

THE EFFECT OF DIGITALIZATION ON HUMAN RESOURCES MANAGEMENT TRAINING AND DEVELOPMENT PROCESSES

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Abstract. In the face of accelerating global competition and continuous technological innovation, the role of digitalization in shaping human resource practices has become increasingly vital. The article explores the transformation of training and development processes under the influence of digital technologies, emphasizing the strategic shift from conventional in-person models to flexible, technology-enabled learning environments. The relevance of the study lies in the growing necessity for organizations to maintain workforce adaptability, skill acquisition, and innovation capacity in response to evolving business dynamics. The purpose of the article is to investigate how digital tools—such as artificial intelligence, gamification, mobile learning, and virtual platforms—redefine educational approaches in Human Resources Management, making them more scalable, interactive, and outcome-oriented. The methodological framework is based on a qualitative synthesis of academic literature and conceptual modeling of training processes, highlighting stages such as needs analysis, program design, implementation, and evaluation. Particular attention is paid to frameworks that enhance the effectiveness of learning strategies, with references to standard models of performance assessment. The findings demonstrate that digitalization enriches learning outcomes by offering personalized and time-flexible content, lowering training costs, enhancing employee engagement, and supporting data-informed decision-making. The integration of performance tracking tools and analytics allows for continuous optimization of training content, aligning learning initiatives with strategic organizational goals. Ultimately, the article provides practical insights into how digital transformation facilitates the development of employee competencies while simultaneously contributing to the competitive positioning of organizations. This perspective positions training and development as both a catalyst for individual growth and a cornerstone of institutional success in the digital age.

Keywords: human resources management; education; development; digitalization; digital human resources management; training and development; e-learning platforms; gamification; employee motivation; artificial intelligence in HR; organizational competitiveness; performance analytics; learning systems.

JEL Classification: A21, I25, J24, J53

Formulas: 0; **fig.** 0; **tabl.** 2; **bibl.** 25

Introduction. In the era of rapid global competition and technological innovation, digitalization has become a driving force in reshaping institutional structures, particularly within the domain of Human Resources Management (HRM). As enterprises increasingly rely on knowledge-based assets, the strategic importance of human capital has surged. Training and development processes, which are core HRM functions, are undergoing a transformation propelled by digital tools and platforms. This shift is not only altering the content and delivery of training programs but is also redefining how organizations assess, manage, and invest in their workforce. Through the use of technologies such as virtual reality (VR), gamification, artificial intelligence (AI), and big data analytics, training is now more flexible, scalable, personalized, and aligned with strategic business objectives. Consequently, digitalization in HRM is not just a technical advancement—it is a holistic transformation that empowers organizations to enhance learning outcomes, employee engagement, and long-term competitiveness.

Literature review. Today, digitalization deeply affects many institutional structures, especially human resources management (HRM). Digital human resources management and related concepts in this field are increasingly coming to the fore in academic discussions to explain the integration of HR processes with technology and the effects of digital transformation (Strohmeier, 2020). Digital transformation is defined as the process of transforming the business processes, operations and structures of businesses in order to benefit from the opportunities offered by new technologies (Fenech et al., 2019). In this process, human capital has become the most strategic and competitive resource for institutions, especially in the context of high-tech industries and the digital economy. Digitalization directly affects the formation and development of human capital; it plays a decisive role in all stages of the personnel life cycle, such as recruitment, orientation, training, performance evaluation and dismissal (Zaborovskaia et al., 2020; Kholod et al., 2021). In particular, digital human resources management processes include the implementation of HR functions such as selection, training, development and evaluation with the latest digital technologies (Zhang and Chen, 2024). This transformation covers not only business life but also education systems. Digitalization needs to be managed with an integrated approach that determines the goals, structure and content of the education process. It is important that the education system, equipped with new technological tools and unlimited information resources, teaches how to use these resources effectively (Andriushchenko et al., 2021). This study evaluates the effects of digitalization on human resources management and corporate training processes in a multidimensional manner. In particular, the integration of gamification-based approaches into corporate training processes shows that human resources development is reshaping in the digital age. As a result, digitalization is considered not only as a technological transformation, but also as a strategic tool that improves the quality of human capital (Strohmeier, 2020; Fenech et al., 2019; Zaborovskaia et al., 2020; Andriushchenko et al., 2021; Zhang and Chen, 2024; Kholod et al., 2021).

Aims. The primary aim of this study is to explore the transformative impact of digitalization on training and development processes within Human Resources

Management. The article seeks to identify how digital tools and strategies have replaced or supplemented traditional training methods, and to analyze the extent to which these technologies contribute to enhancing employee competencies, organizational performance, and competitive advantage. Additionally, the study aims to emphasize the strategic role of digital HR systems in enabling flexible, efficient, and data-driven learning environments that support both individual development and corporate goals.

Methodology. This research employs a qualitative-descriptive methodology based on comprehensive literature analysis. Drawing on contemporary academic sources and applied studies, the authors synthesize theoretical perspectives and empirical insights concerning the integration of digital technologies into HR training and development practices. Key concepts analyzed include digital HRM, e-learning systems, AI-based personalization, gamification, and performance analytics. The methodology includes content examination of strategic training frameworks, stages of learning cycle implementation, and outcome assessments such as Kirkpatrick's model and Return on Investment (ROI) analysis. By systematizing findings from academic literature and HRM practices, the study constructs a conceptual framework illustrating the interaction between digital tools and employee development processes.

Results. Human Resources Management (HRM) is the whole of strategic practices that aim to increase the efficiency and competitiveness of enterprises, and within this framework, training and development stand out as one of the basic functions. Training and development practices contribute to improving both individual and organizational performance by increasing the knowledge, skills and competencies of employees (Goldstein & Ford, 2002, p. 4; Noe, 2017, p. 23). While training refers to providing employees with the knowledge, skills and attitudes required for a specific job or task, development covers a more comprehensive process that reveals the general potential of employees and aims for long-term learning (Goldstein & Ford, 2002, p. 4; Noe, 2017, p. 23). Both processes increase not only individual competencies but also the overall performance of the organization. Particularly effective training and development practices by develop the performance of employees, increase their innovation capacity and thus provide strategic advantage to organizations (Burke & Hutchins, 2007, p. 265). As a result, training and development processes not only improve the knowledge and skills of employees, but also contribute to organizations improving their internal processes and gaining competitive advantage in the foreign market (Kocabaş, 2016, p. 45). In this respect, training and development is being evaluated as a strategic tool that supports individual development and triggers institutional transformation.

Stages of Training and Development Processes. Training and development processes are a set of systematic steps structured to increase the knowledge, skills and competencies of employees. These processes consist of four stages: needs analysis, design, implementation and evaluation. Each stage plays a critical role in increasing the effectiveness of training programs and achieving organizational goals (Blanchard & Thacker, 2013, p. 67; Goldstein & Ford, 2002, p. 12; Noe, 2017, p. 104).

Table 1. Stages of Training and Development Processes

Stage	Description
Needs Analysis	Identify training requirements at organizational, job, and individual levels.
Design	Plan content, goals, methods, and materials aligned with SMART criteria.
Implementation	Deliver training, ensuring educator competence and effective methods.
Evaluation	Assess effectiveness using models like Kirkpatrick's; analyze ROI.

Source: developed by the author

Needs Analysis. This analysis is the first step that forms the basis of the training process and determines the direction of the other stages. This analysis is performed at three levels. At the organizational level, the skills required to achieve general strategic goals are determined; at the business level, the required competencies are revealed through job descriptions and task analyses; and at the individual level, the differences between employees' current skills and job requirements are identified (Blanchard & Thacker, 2013, p. 67; Goldstein & Ford, 2002, p. 12; Noe, 2017, p. 104).

Design Phase. At this stage, the training program is planned to address the deficiencies identified as a result of the needs analysis. At this stage, goals in line with SMART criteria are determined; the nature of the content, methods (face-to-face, online, gamification, etc.), training duration and resources to be used are clarified. Configuration that are appropriate for the learning styles and needs of the participants are important for the success of this stage (Goldstein & Ford, 2002, p. 45; Blanchard & Thacker, 2013, p. 76).

Implementation Stage. This stage is the process in which the designed program is put into practice. The competence of the educators, the applicability of the methods used, the suitability of the educational environment and the technological infrastructure directly affect the success of this stage. Feedback received from participants ensures the dynamism of the process and enables instant improvements (Noe, 2017, p. 137; Tannenbaum & Yukl, 1992, p. 407; Koç & Arslan, 2017, p. 50; Goldstein & Ford, 2002, p. 28).

Evaluation Stage. This phase is carried out to measure the effectiveness of training programs and to guide the improvement of future programs. Kirkpatrick's four-level model measures participant responses, learning level, behavioral change, and organizational outcomes. In addition, ROI (Return on Investment) analyses evaluate the cost effectiveness of training and its contribution to workforce productivity (Kraiger, Ford & Salas, 1993, pp. 572-574; Burke & Hutchins, 2007, p. 270). Carrying out training and development processes gradually and systematically contribute to organizations both increase employee performance and achieve their strategic goals. In this process, accurate identification of needs, effective program design, efficient management of implementation and continuous evaluation are the main elements that determine the success of the process (Blanchard & Thacker, 2013; Goldstein & Ford, 2002; Noe, 2017).

The Effect of Training and Development on Organizational Performance. Training and development activities have a direct impact on performance by increasing the efficiency of organizations. Educated employees increase both individual and corporate success by performing their duties more effectively and quickly. This issue increases the competitive power of organizations and makes it easier for them to

achieve their strategic goals (Blanchard & Thacker, 2013, p. 23). In addition, training programs increase the motivation of human resources by increasing employee loyalty and job satisfaction. When employees are in a work environment where they are given development opportunities, their sense of belonging to the organization is strengthened and their turnover rates are reduced (Burke & Hutchins, 2007, p. 265).

Table 2. Effects of Training and Development on Organizations

Impact Area	Effect Description
Organizational Performance	Improves task efficiency, enhances strategic goal achievement.
Motivation	Boosts employee engagement, fosters teamwork and job satisfaction.
Organizational Commitment & Turnover	Strengthens loyalty, reduces turnover and talent loss.
Competitive Advantage	Develops agility and innovation, supports sustainability and competitiveness.

Source: developed by the author

The Effect of Training and Development Programs on Motivation. Training and development programs not only provide employees with professional skills, but also significantly increase their motivation. Contributing to employees' personal and professional development processes strengthens their commitment to the organization. Providing learning opportunities makes employees feel valued and realize that they are in an environment where they can achieve their individual goals. This enables them to put more effort into their work and produce more creative solutions (Noe, 2017, p. 42). Additionally, training activities encourage cooperation among employees. Activities that focus on group work, team dynamics and leadership skills increase interaction within the organization, creating a more harmonious and solidarity-oriented work environment. Hence, a strong team spirit develops and productivity increases throughout the organization (Yıldırım, 2021, p. 106).

The Effect of Training and Development on Organizational Commitment and Workforce Turnover Rate. Training and development programs play an important role in increasing the commitment of employees towards the organization. Increased organizational commitment increases the loyalty level of employees and reduces their tendency to leave the job. Effective implementation of training and development strategies reduces turnover rates. Thus, the organization can retain qualified employees and minimize talent loss (Tannenbaum & Yukl, 1992, p. 405).

The Effect of Training and Development Strategies on Competitive Advantage. Training and development programs provide organizations with a significant competitive advantage. A qualified and equipped workforce enables organizations to be innovative, flexible and fast-moving. In this way, institutions can quickly adapt to changes in the market and get ahead of their competitors. Educated employees can effectively adapt to changing business conditions and contribute to organizational agility (Blanchard & Thacker, 2013, p. 102). These strategies are also critical to long-term success and sustainable productivity. Research in the literature reveals that training and development practices directly contribute to organizational success. While Goldstein and Ford (2002) draw attention to the impact of these processes on workforce productivity, Noe (2017) states that individual development provided through training plays a fundamental role in achieving the strategic goals of organizations.

Discussion. In today's business world, digitalization has become a fundamental component of training and development processes in human resources management. Digital technologies not only increase the accessibility of education, but also make learning processes more flexible and individualizable. Thus, employees can receive training at their own pace and needs and have the opportunity to learn independently of time and space constraints (Yıldırım, 2021, p. 104; Koç & Arslan, 2017, p. 50; Goldstein & Ford, 2002, p. 92). Educational content offered through digital platforms not only provides cost advantages, but also makes it possible to reach a large number of participants at the same time and speeds up the updating of content (Goldstein & Ford, 2002, p. 94; Yıldırım, 2021, p. 107; Noe, 2017, p. 42). Additionally, online systems support continuous improvement of educational strategies by providing tests, surveys, and feedback tools to measure and evaluate participants' progress (Burke & Hutchins, 2007, p. 265). Digitalization, which increases the quality of education, makes the educational experience more interactive and motivating thanks to innovative applications such as gamification, virtual reality (VR), augmented reality (AR) and mobile learning. These tools provide high impact especially in skill development and applied training (Koç & Arslan, 2017, p. 46; Blanchard & Thacker, 2013, p. 101). Artificial intelligence and big data analytics contribute to significant contributions to the individualization of educational processes and the improvement of performance analysis. While artificial intelligence can create content specific to users' needs, data analytics provides data for organizational decision-making processes by measuring the effectiveness of training strategies (Blanchard & Thacker, 2013, p. 45; Kraiger, Ford, & Salas, 1993, p. 580). E-learning and learning management systems are central elements of digitalization in education and development processes. While these systems enable personalization of education plans and enable institutions to develop education policies in line with organizational goals. In addition, by monitoring employee performance data, required training areas are determined and content is designed accordingly (Noe, 2017; Goldstein & Ford, 2002; Blanchard & Thacker, 2013, p. 45). The key benefits that digitalisation brings to the training and development process include improved efficiency and flexibility. Automation, e-learning platforms, and virtual collaboration tools offer employees on-demand and flexible learning opportunities while reducing training costs (Van Luan, 2023; Rustam et al., 2024; Lumi, 2020; Slatvinskyi & Fomenko, 2024; Zhang & Chen, 2023; Zakaria et al., 2025). Moreover, digitalization supports a culture of continuous learning with personalized learning paths and adaptable training contents, helping employees adapt to technological developments and corporate needs (Van Luan, 2023; Rustam et al., 2024; Lumi, 2020; Slatvinskyi & Fomenko, 2024). However, digital literacy and information technology skills are at the core of HR training so that employees are prepared for changing job roles and innovation is encouraged (Mykhailovska et al., 2024; Rustam et al., 2024; Lumi, 2020; Slatvinskyi & Fomenko, 2024; Siyi, Yu, & Al-Samawi, 2023; Zakaria et al., 2025). Finally, digital HR systems facilitate monitoring of performance and training effectiveness and enable more informed and data-driven decision making (Lumi, 2020; Slatvinskyi & Fomenko, 2024; Zhang & Chen, 2023; Zakaria et al., 2025). In summary, digitalization has made human resources training and development

processes more flexible, accessible, cost-effective and interactive. Technologies such as gamification, VR, AR, artificial intelligence and data analytics increase the quality of education and make significant contributions to organizations achieving their strategic goals. In this way, effective digital training strategies strengthen the efficiency and competitiveness of organizations by improving the competencies of employees (Tannenbaum & Yukl, 1992, p. 405; Mykhailovska et al., 2024; Zhang & Chen, 2023; Jayabalan et al., 2021).

Conclusion. In today's business world, digitalization has created radical transformations in education and development processes, and traditional methods have been replaced by more flexible, accessible and cost-effective digital solutions. Thanks to the digitalization of training platforms, employees can receive training tailored to their individual learning needs without time and space limitations. This increases both the effectiveness of the learning process and participation rates. Technologies such as gamification, virtual reality (VR), augmented reality (AR) and artificial intelligence (AI) add innovation and depth to training processes; thus, employees have more interactive and application-oriented learning experiences. Moreover, while digital training tools enable organizations to reduce training costs, they also enable accurate identification of training needs and rapid updating of content through data analytics and tracking systems. This digital transformation supports not only individual development but also the success of corporate strategies. Therefore, a holistic training and development approach that takes advantages of offered by digitalization is of critical importance for organizations to maintain their competitive opportunities and achieve sustainable success.

Author contributions. The authors contributed equally.

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