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INFLUENCE OF DIGITAL HR TECHNOLOGIES ON CORPORATE PRODUCTIVITY WITHIN THE FRAMEWORK OF ECONOMIC DIGITALIZATION

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ABSTRACT

The purpose of the study is to evaluate the influence of digital technologies on labor productivity at both global and corporate levels, while considering the distinct economic development contexts of various countries. The study employs methods such as correlation and regression analysis, alongside 19 case studies. The investigation identified key determinants of labor productivity at the macroeconomic level across three dimensions: institutional efficacy, human capital, and technology adoption. These determinants encompass the quality of the regulatory environment, the assimilation of digital technologies, the prevalence of fixed broadband subscriptions, and the overall ease of conducting business. In the current study, the above factors are manifested through indicators such as Regulatory Quality, Digital Adoption Index, Fixed Broadband Subscriptions, and Ease of Doing Business. Notably, the Digital Adoption Index and Regulatory Quality exerted the most substantial influence, as evidenced by a one-unit increase in these variables correlating with labor productivity surging by 76.95 and 13.28, respectively. Furthermore, the strong correlation between the projected evolution of the human resources management market and the sectors of artificial intelligence and analytics in personnel management was substantiated. The findings revealed a comparative analysis of implementing digital HR technologies within companies across countries with different levels of development. It was shown that developed countries leverage these technologies with a more strategic orientation, while developing nations tend to prioritize operational efficiency and adaptation to crises. The insights obtained can be utilized at the macroeconomic level to inform policy directions aimed at increasing labor productivity, and at the microeconomic level for the formulation of robust human resource management strategies.

Keywords: digital HR technologies, labor productivity, economic digitalization, artificial intelligence, predictive analytics, automation

Influencia de las Tecnologías Digitales de RRHH en la Productividad Empresarial en el Marco de la Digitalización Económica

RESUMEN

El propósito del estudio es evaluar la influencia de las tecnologías digitales en la productividad laboral, tanto a nivel global como corporativo, considerando los distintos contextos de desarrollo económico de varios países. El estudio emplea métodos como análisis de correlación y regresión, junto con estudios de caso (19). La investigación identificó determinantes clave de la productividad laboral a nivel macroeconómico en tres dimensiones: eficacia institucional, capital humano y adopción de tecnología. Estos determinantes abarcan la calidad del entorno regulatorio, la asimilación de tecnologías digitales, la prevalencia de suscripciones de banda ancha fija y la facilidad general para realizar negocios. En el presente estudio, los factores mencionados se manifiestan a través de indicadores como la Calidad Regulatoria, el Índice de Adopción Digital, las Suscripciones de Banda Ancha Fija y la Facilidad para Hacer Negocios. Cabe destacar que el Índice de Adopción Digital y la Calidad Regulatoria ejercieron la influencia más sustancial, como lo demuestra un aumento de una unidad en estas variables, correlacionado con un aumento de la productividad laboral de 76.95 y 13.28, respectivamente. Además, se corroboró la fuerte correlación entre la evolución proyectada del mercado de gestión de recursos humanos y los sectores de la inteligencia artificial y la analítica en la gestión de personal. Los hallazgos revelaron un análisis comparativo de la implementación de tecnologías digitales de RR. HH. en empresas de países con diferentes niveles de desarrollo. Se

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demostró que los países desarrollados utilizan estas tecnologías con una orientación más estratégica, mientras que los países en desarrollo tienden a priorizar la eficiencia operativa y la adaptación a las crisis. Los conocimientos obtenidos pueden utilizarse a nivel macroeconómico para orientar las políticas destinadas a aumentar la productividad laboral, y a nivel microeconómico para la formulación de estrategias sólidas de gestión de recursos humanos.
Palabras clave: Tecnologías de RR.HH. digitales, productividad laboral, digitalización económica, inteligencia artificial, análisis predictivo, automatización.

Introduction

Under the conditions of economic digitalization, the integration of digital technologies into enterprise operations transcends mere preference, establishing itself as an imperative for sustained competitiveness. (Mishchenko et al., 2025). The sphere of human resources management does not remain detached from these digitalization processes; rather, it emerges as a proactive participant due to the significant advantages afforded by new technologies. Nowadays, artificial intelligence (AI) and predictive analytics are integral to a multitude of human resource management functions, including recruitment, training, adaptation, development, and talent retention. These technologies optimize the efficiency of HR professionals, enabling them to identify and cultivate the talent crucial for company success. The effective deployment of digital technologies within Human Resources (HR) has the potential to enhance productivity, fosters long-term human capital development, elevates employee engagement, and mitigates turnover rates (Ayanponle et al., 2024; Rani, 2024).

In this context, there is a pressing need for systematic inquiry into the impact of digital technologies on labor productivity, both at the global scale and at the company level. Such research endeavors will facilitate the identification of macroeconomic determinants of labor productivity growth as well as the examination of specific HR technologies through the lens of case studies of individual companies. Furthermore, it is important to compare the effectiveness of technology implementation in countries with different levels of development, which makes it possible to trace differences in the focuses of digital transformation. Combining quantitative analysis of global trends with the study of practical cases allows us to form well-founded conclusions regarding the impact of HR technologies on the effectiveness of human resource management in the context of digital transformation.

The initial hypothesis of the current study posits that digital technologies exert a significant influence on labor productivity at the macroeconomic level. The subsequent hypothesis suggests that HR technologies enhance corporate productivity, although their impact may vary depending on contextual factors. The novelty of the study lies in the integration of labor productivity analysis with an examination of the role of HR technologies, artificial intelligence, as well as analytics, framed within the context of institutional, human, and technological determinants. The purpose of the study is to evaluate the impact of digital technologies on labor productivity at both global and corporate levels, while considering the specifics of economic development trajectories of various nations.

Research objectives are as follows:

- Identifying the determinants of labor productivity at the macro level across three dimensions: institutional efficiency, human capital, and technology adoption;
- Analyzing the influence of AI technologies in HR and the role of HR analytics in the growth of the human capital management market;
- Investigating the cases of implementing HR technologies within large companies across diverse countries.

Literature review

The beneficial influence of digital HR technologies on enterprise productivity has been a recurring theme in recent scholarly works. For instance, Ayanponle et al. (2024) assert that the assimilation of advanced technologies constitutes a pivotal factor shaping the future of human resource management. The researchers underscore the significance of harmonizing digital technologies with a human-centered methodology; however, the conclusions drawn from their study remain largely theoretical. Similarly, Rani (2024) posits that digital HR technologies have transformed all facets of human resource management, encompassing recruitment, adaptation, engagement, performance management, and termination. Nonetheless, the findings draw on a survey conducted within Indian companies, which may render the results somewhat subjective and not adequately representative of other nations.

In line with these observations, the research by Salam and Munawir (2024) demonstrated that the adoption of technology in human resource management enhances operational efficiency, productivity, employee satisfaction, and curtails costs. Their conclusions, however, stem from a case study involving several companies, yet they did not quantify the extent to which technology adoption elucidates alterations in performance metrics. By contrast, Suwaji et al. (2024) emphasized the necessity of implementing integrated human resource management systems to augment productivity and bolster corporate competitiveness; however, their study is devoid of quantitative analysis. Likewise, Parry and Battista (2023) and Dabić et al. (2023) conducted reviews of evidence pertaining to the influence of emerging technologies on the HR function and workplace dynamics.

In a related vein, Olurin et al. (2024) investigated the change of HR roles in the context of technological advancement, unveiling diverse approaches to HR management within automated environments. Nevertheless, the conclusions drawn by these scholars are based on literature reviews, thus lacking empirical substantiation. Conversely, Damioli et al. (2021) illustrated the effects of AI implementation on corporate productivity; however, the analysis concentrated on small and medium-sized enterprises within the service sector, potentially limiting the applicability of the findings to larger organizations and other industries. On a different note, Galanti et al. (2021) evaluated the impact of digital technologies against the backdrop of the necessity for remote work during the COVID-19 pandemic. Their study primarily addressed the influence on employees' psycho-emotional states and overall well-being rather than on the efficacy of human resource management. Similarly, Vahdat (2022) examined the role of technology in human resource management during the COVID-19 crisis, yet the conclusions of this work are founded on a review of literature and lack quantitative validation.

Numerous studies investigate the advantages of integrating digital technologies into human capital management and labor productivity within developing countries. Emphasizing the significance of human capital development, Sulaimanova et al. (2022) underscored the necessity for digital competencies among workers in Kyrgyzstan. Similarly, Su et al. (2022) explored the benefits of

deploying innovative technologies within the Chinese labor market. Nevertheless, these works fail to examine the direct consequences of implementing HR technologies on human resource management. In a comparable manner, Zhang and Chen (2024) analyzed the characteristics of digital transformation in human resource management in China, yet did not quantify its influence on productivity enhancements.

In contrast, Kambur and Akar (2022) investigated the effects of artificial intelligence on the operations of human resources departments in Turkey, highlighting the utility of the technology in candidate sourcing, as well as in employee training and development. This study elucidates the impact of emerging technologies specifically on the human resource management process, albeit concentrating on one technology only. Along similar lines, Shpak et al. (2022) and Rodchenko et al. (2021) assessed the influence of digital technologies on the labor market for HR specialists in Ukraine, acknowledging the criticality of fostering a digital culture. However, their research encompasses data prior to the onset of the full-scale war in Ukraine, thereby failing to reveal the specifics of technology implementation and its significance under martial law.

A literature review reveals that the majority of studies do not provide adequate empirical evidence to support the impact of digital HR technologies on labor productivity. Moreover, existing research predominantly concentrates on a singular country, a specific technology, or a particular industry, thereby constraining the potential for generalizing the findings. In this context, there is a pressing necessity for more extensive empirical investigations. Such studies should encompass both an analysis of global data pertaining to the impact of digital technologies on productivity and case studies of HR technology implementations across diverse companies from various countries worldwide. This approach will facilitate a comprehensive evaluation of the digital technologies on labor productivity and enable comparisons of the specific outcomes derived from their application in countries with different levels of development.

Methodology

Research procedure

The research procedure included three stages according to the research objectives. At *the first stage,* an analysis of the labor productivity determinants at the macroeconomic level was undertaken, focusing on three critical dimensions: institutional efficiency, human capital, and technology adoption, using the most recent available data from The Quality of Government Institute (2025), World Bank Group (2025), and International Labour Organization (2025). This stage encompassed the selection of both the target countries and the pertinent indicators for subsequent analysis, in addition to the comprehensive processes of data collection, cleaning, and structuring. The *second stage* evaluated the projected growth of the human resource management market and the AI markets in HR and HR analytics. This assessment encompassed included global indicators, incorporating both an analysis of growth dynamics and an exploration of the interrelations between the growth of the aforementioned markets. At *the third stage,* a series of case studies were presented, highlighting the implementation of HR technologies by organizations in countries with varying levels of development and its consequences. The data encompassed the companies' performance in terms of enhancing the human resource management efficiency as well as elevating labor productivity.

Sample

The general sample of countries for *the first phase* of the work encompassed involved all countries globally; however, the final one was subsequently narrowed down to 49 countries due to insufficient data on specific indicators. Accordingly, the main criterion for including a country was the availability of data on the indicators under analysis. In the first stage, the sample of indicators was formed by considering two key criteria: their relevance for assessing the main drivers of labor productivity, and the availability of official statistical data. This sample included Gross Domestic Product (GDP) per working hour as a key indicator of labor productivity. The indicators of institutional efficiency included regulatory quality, ease of doing business, and government expenditure on education. The Human Capital Indicator (HCI) characterizes human capital. Indicators of technology adoption and use were as follows: the digital adoption index, fixed broadband subscriptions, and Individuals using the Internet.

The *second stage* utilized secondary data on the global growth forecast for the human capital management market and the markets for AI in HR and HR analytics. *The third stage* involved the case studies regarding implementing HR technologies in large companies in countries with different levels of economic development. The sample included companies from the United States of America (USA), Great Britain, Germany, Switzerland, and the Netherlands as examples of developed countries. Companies from Ukraine, Turkey, China, and Kyrgyzstan entered as representatives of developing countries. The main inclusion criterion was the implementation of digital HR technologies (HR analytics, AI, automation) in large organizations, which made it possible to assess their impact on human capital management. The selected companies represent a diverse array of industries and contexts, thereby enabling us to juxtapose various approaches to implementing HR technologies across different business environments.

Methods

The study employed correlation analysis utilizing the Pearson criterion, which facilitated an evaluation of the strength and direction of the linear relationship among the indicators. Additionally, the methodology of multiple linear regression was applied, enabling an assessment of the influence of several independent variables on labor productivity, regarded as the dependent variable. The general formula for linear multiple regression is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n \quad (1)$$

where: Y is the dependent variable; X_1, X_2, ..., X_n are the independent variables; β_0 is the intercept; β_1, β_2, ..., β_n are the regression coefficients. Table 1 contains regression statistics indicating the high quality and reliability of the model.

Table 1.

Regression statistics indicators characterizing the overall quality of the model

Indicator	Value	Interpretation
R (correlation coefficient)	0,9290	Very high correlation between predictors and dependent variable
R^2	0,8631	86.31% of the variation in the dependent variable is explained by the model

Adjusted R^2	0,8391	Considering the number of variables, the indicator still has a high value.
Predicted R^2	0,8154	The model has good predictive ability

Source: calculated by the author based on The Quality of Government Institute (2025); World Bank Group (2025); and the International Labour Organization (2025).

This study also conducted diagnostic tests on the residuals, specifically checking for autocorrelation (Durbin-Watson), heteroscedasticity (Breusch-Pagan-Godfrey, White test), and normality (Shapiro-Wilk, Anderson-Darling, D'Agostino, Jarque-Bera, and others). Crucially, the results from these tests consistently supported the null hypotheses, indicating that the residuals were free from autocorrelation, significant heteroscedasticity, and followed a normal distribution. In conjunction with the aforementioned methodologies, case analyses to investigate the effects of implementing HR technologies worldwide within companies with varying levels of development were employed.

Tools

Excel software, enhanced with the StatPlus add-in, was used to perform the calculations.

Results

Determinants of labor productivity at the macro level

Table 2 presents the findings of the correlation analysis between labor productivity and the indicators of institutional efficiency, human capital, and technology adoption. This analysis offers empirical validation of the interrelationships among these variables. The study utilized the most recent data available for the aforementioned indicators, encompassing a sample of 49 countries, in accordance with the established methodology.

Table 2.
Results of correlation analysis between labor productivity and indicators of institutional efficiency, human capital, and technology adoption

	GDP per working hour
Regulatory Quality	0,844939
Digital Adoption Index	0,847184
HCI	0,7556
Fixed broadband subscriptions (per 100 people)	0,753552
Individuals using the Internet (% of population)	0,66887
Ease of Doing Business global Rank	-0,63644
Government expenditure on education, total (% of GDP)	0,160841

Note
: calculated by the author based on The Quality of Government Institute (2025); World Bank Group (2025); International Labour Organization (2025).

Table 2 shows that labor productivity (GDP per working hour) is closely associated with all indicators encompassed in the analysis, with the notable exception of government expenditure on education. This can be attributed to the lagged effects of educational investments or the inefficacy of educational spending. The correlation is direct with all indicators, except the Ease of Doing Business. However, since this indicator operates inversely (where a lower value corresponds to a superior ranking for the country), we can similarly regard it as a direct relationship. In summary, it can be stated that labor productivity is profoundly and directly correlated with institutional efficiency, the quality of human capital, and the adoption of technological advancements.

To identify the most influential determinants of labor productivity enhancement at the macroeconomic level, a regression analysis was undertaken. The variables of institutional efficiency, human capital quality, and technological development functioned as independent variables in this investigation, while labor productivity was designated as the dependent variable. The results of the analysis are presented in Table 3.

Table 3.
Results of the regression analysis of the impact of institutional efficiency, human capital and technology adoption on labor productivity

	Coeff.	*Std. Err.*	*LCL*	*UCL*	*t Stat*	*p-value*	*H0 (5%)*
Intercept	-23,2993	11,6770	-46,8994	0,3009	-1,9953	0,0529	*Accepted*
Regulatory Quality	13,2838	2,4716	8,2885	18,2792	5,3745	0,0000	*Rejected*
Digital Adoption Index	76,9462	21,5225	33,4476	120,4447	3,5752	0,0009	*Rejected*
HCI	-20,5140	19,2651	-59,4502	18,4222	-1,0648	0,2933	*Accepted*
Fixed broadband subscriptions (per 100 people)	0,4228	0,1592	0,1010	0,7446	2,6555	0,0113	*Rejected*
Individuals using the Internet (% of population)	-0,0453	0,1327	-0,3135	0,2229	-0,3414	0,7346	*Accepted*
Ease of Doing Business global Rank	0,1137	0,0452	0,0223	0,2051	2,5144	0,0160	*Rejected*
Government expenditure on education, total (% of GDP)	1,1246	0,8400	-0,5732	2,8224	1,3388	0,1882	*Accepted*

Source: calculated by the author based on The Quality of Government Institute (2025); World Bank Group (2025); International Labour Organization (2025)

In general, the resulting model can be presented as follows: *GDP per working hour = - 23.2993 + 13.2838 * Regulatory Quality + 76.9462 * Digital Adoption Index - 20.5140 * HCI + 0.4228 * Fixed broadband subscriptions (per 100 people) - 0.0453 * Individuals using the Internet (% of population) + 0.1137 * Ease of Doing Business global Rank* + 1.1246 * Government expenditure on education, total (% of GDP)

According to the findings of the regression analysis, Regulatory Quality, Digital Adoption Index, Fixed Broadband Subscriptions, and Ease of Doing Business have a statistically significant direct influence on labor productivity. Among the variables examined, the Digital Adoption Index demonstrates the most pronounced effect; a one-unit increase in this index correlates with an enhancement in labor productivity by 76.95. Similarly, an elevation in Regulatory Quality by one-unit results in a boost of 13.28 in labor productivity. Furthermore, a one-unit increase in Fixed Broadband Subscriptions and Ease of Doing Business yields an increment in labor productivity of 0.42 and 0.11, respectively.

Digital technologies in human resources management: forecasts and connection with the growth of the HR market

As regression analysis has demonstrated, at the macroeconomic level, labor productivity is predominantly influenced by the degree of digital technology implementation. Within the realm of human capital management, artificial intelligence and HR analytics technologies hold particular significance. These advanced tools are employed throughout the recruitment process, to nurture and retain exceptional talent, assess performance, strategize personnel development, and streamline costs. An analysis of projected data regarding the expansion of the human capital management market and the adoption of AI and HR analytics reveals a strong correlation (Figure 1).

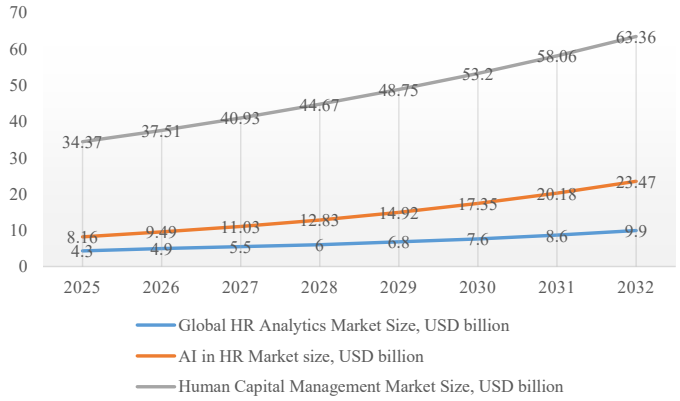

Figure 1. Growth forecast for the human capital management and AI markets in HR and HR analytics
Note: based on Precedence Research (2025a, 2025b) and Market.us (2024) data

As can be seen in Figure 1, the human capital management market is set to nearly double by 2032. The AI sector within human resources is projected to expand almost threefold, while the HR analytics market is expected to increase more than double. This underscores the swift escalation of the digital technologies' significance in the realm of human resource management, particularly concerning the digitalization and automation of HR processes. The implementation of these technologies profoundly influences the efficacy of personnel management, ultimately culminating in enhanced productivity. Consequently, the growing demand for analytics empowers managers to make decisions grounded in data, while the application of AI facilitates the automation of recruitment, adaptation, training, forecasting, and more. Table 4 presents the findings of the correlation analysis among the examined indicators.

Table 4.
Results of correlation analysis between indicators of human capital management market size and AI markets in HR and HR analytics

	Global HR Analytics Market Size	AI in HR Market size	Human Capital Management Market Size
Global HR Analytics Market Size	1		
AI in HR Market size	0,999392	1	
Human Capital Management Market Size	0,997269	0,998056	1

Source: calculated by the author based on data Precedence Research (2025a); Precedence Research (2025b); Market.us (2024)

The correlation between the indicators of the size of the human capital management market and the AI markets in HR and HR analytics exceeds 0.99. This indicates that state-of-the-art technologies are becoming an integral element of the personnel management

process. The results obtained using regression and statistical analysis are confirmed in the practical cases of large companies, presented below.

Cases of HR technology implementation in large companies in different countries

In the preceding sections, it has been demonstrated that digital technologies have a profound influence on labor productivity and are closely linked to the growth of the human capital management market. An analysis of case studies showcasing the implementation of HR technologies, such as artificial intelligence, HR analytics, and various other digital solutions within large enterprises, will further develop the findings by illustrating the specific consequences of digital transformation. Table 5 shows the HR technologies adopted by major corporations globally and the resultant benefits they have brought upon human capital management.

Table 5.
HR technologies used and the results of their implementation in large companies globally

Company/ Country	HR technology implemented	Results
Experian, USA	Predictive HR analytics (200+ variables)	Reduced staff turnover by 2–3%, saved $8–10 million; reduced reporting time by 70%
IBM, *USA*	Watson AI to predict layoffs	Reduced turnover by 25% for critical roles; $300 million in savings over 4 years
Intracorp, *USA*	HR analytics to improve productivity	Increased productivity by 10%, increased staff retention by 128%, reduced meeting inefficiencies by 50% within 30 days
Microsoft, *USA*	Workplace Analytics powered by Office 365	Optimized working hours; increased team efficiency; improved work-life balance
Unilever, *Great Britain/ Netherlands*	Digital recruiting using AI (HireVue, Pymetrics)	Speeding up the hiring process; improved candidate quality; reduced bias
Communicorp, *Great Britain*	AI platform Employment Hero	Reduced payroll processing time from 1–2 days to 1 hour; improved onboarding of new employees
E.ON, *Germany*	HR analytics to reduce absence from work	11 factors determinants of absenteeism have been identified, accompanied by strategic recommendations for leave policies aimed at mitigating this issue
Credit Suisse, *Switzerland*	Predictive analytics for employee retention	300 employees transferred to other positions; 1% decrease in turnover; improved productivity
Lenovo, *China*	Implementation of the Dovetail HR request management system	Increasing the efficiency of HR request handling, improving reporting and managing employee request history
Baidu, *China*	Analyzing the impact of remote work on developer productivity during COVID-19	Both positive and negative impacts of remote work on developer productivity have been identified
China Payroll Client, *China*	Outsourcing HR processes to solve recruitment problems in Shanghai	Hiring over 70 employees in 6 months, filling critical vacancies, reducing time to close positions
Infopulse, *Ukraine*	Development of IT outsourcing services and support of HR processes	Company growth, expansion of international partnerships, improvement of personnel management efficiency
Rozdoum, *Ukraine*	Adapting business processes during wartime	Rapid resumption of work after the outbreak of war, ensuring the safety of employees
DTEK, *Ukraine*	Digital transformation of the annual performance evaluation for 21,000 employees	Optimization of HR processes, implementation of individual development plans, integration with SAP, increasing the efficiency of personnel management
SoftServe, *Ukraine*	Implementing corporate training through SoftServe University	Improving the competencies of personnel, cultivating internal talent, strengthening the company's stature as a leading employer within Ukraine's IT sector
Prykarpattya oblenergo, *Ukraine*	Implementing gamification in HR management	Increasing staff engagement, developing digital competencies, improving the efficiency of human resources management in the energy industry
Softtech (IsBank), *Turkey*	Automate task assignment using a machine learning system	Reduced time spent on manual assignment of tasks, increased efficiency in processing 350 daily requests, improved assignment accuracy
Company X, *Turkey*	Implementing a digital platform for employee engagement	Increased employee engagement, improved internal communication, reduced staff turnover
Tumar Art Group, *Kyrgyzstan*	Partial automation of personnel management and production processes	Scaling production, setting up exports via Shopify, improving the efficiency of human resources management. This contributed to the preservation of traditional crafts and the creation of new jobs

Source: consolidated by the author based on the contributions of Erik van Vulpen and Siocon (2025); Asia Growth Partners (n.d.); Kemindo (2024); Pribanic (2020); SHRMPro (2022); Feloni (2017); Dovetail Software (2023); Bao et al. (2020); IT-Enterprise (2025); Polyanska et al. (2022); Aktas and Yilmaz (2021); Employer of Record Turkey (n.d.); China Payroll (2025); Financial Times (2024); Marvar (2025)

All the countries represented employ predictive analytics, artificial intelligence, and digital platforms, with the widespread implementation of these technologies yielding favorable outcomes such as diminished staff turnover, cost reductions, and expedited processes. That being said, companies in developed countries predominantly leverage advanced technologies – complex AI-driven

solutions and predictive models. In contrast, companies in developing nations gravitate towards more straightforward solutions, in particular automation and digital platforms.

The objectives behind the adoption of these technologies also diverge: in developed countries, the focus is on strategic talent retention, the optimization of managerial decisions, as well as competitiveness enhancement within the global market. On the other hand, in developing countries the aspirations are less ambitious – aiming for the digitalization of fundamental processes, heightened employee engagement, and the improvement of internal communication.

These differences can be attributed not solely to the overall development level and capabilities of the nations but also to the broader context. In developed countries, the integration of HR technologies addresses challenges related to talent competition, hybrid work environments, and the automation of routine tasks. In light of the above, in developing countries such technologies are primarily directed towards recovery from crises or bolstering the national economy. For instance, in Ukraine, the focus is on enhancing operational efficiency in wartime, in Kyrgyzstan, it revolves around supporting local craftsmanship, and in China, it aims to ensure productivity during a pandemic.

Discussion

It can be inferred from the underlying literature that empirical research on digital technologies in enhancing labor productivity is pivotal at the macroeconomic level, alongside the critical significance of HR technologies at the organizational level. The author's conclusions are corroborated by the research conducted by Suwaji et al. (2024), who underscored the indispensable contribution of HR technologies to productivity enhancement. Vahdat (2022) posits that web-based solutions, such as cloud computing, possess the capability to address the paramount challenge of resource allocation. Rani (2024) validated the influence of HR technologies on corporate performance through empirical survey findings. Although the author of this study utilized statistical data from publicly available sources for (his or her) analyses, both methodologies yield consistent outcomes. This consistency underscores the reliability of the derived conclusions and the viability of further scholarly inquiry in this domain. Similar to the author of the current work, Salam and Munawir (2024) examined the efficacy of implementing digital technologies through the lens of several enterprises. The conclusions drawn from both studies align regarding the increased of productivity, operational efficiency, and cost reduction due to digitalization.

Damioli et al. (2021) elucidated that the implementation of artificial intelligence significantly enhances corporate productivity. The researchers examined the period corresponding to the inception of practical applications and advancements in AI, extending up to 2016. The present work augments this analysis by exploring a subsequent timeframe and substantiating the ongoing, intensive evolution of AI, which is becoming increasingly integrated into a broader spectrum of business processes.

Further, Sulaimanova et al. (2022) and Su et al. (2022) corroborated the critical necessity of actively adopting new technologies to increase labor efficiency and productivity in developing countries. An evaluation of the research (Kambur & Akar, 2022; Rodchenko et al., 2021) reveals significant steps toward the incorporation of technology into human capital management within these countries. Nonetheless, these nations possess considerable unrealized potential in this domain, aligning with the author's hypotheses derived from a comprehensive synthesis of technology implementation outcomes among companies in developing countries.

Another noteworthy approach is presented by Trpeski et al. (2021). The authors examined the influence of information and communication technologies on labor productivity across Europe and the United States, observing a pronounced disparity in productivity among European nations. The researchers discovered that the effects of investment in information and communication technologies (ICT) are more pronounced in certain European countries with transitional economies than in their more developed ones. Conversely, the focus of the author's investigation is the efficacy of technology implementation specifically within the human resources domain, which explains the variations in their conclusions. Consequently, the author emphasized that developed countries leverage the opportunities afforded by digital technologies more adeptly and strategically to enhance the efficiency of human resource management. Thus, while the study by Trpeski et al. (2021) emphasizes the overarching economic impact of digitalization, the author's work demonstrates a targeted and functional application of ICT.

Some works have revealed not only the advantages of digital transformation within the realm of human capital management but also the adverse consequences of this phenomenon (Parry & Battista, 2023; Zhang & Chen, 2024). It should be noted that this critical dimension is absent from the author's research. Nonetheless, the study possesses practical significance by elucidating the determinants of labor productivity across three dimensions – institutional efficiency, human capital, as well as the implementation of technology. The research substantiated both hypotheses posited in the study. The author's conclusions, derived from a comparative analysis of HR technology adoption by companies across various countries, also hold substantial practical implications. These findings can be utilized at the macro level to inform policy directions aimed at enhancing labor productivity and at the micro level in the formulation of human capital management strategies.

The limitations of the study are the absence of quantitative indicators by country that would elucidate the extent of HR technology implementation. For instance, there is a lack of data on the share of companies using HR analytics, the degree of automation in HR processes, and similar metrics.

Recommendations

- stimulate digital transformation through the adoption of cutting-edge technologies and the enhancement of broadband Internet accessibility;
- elevate institutional quality, particularly in terms of regulatory excellence, transparency, and the establishment of a favorable environment for digital business development;
- integrate predictive analytics and artificial intelligence into HR strategies, with an emphasis on sustainable human capital development;
- formulate a comprehensive national policy aimed at increasing productivity while fostering collaboration among the state, the business sector, and the labor force.

Conclusions

Digital technologies assume a pivotal role in enhancing labor productivity at the macroeconomic level. Digital human resource technologies exert a beneficial influence on various dimensions of organizational productivity – such as mitigating employee turnover, increasing engagement, and enhancing skillsets. Nevertheless, their impact and degree of integration differ across countries, resulting in disparities in effectiveness and avenues of application.

The principal determinants of labor productivity at the macroeconomic level include the quality of the regulatory environment, the assimilation of digital technologies, the prevalence of fixed broadband subscriptions, and the overall ease of conducting business. In this analysis, these indicators are represented through the metrics of Regulatory Quality, Digital Adoption Index, Fixed Broadband Subscriptions, and Ease of Doing Business. Notably, the Digital Adoption Index exerts the most significant influence; an elevation by one unit correlates with an increase in labor productivity by 76.95. In contrast, an enhancement in Regulatory Quality by one unit is associated with a productivity increment of 13.28. Furthermore, a one-unit rise in Fixed Broadband Subscriptions and Ease of Doing Business yields productivity increases of 0.42 and 0.11, respectively. Additionally, an analysis of predictive data indicates that the forthcoming evolution of the human resources management sector is intricately linked to the integration of AI and HR analytics. A comparative examination of HR technology implementations across various nations reveals that in developed countries, such technologies are characterized by a more strategic application. At the same time, in developing countries the adoption of HR technologies frequently aims at increasing operational efficiency and adapting to crises.

The study holds practical significance, identifying the determinants of labor productivity at the macro level and the strategic focus in terms of implementing digital HR technologies within companies across varying developmental contexts. The findings can inform policy directives aimed at enhancing labor productivity at the macro level and assist in formulating human capital management strategies at the micro level. Future research endeavors should concentrate on elucidating the potential risks associated with the integration of HR technologies, as well as evaluating the feasibility of their implementation and the potential consequences.

Declaración de Conflictos de Interés

No declaran conflictos de interés.

Contribución de autores

Autor	Concepto	Curación de datos	Análisis/ Software	Investigación / Metodología	Proyecto/ recursos / fondos	Supervisión/ validación	Escritura inicial	Redacción: revisión y edición final
1	X	X	X	X		X	X	
2	X		X	X	X		X	
3		X			X	X	X	
4	X		X	X			X	X
5			X		X		X	X

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