458/banks-are-becoming-museums-of-technology-says-ex-barclays-boss?utm_medium=dailynewsletter&utm_source=2023-6-13&member=117943 (accessed on 16.07.2024).

2. Transition to the Formation of a Human-Centered HRM Ecosystem

A logical alternative to technocratic HRM ecosystems is human-centered HRM ecosystems, corresponding to a higher socio-technical process of digitalization (in S. Strohmeier's terminology). Within this framework, the focus shifts from technology directly to the person — the employee or manager.

A positive development in this direction is the introduction of the concept of "digital employee experience" (DEX), which refers to the interaction of an employee with the company's digital tools and services from the moment of hiring until resignation [18]. This definition draws an analogy with customer experience (CX) — the perception of a company by a customer as a result of their interactions [19]. As is known, managing customer experience is one of the key tools of modern marketing. This experience is studied, among other ways, through the "customer journey map" (CJM), which sequentially describes and analyzes the customer's "path" to receiving a product or service. Shortening this path, "cutting corners," and providing convenient navigation create a positive impression from the interaction with the company, thereby increasing its competitiveness [20].

The application of a marketing (human-centered) approach to the "internal digitalization" process reveals several issues of "digital chaos" and helps address them. For instance, it becomes clear that from the employee/manager's perspective, work and HR processes are not separated into distinct streams, but rather merge into a unified flow, consolidated through the employee's digital workspace. In the case of a "zoo of solutions," such merging creates difficulties for the worker, causes dissatisfaction, increases the risk of mistakes, and ultimately reduces productivity. Progressive employers see their task as improving the effectiveness of the digital workspace and ensuring its comfort, but solving this issue is often still delegated to technology [21].

One solution to this situation is the development of fundamentally new digital platforms that integrate both production and HR functions, specifically —customer relationship management systems (CRMS) and human resource management systems (HRMS). Such solutions are possible based on cloud technologies, such as customer data platforms (CDP) or data management platforms (DMP[10]). The capabilities of these platforms allow for the addition of other systems within the organization, including HRMS. In the context of intense competition, particularly in the banking sector, such unique solutions are considered proprietary information. However, IT analysts confirm the practical experience of implementing integrated CRMS and HRMS.

It is known from open sources that large companies with powerful technological infrastructure and a staff of highly skilled IT specialists are developing their own in-house HRM platforms based on the analysis of employees' digital experiences.

A notable example in this case is Alfa-Bank, which faced the problem of fragmented IT infrastructure during the pandemic and created its own HR platform, "Alfa People.[11]" The task was addressed in the "digital workplace" concept and consisted of several stages: describing the employee/manager experience using the Employee Journey Map; analyzing 9 HR blocks from recruitment to termination (identifying 23 applications and 109 processes/programs); discussions with employees and compiling a registry of 200 "pain points/problems"; creating the Alfa People platform (an HR Tech product that combined 200 processes and 23 programs with a single entry point for employees and managers in two formats — adaptive web and mobile app); implementing new development logic — from the employee's workspace and from teams (for managers), rather than from HR process names, as it was in the previous services; forming the main sections of Alfa People based on the "self-service" principle (profile, news, events, services, departments, HR support [human help]); introducing the Voice of Employee (VOE[12]) metric to measure the usability of Alfa People (on a 5-point scale); and continuous improvement of the platform in the direction of further personalization based on VOE monitoring.

Earlier (in 2019), Sber carried out a similar, but more large-scale development by launching the digital HR platform "Pulse" [22]. The uniqueness of this solution lies in the fact that the bank initially offered it to participants in its business ecosystem, and in 2024, it launched an upgraded version of the platform as a commercial product (which incorporated GigaChat and Kandinsky neural networks). The number of users of "Pulse" is steadily increasing and currently exceeds 300,000 people. This fact is undoubtedly exceptional in a competitive environment and once again demonstrates Sber's leadership potential. However, there are grounds to believe that the translation of corporate technologies in HR into the "open code" principle, as an example, will evolve into a trend and further into practice, providing the company with a competitive edge in the market (similar to product competition).

In addition to the development and implementation of universal digital platforms, the evolution of HRM ecosystems is linked to artificial intelligence (AI). According to researchers, its use is not just a stage in the development of HRM ecosystems, as AI plays a direct role in their formation. As S. Raisch and S. Krakowski write, "people train algorithms, and algorithms train people" [23]. The authors refer to this phenomenon as co-evolution and see the further development of any phenomenon

[10] The future of the banking industry after 2023. PLAS 2023. URL: https://plusworld.ru/journal/2023/plus-9–2023/budushchee-bankovskoy-otrasli-posle-2023-goda/ (accessed on 07.07.2024).

[11] How we created a Digital Workplace for employees. Alfa Bank. 2022. URL: https://habr.com/ru/companies/alfa/articles/689700/ (accessed on 20.07.2024).

[12] Voice of Employee — translated from English.

involving AI as entirely in line with the principle of reciprocity. A number of scholars believe that, with regard to HRM ecosystems, it is precisely AI that will allow the transition from the "digitization" stage aimed at automating processes to the expansion of HRM ecosystem capabilities for solving business and people-related tasks (augmentation). The implementation of AI as an independent component creates a new model of ecosystems, which the authors call "extended HR ecosystems" [24]. This approach draws an analogy with the popular concept of super teams — "people plus digital technologies," the creation of which, in Deloitte's reviews, is considered a current trend in the formation of human capital.[13] In any case, the symbiosis of people and technologies requires primary attention to the people involved. Thus, when discussing an extended digital HR ecosystem with AI participation, researchers highlight the need to consider factors such as: close interaction between the company's top management — the CEO, the Chief HR Officer, and the Chief Digital Officer (CEO, CHRO, CDO); involving key employees, HR, and IT specialists in decision-making processes related to AI; an adaptive approach to different categories of personnel when implementing AI — in particular, taking into account the differences between young "digital natives" and older workers (digital immigrants); ethical issues of AI (employee information security, data privacy protection, the option to refuse to provide personal information or participate in assessment procedures using AI).

Nevertheless, when analyzing extended HRM ecosystems, specialists in the field tend to remain within the framework of the technocratic model and focus predominantly on the technological component. In this regard, attention is drawn to scientific works by authors who, while considering HRM ecosystems in the context of digitalization, focus on their humanitarian aspect.

For example, E.A. Mitrofanova and A.E. Mitrofanova [11] identify two components of the HRM ecosystem: 1) the personnel ecosystem — a collection of participants both within the organization and outside it; 2) the technological HRM ecosystem — a platform (marketplace) where various human resource management technologies are offered. These authors, studying the structure of the personnel ecosystem and the required skills ("hard," "soft," and digital), and the need for new approaches to managing integrated human resources (in particular, Agile technologies), rightly conclude that the "platform" should be adjusted to suit people, taking into account the scale of tasks in new socio-economic conditions and transformational processes in the labor market.

Nevertheless, by emphasizing the humanitarian component of HRM ecosystems (and even distinguishing it as independent), researchers see the goal of its formation as solely focused on managing the structure of personnel in the increasingly complex conditions of the gig economy.[14] A similar approach can be found in the publication by E.P. Kostenko [10], which discusses in detail the personnel ecosystem, which can include: full-time and part-time employees, contractors, freelancers, remote and gig workers engaged through mobile applications (usually in the fields of development, services, and delivery), crowdsourcing specialists with part-time/short-term employment using specialized virtual platforms/marketplaces, focused on various projects and individual tasks — as a new challenge for organizations.

However, it seems that this conclusion limits the opportunities and potential for the development of HRM ecosystems and does not fully align with their operational practices. For example, the banking sector is one of the leaders in applying the ecosystem approach to HRM,

[13] International trends in the field of personnel management — 2020 Deloitte Insights. 2020. URL: https://delovoymir.biz/res/upload/columns/Deloitte_HR-trends-2020_RU.pdf (accessed on 25.07.2024).

[14] The gig economy is a work model when a business does not hire employees, but attracts third-party specialists to carry out individual projects and tasks.

but banks, due to the nature of their activities, follow a very conservative hiring policy and do not engage freelancers or gig workers on a large scale.

Nevertheless, the application of the ecosystem concept to various aspects of human resource management ("labor market ecosystem," "talent ecosystem" [25], "recruitment ecosystem") is supported by both researchers and practitioners, which indicates the productivity of this approach to understanding current processes in the labor market.

Table

Distinctive features of technocratic and human-centric HRM ecosystems

Essential distinctive features	Technocratic HRM ecosystem	Human-centric HRM ecosystem
Goal	Digitization of HR information for process automation and optimization of HR procedures	Integration of key (unique) resources to ensure business competitiveness
Focus	Digital HR technologies	People + technology, with a focus on solving strategic business tasks and ensuring the well-being of people in business
Structure	Digital HRM platform + services	Stakeholders (managers, employees, HR specialists, external partners) + unified information environment based on digital technologies
Customer	Primarily HR specialists	Managers (business managers), employees, HR specialists, partner pool
Principle of Formation	HR functionality in accordance with the employee life cycle (from hiring to termination)	Creation of value for all participants of the HR ecosystem according to the employee/manager/partner journey map, integration of HR tools into main business processes
Advantages	Equipped with digital technologies, quick access to new HR tools and services, improved operational HR efficiency, cost reduction	Consideration of the real needs of employees/managers/partners, personalization of services, customization for functional tasks, creation of comfort (including digital) at the workplace, ability to ensure the necessary level of competence, productivity, effectiveness, and engagement in the interests of all participants of the HRM ecosystem
Disadvantages	Accumulation of HR tools due to a microservice approach ("patchwork quilt" of technical solutions) at the expense of the person (employee, manager, partner)	Complexity of implementation (time and effort costs) in conditions of a rigid hierarchical organizational culture, significant investments

Source: compiled by the authors.

3. The Transitional HRM Ecosystem as a Result of Combining Technocratic and Human-Centric Models

A review of existing perspectives on HRM ecosystems in the context of business digitalization highlights several key characteristics (see *Table*):

- HRM ecosystems develop within the framework of business ecosystem growth and therefore reflect many processes and phenomena characteristic of business ecosystems. These include the co-evolution of their entities (reflecting the biological metaphor), the evolutionary nature of ecosystems themselves (transitioning from an earlier technocratic form to a more advanced human-centric one), and the impact of digitalization as a transformative factor.
- An HRM ecosystem corresponds to an organization's level of digital maturity. Currently, digitalization is in the "digitization" phase, meaning the conversion of information from analog to digital format for automation purposes. At this initial stage, HRM ecosystems tend to be technocratic, focusing on technology and functionality, often harmful to human factors. Excessive enthusiasm for digital tools and microservice infrastructures has led to corporate IT landscapes becoming a "patchwork quilt" of digital solutions.
- However, the practices of leading employers — particularly in banking and fintech — indicate a shift toward a higher level of digitalization, understood as a socio-technical process. This transition involves the formation of human-centric HR ecosystems that emphasize workforce structure and skills, take employee needs and digital experience into account, introduce digital workplaces, manage the employee lifecycle, and address ethical issues related to digitalization.

As mentioned earlier, HRM ecosystems are currently at the very early stages of formation and are developing within the framework of individual models. However, the analysis conducted

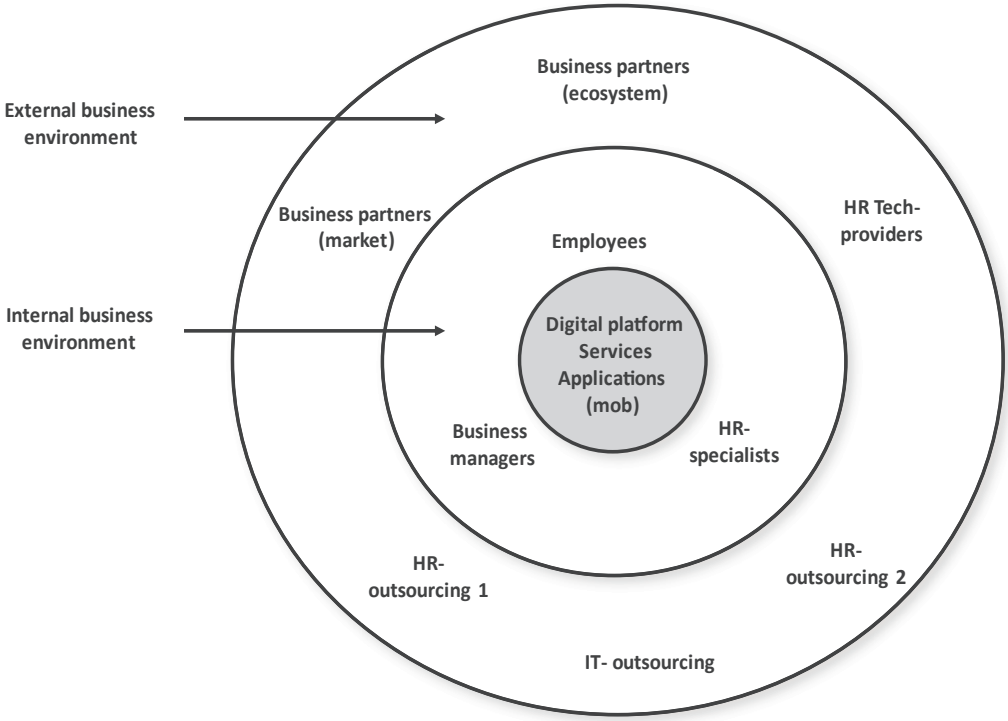

Fig. HRM **ecosystem in the context of digitalization**

Source: compiled by the authors.

allows us to present the HRM ecosystem in the form of a structural model of a transitional period, combining characteristics of both technocratic and human-centric ecosystems (see the *Figure*).

The goal of forming an HRM ecosystem is to integrate resources to ensure business competitiveness in the market. The HRM ecosystem includes two contours: internal and external. The first is the internal business environment (company, strategy, organizational culture, policies and procedures, business processes). The second represents the broader socio-economic, political, and industry contexts, as well as the labor market.

It is evident that such an ecosystem is formed under the influence of external circumstances. For instance, the negative geopolitical and socio-economic situation in recent years has triggered the need for import substitution and served as a catalyst for the rapid development of Russian fintech.

Regarding the internal environment, several global studies on digital maturity, including those by SAP, Deloitte, and iR&D Club, have noted that the hierarchical organizational culture prevalent in Russian companies is one of the main barriers to digital transformation [26]. Environmental factors and the effects of influence on the HRM ecosystem may become promising areas for further scientific research.

By analogy with the business ecosystem, it seems reasonable to talk about the HRM ecosystem in a broader sense, distinguishing two components: the humanitarian (people) and technological (digital technologies) aspects.

The internal component of the humanitarian aspect covers employees, managers (business managers), and human resources specialists (HR specialists). Currently, digital technologies meet the needs of these three subjects of the HRM ecosystem (with a clear predominance of HR specialists' requests). However, the further development of self-service and self-management tools for personnel, as well as the creation of new digital solutions (platforms) that allow the integration of management cycle functions (planning, organization, motivation, control) under the guidance of business managers into business processes, will lead to the reduction and subsequent transformation of the HR specialists' functions (in the HR Zero concept[15]) and an increase in the role of employees and managers in HRM processes [27].

The external component of the humanitarian aspect is formed in accordance with the business strategy of the company that owns the HRM ecosystem and, accordingly, contains an open list of participants. The minimum composition includes:

- HR function partners: recruitment, training, and consulting companies, agencies providing services (cleaning, catering), medical centers (health insurance), and other providers of health, safety, and employee well-being services (HR Outsourcing 1 on the *Figure*);
- IT and HR function partners — providers of digital HR Tech solutions.

The expansion of participants in the HRM ecosystem occurs in line with the growth of the business scale of the company-owner, the presence of its own business ecosystem, involvement in the ecosystem of another business, or moving beyond the perimeter of the business ecosystem. In the latter case, a characteristic example is Sber which made the users of its HR platform "Pulse" participants in its business ecosystem and clients, and launched the platform as a commercial product. Thus, the external component of the HRM ecosystem can also include:

- Business partners and clients of the company-owner (within the ecosystem);
- Business partners and clients outside the business ecosystem (market);

[15] HR Zero — This is the principle of organizing HR processes in a company, in which HR specialists, using digital technologies, transfer some of their functions to business managers and directly to employees.

• Organizations providing outsourcing services for personnel if the HRM ecosystem owner actively engages freelancers and other gig workers (HR Outsourcing 2 on the *figure*);

• IT companies (mainly startups), whose personnel participate in the independent or joint development of IT solutions for the company-owners within business incubators or aggregators (IT outsourcing).

Similar to business ecosystems, HRM ecosystems can be open, closed, or hybrid in nature. Given their early stage of development, the issue of typology is not addressed in this article. However, it can be assumed that HRM ecosystem models will primarily develop according to a hybrid type, combining both closed and open segments. The former will focus on integrating targeted (unique) resources that the company — owner of the business ecosystem — deems important in a competitive environment (e.g., a partner pool). The open segment, on the other hand, could involve personnel recruitment. Due to the acute shortage of labor in the job market, many companies use publicly available recruiting platforms, job boards,[16] services, and chatbots, which facilitate a broad hiring funnel (any applicant can enter the system, submit their resume, and, if selected, undergo the full recruitment process). The classification of HRM ecosystem models as they evolve could be an interesting area for further research.

The technological component of the HRM ecosystem (digital platform(s), services, applications, including mobile) ensures its operation according to the defined parameters and models. As digital technologies improve, the microservices architecture of HRM will be integrated into a unified digital environment (based on a single high-tech platform that integrates business processes and HRM) following the "open-source" principle, with seamless access to necessary resources for various categories of users — from company employees to potential clients and partners.

CONCLUSION

The research conducted in line with the set objective and the obtained results allow for several conclusions that define the scientific novelty of this work:

• Based on the existing understanding of the digitalization process, technocratic and human-centric HRM ecosystems have been identified, which correspond to different stages of digital evolution: the former corresponds to the initial (technical) stage, while the latter aligns with the subsequent (sociotechnical) stage.

• Distinctive characteristics of technocratic and human-centric HRM ecosystems have been defined. The technocratic ecosystem is characterized by a focus on technology; the primary customer is HR; it involves the digitization of numerous HR functions within hierarchical organizational structures of large companies (resulting in accumulation / a "patchwork" of digital solutions). The human-centric ecosystem focuses on people; it is distinguished by digital comfort; and all stakeholders in the ecosystem are considered customers.

• The authors' definition and structural model of the HRM ecosystem of the transitional period have been proposed, including the humanitarian (people) and technological (digital technologies) components. These elements are observed in the practices of advanced employers (such as accounting for digital employee experience, adjusting digital technologies according to the "employee roadmap," etc.).

• Possible directions for the development of the HRM ecosystem have been outlined, with the focus being the creation of a unified and comfortable information environment for all ecosystem participants, aimed at the joint creation of value and improving the business's competitiveness in the market.

• As the ecosystem approach evolves, different HRM ecosystem models (open, closed, and

[16] A job board is a type of career site on which employers post vacancies and applicants post resumes.

hybrid) may arise according to the competitive business strategy in the market, which could be the subject of future research.

The analysis, considering the fragmented scientific and methodological base on HRM ecosystems, leaves a wide field for further research. For instance, topics related to the external environmental factors influencing the formation of HRM ecosystems, practices of interaction among their participants (including necessary competencies), as well as the possibilities and limitations of HRM ecosystems' functionality, comprising systemic risks, can be of undeniable interest.

REFERENCES

1. Kobylko A.A. Prospects of developing business ecosystems: Competition, cooperation, specialization. *Russian Journal of Economics and Law*. 2022;16(4):728–744. (In Russ.). DOI: 10.21202/2782–2923.2022.4.728–744
2. Kulapov M.N., Pereverzeva E.I., Kirillova O.Y. Business ecosystems: Definitions, typologies, development practices. *Voprosy innovatsionnoi ekonomiki = Russian Journal of Innovation Economics*. 2022;12(3):1597–1612. (In Russ.). DOI: 10.18334/vinec.12.3.115234
3. Statsenko V.V., Bychkova I.I. Ecosystem approach in building modern business models. *Industrial'naya ekonomika = Industrial Economics*. 2021;(1):45–61. (In Russ.). DOI: 10.475776/2712–7559_2021_1_45
4. Ulrich D., Yeung A. Reinventing the organization: How companies can deliver radically greater value in fast-changing markets. Boston, MA: Harvard Business Review Press; 2019. 336 p. (Russ. ed.: Ulrich D., Yeung A. Novaya model' organizatsii: kak postroit' bolee sil'nuyu i gibkuyu organizatsiyu. Moscow: Bombora; 2022. 304 p.).
5. Jacobides M.G., Cennamo C., Gawer A. Towards a theory of ecosystems. *Strategic Management Journal*. 2018;39(8):2255–2276. DOI: 10.1002/smj.2904
6. Moore J.F. The death of competition: Leadership and strategy in the age of business ecosystems. New York, NY: Harper Business; 1997. 315 p.
7. Dietz M., Khan H., Rab I. How do companies create value from digital ecosystems? Washington, DC: McKinsey & Company; 2020. 9 p. URL: https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Digital/Our%20Insights/How%20do%20companies%20create%20value%20from%20digital%20ecosystems/How-do-companies-create-value-from-digital-ecosystems-vF.pdf (accessed on 07.07.2024).
8. Kleiner G.B. Industrial ecosystems: Foresight. *Ekonomicheskoe vozrozhdenie Rossii = Economic Revival of Russia*. 2018;(2):53–62. (In Russ.).
9. Porter M.E. Competitive advantage: Creating and sustaining superior performance. New York, NY: The Free Press; 1998. 592 p. (Russ. ed.: Porter M. Konkurentnoe preimushchestvo: Kak dostich' vysokogo rezul'tata i obespechit' ego ustoychivost'. Moscow: Alpina Business Books; 2005. 715 p.).
10. Kostenko E.P. Transformation of personnel management mechanism in conditions of formation of new technological layout. *Gosudarstvennoe i munitsipal'noe upravlenie. Uchenye zapiski = State and Municipal Management. Scholar Notes*. 2020;(2):58–69. (In Russ.). DOI: 10.22394/2079–1690–2020–1–2–58–69
11. Mitrofanova E.A., Mitrofanova A.E. Ecosystem approach for the human resource management transformation. *Liderstvo i menedzhment = Leadership and Management*. 2022;9(1):201–218. (In Russ.). DOI: 10.18334/lim.9.1.114296
12. Krylov A. How HR ecosystems work, and why big business needs them. 2021. URL: https://strategyjournal.ru/innovatsii/kak-rabotayut-hr-ekosistemy-i-zachem-oni-krupnomu-biznesu/ (accessed on 15.07.2024). (In Russ.).
13. Harman R. An overview of the developing digital HR ecosystem. Engadget. Jul. 07, 2016. URL: https://www.engadget.com/2016–07–06-an-overview-of-the-developing-digital-hr-ecosystem.html (accessed on 16.07.2024).
14. Biglova A.A. HR-DIGITAL: Digital technologies in personnel management. *Ekonomicheskie issledovaniya i razrabotki = Economic Development Research Journal*. 2021;(11):67–72. (In Russ.). DOI: 10.54092/25420208_2021_11_67

15. Ilyukhina L.A., Bogatyreva I.V. The concept of personnel management amidst digital transformation. *Kreativnaya ekonomika = Journal of Creative Economy*. 2022;16(6):2445–2462. (In Russ.). DOI: 10.18334/ce.16.6.114810
16. Olenev D.A. Digitalization of HR technologies: An overview of Internet sources. In: Digital transformation of society, economy, management and education. Proc. 1st Int. conf. on digitalization (DCEME-2018). (Ekaterinburg, December 14–15, 2018). Sedlčany: Ústav personalistiky; 2018:68–75. URL: https://elar.urfu.ru/bitstream/10995/98224/1/978–80–88327–00–4_012.pdf (In Russ.).
17. Strohmeier S. Digital human resource management: A conceptual clarification. *German Journal of Human Resource Management*. 2020;34(3):345–365. DOI: 10.1177/2397002220921131
18. Boatman A. Digital employee experience: A definitive guide for 2025. Academy to Innovate HR (AIHR). URL: https://www.aihr.com/blog/digital-employee-experience/#:~: text=What%20is%20digital%20employee%20experience%3F, be%20engaged%2C%20proficient%2C%20and%20productive (accessed on 20.07.2024).
19. Pryadokhina I.V., Prishchenko E.A. Methodological approach to managing customer experience in the IT services market. *Mir ekonomiki i upravleniya = World of Economics and Management*. 2023;23(1):95–108. (In Russ.). DOI: 10.25205/2542–0429–2023–23–1–95–108
20. Kutsulym D.V., Zhrebets E.V. Customer experience management in the BIG DATA era. *Forum molodykh uchenykh*. 2020;(10):303–310. URL: https://cyberleninka.ru/article/n/upravlenie-klientskim-opytom-v-epohu-big-data (accessed on 19.07.2024). (In Russ.).
21. Vinogradova E. Without officialdom. Forbes. Nov. 19, 2021. URL: https://www.forbes.ru/partner-article/445399-bez-oficioza (accessed on 25.07.2024). (In Russ.).
22. Vasilyeva E.V., Gromova A.A., Moiseeva A.P. Technological ecosystem of the modern office, digital workspace: Pros and cons. *Innovatsii i investitsii = Innovation & Investment.* 2023;(6):83–86. URL: https://cyberleninka.ru/article/n/tehnologicheskaya-ekosistema-sovremennogo-ofisa-tsifrovoe-rabochee-prostranstvo-za-i-protiv (accessed on 20.07.2024). (In Russ.).
23. Raisch S., Krakowski S. Artificial intelligence and management: The automation-augmentation paradox. *Academy of Management Review*. 2021;46(1):192–210. DOI: 10.5465/amr.2018.0072
24. Singh A., Pandey J. Artificial intelligence adoption in extended HR ecosystems: Enablers and barriers. An abductive case research. *Frontiers in Psychology*. 2024;14;1339782. DOI: 10.3389/fpsyg.2023.1339782
25. Vittenbeck N.V. Talent management of foreign trade companies amidst of digital transformation: A new context or a paradigm shift. *Liderstvo i menedzhment = Leadership and Management*. 2023;10(4):1337–1352. (In Russ.). DOI: 10.18334/lim.10.4.119145
26. Borisov I. Digital maturity of Russian companies requires development. *Ekonomika i zhizn'*. 2021;(17–18). URL: https://www.eg-online.ru/article/436133/ (accessed on 30.07.2024). (In Russ.).
27. Kalinovskaya I.I. Analysis of the possibility of applying the HR ZERO concept by Belarusian organizations. *Vestnik Vitebskogo gosudarstvennogo tekhnologicheskogo universiteta = Vestnik of Vitebsk State Technological University*. 2022;(1):155–169. (In Russ.). DOI: 10.24412/2079–7958–2022–1–155–169

ABOUT THE AUTHORS

Dmitry S. Salin — postgraduate student of the Department of Management and Marketing, Russian Foreign Trade Academy of the Ministry for economic development of the Russian Federation, Moscow, Russia
Corresponding author:
ds000777@mail.ru

Natalya V. Vittenbeck — Cand. sci. (Psychology), Assoc.Prof., Assoc. Prof. of the Department of Management and Marketing, Russian Foreign Trade Academy of the Ministry for economic development the Russian Federation, Moscow, Russia
SPIN-код 6906–7536
vitte@mail.ru

Conflicts of Interest Statement: The authors have no conflicts of interest to declare.

Article was submitted on 27.09.2024; revised on 28.10.2024 and accepted for publication on 09.12.2024. The authors read and approved the final version of the manuscript.