

The Digitalization of Human Resource Management: Present and Future

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Abstract

Information technologies are rapidly transforming the field of human resource management at organizations. The digital transformation of human resource management has become specifically important in the context of the COVID-19 pandemic, which has significantly accelerated the pace of digitalization of HR processes. Companies that are able to quickly take advantage of the opportunities of the implemented digital HRM technologies are in a better position than those in which digitalization was paid less attention. At the same time, the factors and consequences of the digitalization of human resource management, as well as its relationship

with various characteristics of firms, remain unclear today. This article provides an attempt to shed light on the key components of HRM digitalization analyzed against significant characteristics of organizations (size, personnel structure, staff turnover, performance) using the data of 449 small, medium, and large businesses operating on the Russian market. The collected data indicate the presence of two key components of digitalization: quantitative (reach or breadth) and qualitative (effectiveness of digital practices). We found that the combination of wide reach and high efficiency has not always been a sign of more successful and functional companies.

Keywords: human resource management; information technology; digitalization; digital transformation; electronic human resource management; Russia

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Introduction

The digital revolution, which in recent years has been taking place in many business organization areas has not bypassed the human resource management (HRM) sphere either, which was reflected in the application of new technologies in personnel management, the change of relevant arrangements, and redistribution of functions (Ulrich, Dulebohn, 2015). Digital technologies are transforming conventional HRM processes, the structure and functions of HR departments, the activities of relevant staff members, and, ultimately, the entire human capital-based value chain. Though the general dynamics of these processes has been described in the literature in sufficient detail, considerable disagreement remains regarding the specific forms it takes in corporate practices (Ulrich, Dulebohn, 2015; Bondarouk, Brewster, 2016; Kehoe, Collins, 2017; Huselid, Minbaeva, 2018). The correlation between applying particular management techniques and the organization's performance has not yet been proven (Bondarouk et al., 2016)¹, which results in subjectivism, bias, and the unjustified replication of decisions and reforms.

An additional challenge in the theoretical understanding of the ongoing developments is the fact that almost all modern HRM approaches were developed in a predictable environment, which makes them unsuitable for a volatile situation (Parry, Strohmeier, 2014; Stone et al., 2015). The coronavirus pandemic and the resulting economic crisis have increased the importance of HRM digitalization. Digital technologies have become the universal answer to emerging challenges. Companies capable of quickly mastering new tools gain a comparative advantage over more conservative competitors. The effectiveness of digital HRM technologies is associated with their suitability for flexible and remote employment formats, but a practical assessment of this relationship has yet to be made.

Key aspects of HRM digitalization such as coverage and performance are approached in this paper in terms of more important company characteristics including size, staff structure and turnover, and productivity. The empirical basis of the study was provided by the survey of 449 small, medium, and large companies operating on the Russian market. The survey was conducted in November–December 2019, so it reflects the pre-crisis situation.

Digitalization of Human Resource Management: Research by Academic Organizations and Consulting Companies

Digitalization as a key aspect of a digital economy based on the use of data essentially amounts to the application of digital (information and communication (ICT) and computer) technologies to

significantly improve business performance indicators such as labor productivity and customer service, optimize operations, or develop new business models (Lepak, Snell, 1998; Vial, 2019; Fitzgerald et al., 2014). A number of this process's features (multidimensional in their structure and effects) were identified by analyzing a large array of sources (Strohmeier, 2020), in particular converting analogue organizational information into a digital format for subsequent automated processing. This socio-technological approach aims to unlock a company's digital potential to accomplish operational objectives and/or strategic goals.

Four types of organizations can be distinguished depending on the degree of their strategy and operational digitalization (Strohmeier, 2020). Those of the first (analogue) type do not digitize either strategic or routine activities. In the second case (digital organization type I, operational application) digitalization is applied exclusively to manage operational processes in order to increase their speed, improve quality, and reduce costs. The third type (digital organization type II, or strategic alignment) implies aligning technological capabilities with the organization's strategic goals; digitalization is applied to all business operations and some of the strategy. Organizations of the last type (digital organization type III, strategic integration) directly integrate technology into the strategy development process, while their digital potential is used to find new business development areas (Strohmeier, 2009, 2020).

The electronic HRM (e-HRM) concept was initially applied to describe the digitalization processes in the area under consideration, which includes various approaches to integrating personnel management mechanisms and ICT for target groups of line and administrative workers, to create value at individual organizations and between them (Bondarouk, Ruel, 2009). Electronic HRM is an effective tool for performing relevant corporate functions via the internet (Parry, Tyson, 2011). The rapid evolution of artificial intelligence and robotics has profoundly transformed approaches to electronic HRM; its next development stage involved the adoption of the digital HRM concept, which was first theoretically and empirically described in 2020. For the purposes of this paper, the terms "electronic" and "digital" HRM are used interchangeably.

Most of the existing studies describe digital HRM as a one-dimensional process or corporate practice (see, e.g., (Parry, Tyson, 2011)). As a result, in quantitative studies it is seen as a generalized characteristic of digital technologies' application for personnel management purposes. However, a more comprehensive analysis requires distinguishing between at least two digital HRM dimensions: coverage (or "breadth") and effectiveness. Breadth

is measured as a numerical coefficient of digital HRM application (Parry, 2011). Thus, a company that applies digital technologies to manage a significant part of HR-related processes including recruiting, training and development, motivation, career advancement, and so on will have a wider digital HRM breadth, regardless of these technologies' actual contribution to managerial performance.

Digital HRM effectiveness is a qualitative characteristic of digitalization measuring the integration of digital practices into the company's core activities, their application to perform routine tasks, and the "strength" of digital tools (Bowen, Ostroff, 2004; Bondarouk et al., 2015). For example, a company may digitize a single aspect of personnel management and still receive significant "rent" from the adoption of the relevant technology.

If Russian businesses started to digitize HRM only relatively recently (so this phenomena still has more quantitative (breadth) than qualitative (effectiveness) characteristics), many other countries have accumulated much more extensive experience. This allows researchers of HRM transformation to not resort solely to specific case studies in their analysis, but to compare large amounts of data accumulated over several decades. Vossen, Sorgner (2019) note both the destructive (replacing human workers with machines) and transformative (increased productivity) effects of digitalization on the labor market.

Two main research areas can be identified in digital HRM studies. The first is related to the actual application of digital technologies in personnel management, while the second is concerned with the transformation of relevant corporate strategies and practices. In the first case, the object of study is the digitalization process as such, and in the second - digital technologies as a means of transforming the HRM functions in a dynamic environment.

In the scope of the first area the features of digital technologies' penetration into companies' HRM practices are analyzed, in particular their contribution to reducing personnel management costs and improving its efficiency (Bondarouk et al., 2015). Although certain authors note the positive effects of HRM digitalization, its productive impact on company performance still is not believed to be conclusively proven (Bondarouk et al., 2016). The actual issue under consideration is poorly conceptualized, which is evident in the different approaches to studying it and inconsistent assessments of the results. The aspects which have not

yet received due attention include the factors and consequences of applying digital HRM.

According to the authors who follow the second approach, taking into account the strategic aspects of personnel management in meeting present-day socio-economic challenges allows one to assess the role of digital practices in companies' operations. The relevant departments need to think strategically, be agile, efficient, and customer-focused all at the same time, while providing a full range of services. Digital technologies have sufficient potential to achieve this goal and improve HRM; digitizing the latter area can help accomplish various operational, relational, and transformational corporate objectives (Lepak, Snell, 1998). At the operational level, routine activities can be automated (with less added value), such as document management, recruitment, and administration of remuneration systems. At the relational level, internal and external communications take place, ensuring the speed and quality of service for employees and customers alike (Brockbank, 1997). At the transformational level, strategic coordination and integration of specific HRM practices and initiatives is carried out on a corporate scale and in specific divisions. Factors related to the perception of new decisions by staff play a key role in implementing digital technologies at all levels; they can be broken down into those concerning the quality and usefulness of the changes being made (Kohansal et al., 2016).

HRM digitalization issues also attract the attention of consulting and analytical companies. For example, a PwC report mentions it among the priority aspects of Industry 4.0, while a low level of digital culture and lack of adequately skilled personnel are named as the main barriers hindering its implementation at companies.² The role of personnel and the importance of developing adequate strategies for successful digitalization are also noted in the report by McKinsey experts.³ Deloitte's annual Human Capital Trends review highlights the most important trends in corporate HRM across countries. Digitalization remained a key personnel management trend for many years. In 2017, the authors of the aforementioned study noted that the function under consideration should not only digitize itself but also contribute to the digitalization of other areas, so that the digital transformation of an organization begins precisely with HRM.⁴ The review also described the content of HRM digitalization: the adoption of relevant ICT tools and specialized applications, their automation, and the introduction of data-driven decision-making.

¹ See also: <https://www.vedomosti.ru/management/articles/2020/12/15/851115-sovershenni-protsessi>, accessed on 19.03.2021.

² https://www.pwc.ru/ru/technology/assets/global_industry-2016_rus.pdf, accessed on 19.03.2021.

³ <https://www.mckinsey.com/business-functions/organization/our-insights/the-people-power-of-transformations>, accessed on 19.03.2021.

⁴ <https://www2.deloitte.com/us/en/insights/focus/human-capital-trends/2017/digital-transformation-in-hr.html>, accessed on 19.03.2021.

If consulting companies' studies conducted in 2016–2017 describe digitalization as a priority in itself, in the reviews published in 2018–2019, it was viewed as a tool for achieving goals of a more strategic nature created by the changing socioeconomic environment. A joint SAP and Deloitte report⁵ based on Russian material shows that companies with more than 10,000 employees achieved the best results in the area under consideration. They are the ones who have demand for and the ability to introduce relevant practices. Meanwhile most of small (up to 100 employees) organizations believe they can do without introducing formal HRM practices and automating them. Companies were broken down into four groups: (1) those adopting the traditional “manual” approach (paper-based HRM), (2) partial automation, (3) mature automation, and (4) intelligent HRM.

According to experts, Russian companies' digitalization is at a somewhat lower level than that of its foreign counterparts, corresponding to the fragmented automation stage. A quarter of domestic organizations belong to the “paper-based HRM” group with only 9% can be considered to have reached mature automation and none included in the “intelligent HRM” group. Digitalization levels significantly vary across sectors of the Russian economy. For example, the financial and banking sector, metallurgy and mining, IT and telecommunications are the leaders in applying best international practices in the field. Retail, pharmaceutical, consumer products (FMCG), and media companies (including online ones) also tend to show high HRM digitalization rates. The “partial HRM automation and digitalization” (“catching up”) group includes oil and gas production, knowledge-intensive business services (KIBS), manufacturing, and logistics companies.

The results of open-access analytical reports generally match the conclusions of academic studies about the high importance of the transformations taking place in the HRM sphere. Having completed a number of initial stages, Russian businesses' digitalization is advancing toward numerous new areas. Against this background, identifying the key characteristics of companies involved in the above-mentioned processes becomes a relevant objective.

Methodology

A series of structured telephone interviews with heads of HR departments, senior executives, and personnel managers at organizations operating in large cities was conducted to collect information about the current digitalization level of Russian companies (Table 1).

A random sample of companies from the Amadeus Bureau Van Dijk database was built using such primary criteria as having more than 50 employees and operating in Russian cities with a population of more than 800,000. The randomization allowed for building a sample similar to the general population of Russian companies in terms of key characteristics including age, size, and industry affiliation. The final sample comprised 449 companies from 16 industries (Table 2).

The goal of the study was to compare companies with differing breadth and effectiveness of the digital HRM tools they apply. To measure the first parameter, the respondents were asked to assess the use of such tools by their company on 15 Likert scales from 1 (not used at all) to 7 (actively used). The scales included the following sections: the publication of HRM information online, availability of intranet services, use of online tools for recruitment, training and development, motivation, and assessment purposes, and for the development of an HR brand (e.g., “Staff training is conducted using e-learning tools”). The effectiveness of HRM digitalization was assessed in a similar way using 25 scales measuring the following characteristics: correctness, quality, frequency, reliability and flexibility of ICT solutions, their integration into actual management practices, user and stakeholder satisfaction, the impact of ICT on accomplishing company goals, HR department objectives and staff involvement (e.g., “Digital HRM tools are reliable (available, and work without fail”). Factor analysis confirmed the robustness of both indicators (AVE > 0.5, CR > 0.8, Cronbach's alpha > 0.8).

Information from the Bureau van Dijk database was also used over the course of the analysis (number of employees in 2019, capitalization (in euros), growth in the number of company employees over three years, return on assets (ROA), return on capital employed (ROCE)), along with data collected via the questionnaire (staff structure by age and employment type, personnel turnover, use of ana-

Table 1. Distribution of companies by city

City	Number of companies in sample
Kazan	38
Moscow	139
Nizhny Novgorod	8
Perm	44
Samara	41
St. Petersburg	135
Ufa	42
<i>Sources:</i> authors.	

⁵ http://obzory.hr-media.ru/cifrovaya_transformaciya_hr_russia, accessed on 19.03.2021.

Table 2. Distribution of companies by industry

Industry	Number of companies in sample
Manufacturing	145
Knowledge-intensive business services, R&D	71
Wholesale and retail trade; motor vehicles and motorcycles repair	51
Construction	49
Transport and storage	27
Information and communication	22
Real estate	16
Electricity, gas and steam supply; air conditioning; water supply; sewage, collection and disposal of waste, pollution management	16
Administration activities and related services	14
Hospitality and catering	10
Mining	8
Finance and insurance	7
Healthcare	5
Education	3
Sports, recreation, entertainment	2
Repair of computers, personal and household items	1
<i>Source:</i> authors.	

logue HRM practices). Analogue practices were measured using a popular model which distinguishes between three interrelated HRM practices: ability, motivation, and opportunity (AMO (Gardner et al., 2011; Appelbaum et al., 2000)). For example, ability is related to training and recruiting practices, motivation to compensation and evaluation, and opportunity to involvement and feedback. Relevant practices were assessed using a Likert scale from 1 (none) to 7 (widely used).

Results

The companies were broken down into clusters by the median values of breadth (3.5) and effectiveness (4.5) of their HRM digitalization. Four clusters were obtained altogether (Fig. 1)

The first cluster comprises companies that have achieved a high effectiveness and wide breadth of HRM digitalization. The second is made up of highly effective companies with a more modest coverage, i.e., those applying a limited number of technologies only to cover certain HRM processes, but with impressive results. The third cluster comprises companies with wide breadth, but low effectiveness of digital HRM practices. Here many processes are performed using digital tools, but not effectively enough. Finally, the fourth cluster is made up by organizations whose HRM practices are poorly and inefficiently covered by digital tools.

Industry analysis shows that the “high effectiveness, wide breadth” cluster has the largest share of KIBS companies, while the largest share of manufacturing, construction, and mining firms occupy the cluster representing companies with the lowest HRM digitalization level.

Further analysis was carried out in several stages. Key parameters describing the size of the four clusters’ companies were analyzed first. At the second stage, their staff structure by age and employment type, and the level of personnel turnover was considered. The third stage comprised the analysis of conventional (analogue) HRM practices including those aimed at skill development, strengthening motivation, and extending professional opportunities. At the fourth and final stage, the performance of companies with different kinds of HRM digitalization was evaluated.

Company Size

Table 4 presents data on key company size parameters (number of staff and capitalization) for all four clusters. The third cluster (low effectiveness, broad coverage) comprises the smallest organizations, while the fourth one (low effectiveness, narrow coverage) includes those with the largest number of employees. The first cluster (high effectiveness, broad coverage) has companies with largest amount of total assets. Large standard deviations (dispersion) in the number of employees and the amount of assets between the first and fourth cluster companies may indicate their high internal heterogeneity.

Table 3. Industry affiliation of companies with varying degree of HRM digitisation

Indicator	Cluster			
	1	2	3	4
Manufacturing, construction, mining: number of companies (% of total)	83 (19%)	21 (5%)	16 (4%)	98 (22%)
KIBS: number of companies (% of total)	73 (16%)	12 (3%)	13 (3%)	53 (12%)
Trade and transport: number of companies (% of total)	31 (7%)	4 (1%)	9 (2%)	34 (8%)
Note for tables 3-7: cluster 1 - high effectiveness, broad coverage; cluster 2 - high effectiveness, narrow coverage; cluster 3 — low effectiveness, broad coverage; cluster 4 - low effectiveness, narrow coverage..				
<i>Source:</i> authors.				

Table 4. Descriptive company size statistics

Indicator	Cluster			
	1	2	3	4
Number of staff, persons (average)	321.50	362.11	276.71	393.24
Number of staff, persons (standard deviation)	506.94	499.99	499.16	688.25
Company type by size (number of companies)	Large (≥250)	58	17	7
	Medium (100–250)	68	11	12
	Small (50–100)	61	9	19
Capitalisation, euros (average)	24167.59	17076.42	12753.17	21264.72
Capitalisation, euros (standard deviation)	66251.77	27658.61	23406.06	52691.58

Source: authors.

The obtained data reveals a correlation between company size and HRM digitalization type. Moreover, this correlation seems to be non-linear and affected by other factors.

Staff Structure and Turnover

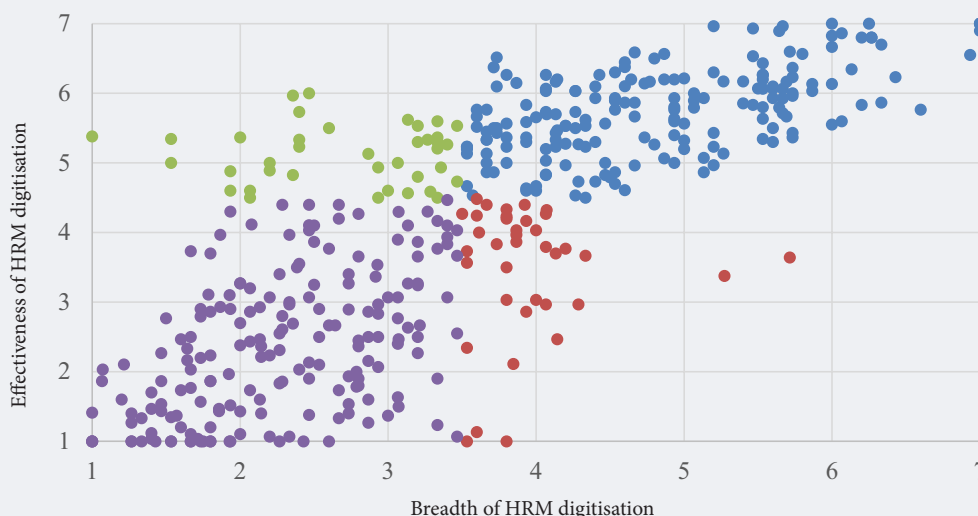
Table 5 describes the staff structure and turnover in the four company clusters. The first cluster (high effectiveness, broad coverage) stands out by age structure, with the largest share of employees under 25 and the smallest share of those aged 55 and older. Companies in the other three clusters have similar age structures, with the highest shares of employees aged 26-30 and 41-54. Companies in the third and fourth clusters (low effectiveness of HRM digitalization) have the largest share of employees aged 55 and older. These results give grounds to assume a negative correlation between the effectiveness of HRM digitalization (regardless of its breadth) and the average employee age.

The first cluster (high effectiveness, broad coverage) is also significantly different, in terms of the employment type structure: these companies tend to use unconventional employment formats more often (about 19% of such employees in total). Companies in the third cluster (low effectiveness, broad coverage) have a relatively high share of WFH and part-time employees.

The first cluster companies show the highest overall staff turnover rate (at employee initiative and for other reasons). Organizations with advanced digital HRM infrastructure have a large amount of data and various mechanisms for dismissing employees at their disposal, which leads to a higher labor mobility. The lowest turnover rate for reasons beyond employee control is demonstrated by the third cluster companies (low effectiveness, broad coverage).

Table 6 presents averaged-out indicator values for the use of various conventional (analogue) HRM

Figure 1. Clustering companies by breadth and effectiveness of HRM digitisation



Note: colours indicate companies' affiliation with HRM digitisation clusters.
Source: authors.

Table 5. Descriptive staff structure and turnover statistics

Indicator		Cluster			
		1	2	3	4
Average number of employees, persons		321.50	362.11	276.71	393.24
Staff structure by age groups, %	25 and younger	17.83	11.73	10.80	9.82
	26-40	40.92	38.70	45.79	40.14
	41-54	29.24	36.97	31.58	34.39
	55 and older	15.06	15.28	19.03	19.33
Staff structure by employment type, %	Remote employment	11.07	1.67	4.44	2.92
	Part-time employment	11.20	3.91	5	4.43
	Freelance	8.65	0	0	1.42
	Full-time employment	80.80	96.62	97.89	95.30
Staff turnover	Employee initiative	5.51	6.47	5.59	4.76
	Other reasons	4.19	2.46	1.00	2.53

Source: authors.

practices such as skills development, motivation, and opportunity. The first cluster companies (high effectiveness, broad coverage) most actively apply all three types of practices. A relatively high use of opportunity enhancement practices (5.2) singles out the third cluster (low effectiveness, broad coverage). These practices are least common in companies with low effectiveness and narrow coverage of HRM digitalization.

Thus, digital tools do not replace, but rather complement analogue HRM practices.

Company Performance

Table 7 summarizes various company performance indicators: growth over the last three years, ROA, and ROCE. We can see that the allegedly beneficial effect of applying digital HRM tools noted in numerous studies is not confirmed empirically. Companies in the fourth cluster (low effectiveness, narrow coverage) turned out to be the highest performers in the sample. This can be explained by their heterogeneity (evident in the high standard deviation values) due to many players' long presence on the market, which ensured their competitiveness without the use of digital tools. Another possible explanation is the generally low level of

digital HRM development in Russia. Companies committed to its implementation are looking for new sources of competitiveness, for ways to convert technology into business results. Companies in the first cluster have achieved relative success in this regard, in terms of growth and profitability alike.

“Half-way” HRM digitalization strategies turned out to be the least effective in terms of performance. The second (high effectiveness, narrow coverage) and third (low effectiveness, broad coverage) clusters demonstrate similarly low growth and profitability rates.

Conclusion and Discussion of Results

Our study of HRM digitalization at 449 small, medium, and large businesses in 16 sectors of the Russian economy was based on existing academic studies and reports published by leading consulting companies (Deloitte, PwC, McKinsey) in the area under consideration. In contrast to the prevailing approach in the literature, a comprehensive view of HRM digitalization is proposed, using at least two characteristics to describe it: quantitative (breadth) and qualitative (effectiveness). The breadth of HRM digitalization measures the application of digital technologies in HRM, i.e., digital HRM as such, while effectiveness reflects the level of digital practices' integration into actual HRM, i.e., how easy such practices are to apply to accomplish operational objectives.

Using these characteristics on the one hand allows one to take a fresh look at the uneven HRM digitalization process, by expanding its coverage or, conversely, by focusing on a particular aspect. On the other hand, this approach helps to more clearly operationalize HRM digitalization taking into account not its “overall level” but specific meaningful parameters.

Table 6. Descriptive HRM practices statistics

Indicator (average value)	Cluster			
	1	2	3	4
Use of skill development practices	5.43	4.55	4.22	3.63
Use of motivation strengthening practices	5.54	4.42	3.99	3.77
Use of opportunity enhancement practices	5.76	4.45	5.20	4.07

Source: authors.

Table 7. Descriptive company performance statistics

Indicator	Cluster			
	1	2	3	4
Company growth over 3 years (average)	3.06	0.64	0.90	4.48
Company growth over 3 years (standard deviation)	11.53	1.85	2.24	24.52
ROA (operational revenue/total assets) (average)	2.21	2.15	2.09	5.93
ROA (operational revenue/total assets) (standard deviation)	3.13	1.94	1.79	53.10
ROCE (average)	40.61	31.10	37.63	48.18
ROCE (standard deviation)	102.21	43.68	34.68	86.89

Source: authors.

The collected empirical data confirms the existence of two HRM digitalization modes, on the basis of which the companies in the sample can be broken down into four clusters characterised by (1) high effectiveness of digital HRM practices and broad coverage of relevant processes' digitalization, (2) high effectiveness of such practices but narrow coverage of digitalization, (3) low effectiveness of digital practices but broad coverage of digitalization, and (4) low effectiveness and narrow coverage of digital HRM practices. In addition to existing studies of the relationship between HRM digitalization and various company characteristics (see, e.g., (Bondarouk et al., 2016)), the analysis of these clusters revealed patterns and features specific to companies with different levels of HRM digitalization.

The findings suggest that companies more successful in digitalization have greater flexibility in managing their workforce structure: they more often use unconventional employment formats and on average tend to have younger staff. This is facilitated by the use of ICT tools to strengthen the HR brand, which increases job seekers' interest in vacancies. Companies with broader and more effective HRM digitalization also demonstrate higher levels of employee turnover, including at the employer's initiative, which may reflect not so much the shortcomings of HR management as its flexibility and dynamism (Siebert, Zubanov, 2009). These findings add to the controversy of previous evidence that digital technologies affect company personnel's work experience in an exclusively positive way (Malik et al., 2020).

Another confirmed hypothesis is the absence of a direct correlation between the digitalization level and business performance, which contradicts the conventional wisdom but is consistent with the findings of some studies that questioned whether

HRM digitalization yields quick returns in the form of economic indicators. Though technology does relieve HR managers of much of the routine tasks (Ruel et al., 2004) and makes it easier for front-line employees to manage HR (Malik et al., 2020), its impact on company performance requires further study. The obtained data indicates that companies with the lowest digitalization level (narrow coverage, low effectiveness) were leaders in key performance indicators including growth rate. This may mean that the effects of HRM digitalization are not necessarily beneficial for all kinds of businesses and that some organizations seem to be managing very well without relevant ICT tools. We are talking about the fourth cluster companies, which also use conventional (analogue) HRM practices. These findings somewhat reinforce the earlier conclusions that HRM yields sustainable economic performance gains only when it is deeply integrated into the business and supports the strategic HRM function (Njoku, 2016).

As to practical recommendations, we would like to note the need to thoroughly analyze and identify the HRM functions that require ICT solutions. Organizations should carefully estimate the expected results of applying such tools and soberly evaluate the economic return on relevant investments. Managers should take into account the structural features of their company, including those related to the workforce and the extent of applying HRM practices when they plan relevant digital projects.

Further research could focus on the nature and factors of digitalization at Russian and foreign companies. Despite the progress made in identifying incentives for and barriers to the introduction of digital technologies in the field of HRM, the actual mechanism of their impact still remains unclear. Qualitative research of companies with high and low degrees of HRM digitalization may help fill this gap. Assessing the relationship between these processes' parameters and Russian companies' performance indicators on the basis of a larger array of data and using specialized statistical tools also remains relevant. An analysis of, among other things, non-economic performance indicators could be valuable as well. Thus, there is reason to believe that digital HRM technologies are particularly effective in overcoming the crisis and reorienting companies toward remote work. Accordingly, HRM digitalization can be viewed as a crisis management tool, even if it does not guarantee short-term economic results.

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References

- Appelbaum E., Bailey T., Berg P., Kallenberg A.L. (2000) *Manufacturing advantage: Why high-performance work systems pay off*, Ithaca, NY: Cornell University Press.
- Bondarouk T., Brewster C. (2016) Conceptualising the future of HRM and technology research. *International Journal of Human Resource Management*, 27(21), 2652–2671. <https://doi.org/10.1080/09585192.2016.1232296>
- Bondarouk T.V., Ruël H.J.M. (2009) Electronic human resource management: Challenges in the digital era. *International Journal of Human Resource Management*, 20, 505–514. <https://doi.org/10.1080/09585190802707235>
- Bondarouk T., Harms R., Lepak D. (2015) Does e-HRM lead to better HRM service? *International Journal of Human Resource Management*, 28(9), 1332–1362. <https://doi.org/10.1080/09585192.2015.1118139>
- Bondarouk T., Parry E., Furtmueller E. (2016) Electronic HRM: Four decades of research on adoption and consequences. *International Journal of Human Resource Management*, 28(1), 98–131. <https://doi.org/10.1080/09585192.2016.1245672>
- Bowen D.E., Ostroff C. (2004) Understanding HRM-Firm Performance Linkages: The Role of the “Strength” of the HRM System. *Academy of Management Review*, 29(2), 203–221. <https://psycnet.apa.org/doi/10.2307/20159029>
- Brockbank W. (1997) HR’s Future on the Way to a Presence. *Human Resource Management*, 36, 65–69. [https://doi.org/10.1002/\(SICI\)1099-050X\(199721\)36:1%3C65::AID-HRM11%3E3.0.CO;2-D](https://doi.org/10.1002/(SICI)1099-050X(199721)36:1%3C65::AID-HRM11%3E3.0.CO;2-D)
- Fitzgerald M., Kruschwitz N., Bonnet D., Welch M. (2014) Embracing digital technology: A new strategic imperative. *MIT Sloan Management Review*, 55(2), 1–12. <https://sloanreview.mit.edu/projects/embracing-digital-technology/>, accessed 15.11.2021.
- Fossen F.M., Sorgner A. (2019). Mapping the Future of Occupations: Transformative and Destructive Effects of New Digital Technologies on Jobs. *Foresight and STI Governance*, 13(2), 10–18. DOI: 10.17323/2500-2597.2019.2.10.18
- Gardner T.M., Wright P.M., Moynihan L.M. (2011) The impact of motivation, empowerment, and skill-enhancing practices on aggregate voluntary turnover: The mediating effect of collective affective commitment. *Personnel Psychology*, 64(2), 315–350. <https://doi.org/10.1111/j.1744-6570.2011.01212.x>
- Huselid M., Minbaeva D. (2019) Big Data and Human Resource Management. In: *The SAGE Handbook of Human Resource Management* (eds. A. Wilkinson, N. Bacon, S. Snell, D. Lepak), Thousand Oaks, CA: SAGE Publications Ltd., pp. 494–507. <http://dx.doi.org/10.4135/9781529714852.n29>
- Kehoe R.R., Collins C.J. (2017) Human Resource Management and Unit Performance in Knowledge-Intensive Work. *Journal of Applied Psychology*, 102(8), 1222–1236. <https://doi.apa.org/doi/10.1037/apl0000216>
- Kohansal M.A., Sadegh T., Haghshenas M. (2016) E-HRM: From Acceptance to Value Creation. *Journal of Information Technology Management*, 27(1), 18–27.
- Lepak D.P., Snell S.A. (1998) Virtual HR: Strategic human resource management in the 21st century. *Human Resource Management Review*, 8(3), 215–234. [https://doi.org/10.1016/S1053-4822\(98\)90003-1](https://doi.org/10.1016/S1053-4822(98)90003-1)
- Malik A., Budhwar P., Patel C., Srikanth N.R. (2020) May the bots be with you! Delivering HR cost-effectiveness and individualised employee experiences in an MNE. *International Journal of Human Resource Management*, Ahead-of-print, 1–31. <https://doi.org/10.1080/09585192.2020.1859582>
- Njoku E. (2016) *An analysis of the contribution of e-HRM to sustaining business performance* (doctoral dissertation), Newport: University of South Wales.
- Parry E. (2011) An examination of e-HRM as a means to increase the value of the HR function. *International Journal of Human Resource Management*, 22(5), 1146–1162. <https://doi.org/10.1080/09585192.2011.556791>
- Parry E., Strohmeier S. (2014) HRM in the digital age — digital changes and challenges of the HR profession. *Employee Relations*, 36(4). <https://doi.org/10.1108/ER-03-2014-0032>
- Parry E., Tyson S. (2011) Desired goals and actual outcomes of e-HRM. *Human Resource Management Journal*, 21(3), 335–354. <https://doi.org/10.1111/j.1748-8583.2010.00149.x>
- Ruel H., Bondarouk T., Looise J.K. (2004) E-HRM: Innovation or Irritation: An explorative empirical study in five large companies on web-based HRM. *Management Revue*, 15, 364–381.

- Siebert W.S., Zubanov N. (2009) Searching for the optimal level of employee turnover: A study of a large UK retail organization. *Academy of Management Journal*, 52(2), 294–313. <https://doi.org/10.5465/amj.2009.37308149>
- Stone D.L., Deadrick D.L., Lukaszewski K.M., Johnson R. (2015) The influence of technology on the future of human resource management. *Human Resource Management Review*, 25(2), 216–231. <https://doi.org/10.1016/j.hrmr.2015.01.002>
- Strohmeier S. (2020) Digital human resource management: A conceptual clarification. *German Journal of Human Resource Management: Zeitschrift für Personalforschung*, 34(3), 345–365.
- Strohmeier S. (2009) Concepts of e-HRM consequences: A categorisation, review and suggestion. *International Journal of Human Resource Management*, 20, 528–543. <https://doi.org/10.1080/09585190802707292>
- Ulrich D., Dulebohn J. H. (2015) Are we there yet? What's next for HR? *Human Resource Management Review*, 25(2), 188–204. <https://doi.org/10.1016/j.hrmr.2015.01.004>
- Vial G. (2019) Understanding digital transformation: A review and a research agenda. *The Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>