

THE ROLE OF HUMAN CAPITAL IN THE ERA OF DIGITAL ECONOMY. A SYSTEMATIC LITERATURE REVIEW

Jakub HOLÚBEK, Jana MASÁROVÁ

Abstract

Digitalisation plays a key role in today's economy, where businesses need to invest in developing the digital competences of their human capital to remain competitive. Human capital is thus becoming an essential element of the digital transformation process. In this context, increasing investment in human capital is an essential strategy to foster innovation and sustainable growth. Although the existing literature addresses various aspects of human capital in the digital economy, a systematic review of the most relevant research areas is still lacking. The aim of this study is therefore to identify current research directions regarding the role of human capital in the digital era. Based on an analysis of peer-reviewed articles from the Web of Science database, published in SSCI journals in Q1 and Q2 categories, we identified key research areas using the PRISMA method. The most frequently researched topics include the importance of human capital, the development of digital competencies, investment in innovation and business performance. This study provides a systematic literature review that can serve as a foundation for future research initiatives in the digital economy and human capital development.

Key words:

digital economy, Human capital, Digital transformation, Innovation

JEL Classification M12, M14, M15. M20

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INTRODUCTION

Today, we are witnessing rapid digital and technological changes that are shaping the way companies operate and, more importantly, changing established work processes. (Hossain et al., 2024). These changes involve integrating elements of digital transformation into all aspects of the enterprise (Liu et al., 2024). The speed at which businesses adapt to these changes has become a critical factor for competitiveness in the current economy (Ferrer-Serrano et al., 2024). Human capital plays a major role in this adaptation process (Stephany & Teutloff, 2024; Van et al., 2023). Increasing competitive pressures are forcing firms to promote and develop their human capital, especially their digital competences (Chaudhuri et al., 2023; Heubeck & Meckl, 2022; Hossain et al., 2024). Continuous learning is essential, especially because human capital represents a source of innovative and creative thinking that machines are not yet able to fully replace (Ji et al., 2023). Keegan & Meijerink (2023) add that human capital is a major key to moving forward and to maintaining a company's competitiveness. Not only businesses but also universities are already responding to this fact and are increasingly

trying to educate students in digital competencies so that they are more prepared for working life (Canal et al., 2024; Ji et al., 2023; Moncada et al., 2024).

Empirical findings in recent years highlight the role of human capital as a source of innovative progress (Cabrilo et al., 2024). Therefore, Canal et al. (2024) in their research call for transforming education systems so that future employees acquire the necessary digital competencies associated with business transformation before they enter the workforce. They also add that higher education in particular has a significant impact for the current digital economy and for human capital development. Ji et al. (2023) add that it is essential to teach students innovative competencies through the development of higher education. Fostering high-quality development is essential for building talents who bring innovation in the current digital era. It is the ability to innovate and the subsequent investment support that is essential for businesses to remain competitive (Moncada et al., 2024). At the same time, human capital plays a key role in economic development precisely because of the innovative

capabilities that enhance business performance (Simionescu et al., 2021).

The authors of numerous academic studies agree that human capital is an essential component in the era of the digital economy. Despite this research, a systematic and comprehensive view of the role of human capital in the digital economy is still lacking. Therefore, the aim of this research is to identify current research directions in the field of human capital and the digital economy. In addition to identifying the main research themes, two research questions are identified to complement the systematic literature review.

RQ1: What keywords do authors use most often in their publications?

RQ2: Which authors are the most cited on the subject?

For the purpose of gathering the necessary literature, the Web of Science database was used, where only journals indexed in SSCI in the categories of management and economics were identified as Q1 and Q2. Books and conference proceedings were not included in the systematic literature review. The PRISMA method was used for the systematic literature review (Page et al., 2021). Bibliometric analysis using VOSviewer was used to identify keywords and most cited authors.

The following chapters explain the methodological procedures, in particular the data collection procedures and the way of their subsequent evaluation. Then, the most relevant research themes for the period 2020-2024, which were identified in the systematic literature review, are presented in the results and discussion. Implications for science and practice are also presented, and finally, the most significant results, research strengths and weaknesses, and suggestions for further research are summarised.

2. RESEARCH METHODS

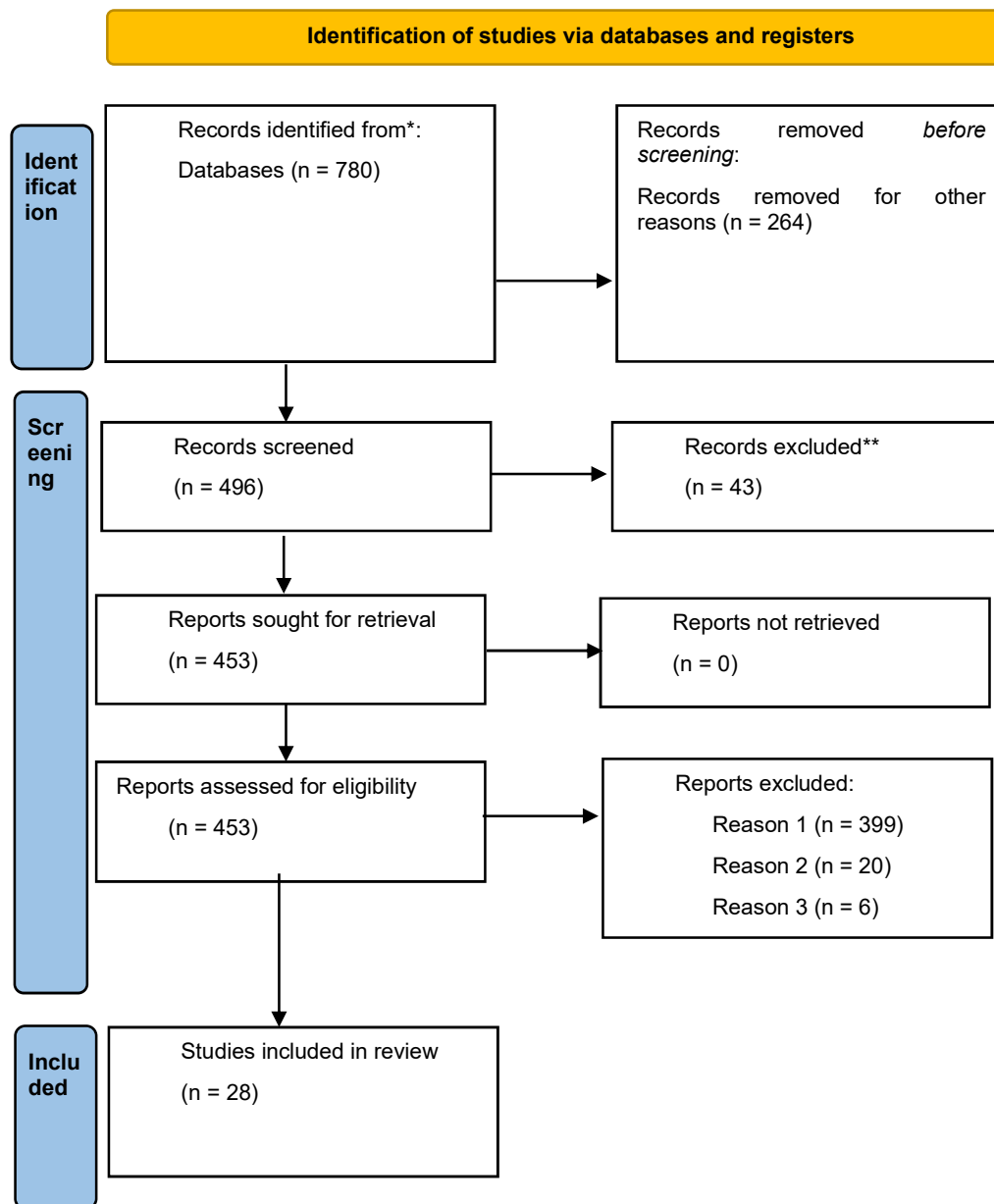
A sample of publications (n=28) was used in the research. This sample includes

publications that directly address the issue of 'human capital and the digital economy'. They were published between 2020 and 2024 in journals indexed in the SSCI Web of Science scale as Q1 and Q2. Based on the ranking of the journals at the top of the SSCI scale, it is possible to define their quality and importance in terms of contributions to science. The data collection itself was carried out through the Web of Science database, which provides a wide range of high quality peer-reviewed journals. For the purpose of selecting and retrieving relevant publications, the PRISMA method was used. PRISMA contains checklists with seven sections and items that govern the areas of the systematic literature review, such as eligibility criteria, sources of information, search strategy, selection process, data collection process, and an elaborate flow chart (Page et al., 2021). The main advantages of the PRISMA method are the adherence to strict rules that lead to the presentation of all necessary information to assess credibility and transparency and, above all, the elimination of subjective bias (Rózsa et al., 2023). The final PRISMA selection and selection process is illustrated in Figure 1.

In a first step, keywords (human capital and digital economy) were identified and used to search for published articles (n=780). Next, publications were filtered based on the span of 2020 to 2024 (n=496). We focused exclusively on articles, while conference papers and books were not considered (n=453). Subsequently, the management and economics categories, the SSCI index, and the filtered journals that ranked as Q1 and Q2 in the SSCI scale were determined (n=28). The filtering of journals was performed using the Journal Citation Report tool. The PRISMA method resulted in 28 articles published in 20 journals.

To complement the systematic literature review, two research questions were set. Using bibliometric analysis, the keywords most frequently used by the authors were identified. In addition to the identification of keywords, the most cited authors in the subject were identified through bibliometric analysis.

Figure 1: PRISMA cell selection process



Source: Processed by the authors

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The methods used bring concrete limits. The main limitation of the PRISMA method is the fact that its results are quantitative in nature. It relies on quantitative data and does not take into account the quality of the individual variables that enter into it. Therefore, it is necessary to have clearly defined rules for the selection of the sample that enters the method, e.g. by filtering only the most reputable journals. Similarly, the limitation of bibliometric analysis is the restriction to quantitative data only. Thus, high quality articles that are published in less prominent journals are not included in the given sample that enters the analysis. Another limitation is that bibliometric analysis assesses quality based on the number of citations of a given article. A final limitation is that the bibliometric analysis ignores the content context of the article and relies solely on numerical values.

3 FINDINGS AND DISCUSSION

Current research published between 2020 and 2024 mostly points to the fact that human capital has an indispensable role to play in today's digital economy. Human capital is seen as a vehicle for innovation, without which businesses would not be able to sustain their competitiveness (Simionescu et al., 2021). For

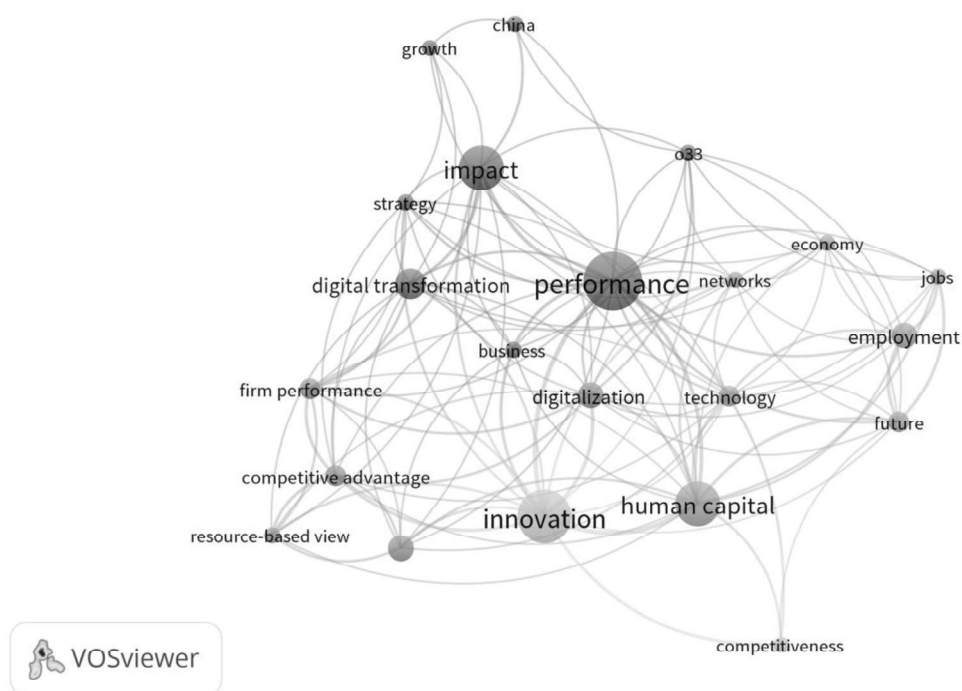
example, research Hossain et al., (2024) aimed to provide a model to enhance the digitalisation of SMEs. The authors concluded that human capital plays an indispensable role in bringing strategic innovations that contribute to the digitalization of SMEs. Similar findings were also reached by Keegan & Meijerink, (2023) who add that human capital is an essential element of enterprise value creation. Therefore, it is important to continuously educate human capital and develop their digital competencies. Ji et al., (2023) state that the promotion and development of universities is required and necessary in this new era. The aim of their research was to investigate how high-quality higher education can provide innovative solutions in economic development decision-making in the digital economy era. The findings showed that Chinese regions that have higher quality universities perform better economically than regions that have fewer or no universities. The overall findings suggest that high-quality digital competency development is necessary not only for businesses to remain competitive but also for regions to grow economically. In the same way, research Canal et al, (2024) concludes that higher education has a major impact on boosting the economy and developing human capital.

The main role of human capital is to deliver innovations that support digital transformation and business performance (Chaudhuri et al., 2023; Chen et al., 2024). Businesses are constantly compelled to invest in these innovations. Research conducted by Moncada et al. (2024) found that businesses most often invest in innovations that were delivered by human capital with the highest education and most advanced digital competencies. Further, the research Qin et al, (2024) revealed that SMEs are also compelled to invest in research and development of new innovations to maintain performance and competitiveness. Yu et al, (2024) add that enhancing investment in enterprise innovation through digital transformation is an important strategy to promote innovation across the market. Thus, digital transformation facilitates technological innovation, promotes human capital and thus contributes to higher enterprise performance (Cabrilo et al., 2024; Chaudhuri et al., 2023; W. Yu et al., 2023; Zhao & Fang, 2023).

The main objective of the research was to identify current research directions in the field of human capital and the digital economy. Based on a systematic literature review, the following research themes were identified: the importance of human capital, the development of digital competencies, investment in innovation and business performance. A comprehensive overview of published articles and their research

topics is presented in the appendix (Table 1). Through bibliometric analysis, we identified the most used keywords mentioned by the authors in their papers. Specifically, these are the terms: performance, human capital, innovation and digital transformation.

Figure 2: Bibliometric analysis of keywords

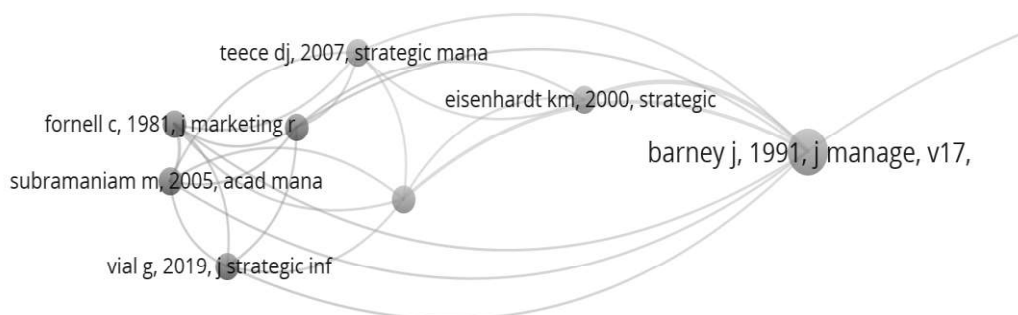


Source: Processed by the authors

Next, the most cited authors whose ideas were relied upon by the current authors of the articles were identified. Specifically, these authors are Barney (1991) and Fornel (1981)

with a citation count of 5. The current most cited authors in the study area are Large (2020), Vail (2019), and Warner (2019), with each author being cited 3 times within the identified articles.

Figure 3: Bibliometric analysis of the most cited authors on the subject



Source: Processed by the authors

The research provides a systematic and comprehensive list of available quality resources that can assist authors in their personal research on the role of human capital in the digital economy era. In addition, the results may be beneficial for businesses undergoing the digital transformation process. Digital transformation has a significant impact on their performance.

4. CONCLUSION

Human capital plays a significant role in the current era of digital technology, as evidenced by the numerous leading scientific research papers in top journals. Despite the widespread evidence of the importance of human capital, there has not yet been a systematic and comprehensive review of scientific knowledge that brings together the most up-to-date scholarly contributions on the topic. Therefore, the aim of this research was to identify current research directions in the field of human capital and the digital economy. Based on the PRISMA method, 28 articles in 20 major journals were identified. By analyzing the articles, 4 major research themes were identified that were addressed by the authors of the research articles. The first and most significant theme was the importance of human capital. The second theme was the need to develop digital competencies. The third most prevalent theme was investment in innovation

and the last theme was business performance. At the same time, the commonly used keywords that were most frequently mentioned by the authors in their research were clarified. In addition, the most cited authors that researchers relied on in their current research were defined.

The limitations of the research lie mainly in the chosen database, index, quartile and years of selection (Web of Science/SSCI/Q1 and Q2/2020-2024). Therefore, it is not possible to generalize our findings to other databases and years. Despite these limitations, the assumption is that findings published even in a narrow selection of high-quality journals reveal the current direction of the field to the required extent.

Future research could extend the systematic literature review for future years. Similarly, future research could address issues of human capital engagement, motivation and satisfaction in the digital economy.

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ATTACHMENTS

Table 1 Systematic literature review

Authors	Year	Goal	Theoretical framework	Method
Andersson, M., Kusetogullari, A., & Wernberg, J.	2023	Analyse the distribution and characteristics of firms investing in software development and focus on the areas of their investment, examining the importance of software development as a form of digital innovation and its impact on competitive advantage in a digitalised economy	Software development is seen as a central element of digitisation and innovation, and is compared to investment in research and development (R&D). Theoretically, in-house software development is thought to be associated with large innovative firms in high-tech and knowledge-intensive industries, suggesting its key role in building competitive advantage.	Analysis of data from a unique firm-level survey of 3,929 firms across Sweden to identify the distribution, characteristics and investment focus of firms in software development
Cabrilo, S., Dahms, S., & Tsai, F.	2024	Deepen understanding of the contingency and complex interrelationships between multidimensional intellectual capital (IC), technological knowledge management (KM) and innovation outcomes in dynamic business environments. Specifically, explore causal recipes for high innovation performance based on different dimensions of IC and digital KM practices.	The article is based on the theory of intellectual capital, which includes traditional (human, structural and relational capital) and new dimensions (renewal capital, entrepreneurial capital, trust capital), and the concept of digital technological knowledge management (KM) as a key driver of innovation performance. The combination of these components creates the conditions for open and collaborative innovation in the digital era	The study uses a neoconfigurational approach and fuzzy-set qualitative comparative analysis (fsQCA) to identify multiple conjoint causes of high innovation performance. The data are drawn from a survey conducted among 102 publicly listed firms in Taiwan. The research revealed four archetypes (causal recipes) that illustrate the relationships between different dimensions of IC, digital KM and innovation performance
Canal, M., de Obesso, M., & Rivera, C.	2024	Examine how educators' digital competencies affect student learning outcomes, as measured by their perceptions of	The study draws on theories of the economics of education and evidence-based learning, focusing on the effectiveness of investments in educators'	DigCompEdu, a validated tool that assesses educators' digital competencies, was used to collect the data. The data was collected through an

learning and learning outcomes. The aim is to develop a model for understanding the impact of educators' digital competencies as a specific factor of pedagogical intervention on learning outcomes, thereby providing a basis for educational policy and higher education management

digital competencies. Higher education is seen as key to economic development and human capital building. The study examines the relevance of professional engagement and digital teaching skills as factors of teaching effectiveness

online questionnaire that was self-administered by the respondents. Correlation analysis and structural equation modeling (SEM) using partial least squares method (PLS-SEM) were applied to analyze the data

<p>Ferrer-Serrano, M., Fuentelsaz, L., & Gil-Lamata, M.</p>	<p>2024</p>	<p>Examine the relationship between the level of digitalization and the effectiveness of technology transfer (TT), focusing on identifying whether countries with medium levels of digitalization perform better in TT than countries with higher levels of digitalization</p>	<p>Digitalisation is seen as a key factor influencing global cooperation and technology exchange. The research challenges the traditional view of the linear impact of digitalization on TT and identifies specific indicators of digitalization (connectivity, human capital, integration of digital technologies) that can influence the position of countries within the TT network</p> <p>A two-stage analysis was used to analyse the relationship between digitisation and technology transfer. The network analysis identified patterns of collaboration between 31 countries and 2 890 organisations. Subsequently, a clustering and ANOVA method verified differences in TT effectiveness by level of digitisation based on data from Horizon Europe and the Digital Economy Index</p>
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<p>Gil-Lamata, M., Fuentelsaz, L., & Latorre-Martínez, M.</p>	<p>2023</p>	<p>Examine how digitisation is supporting the transition to a circular economy (CE) in EU Member States and identify key digitisation drivers affecting CE</p>	<p>The study focuses on the link between digitalisation and the circular economy, analysing their mutual effects and identifying important variables such as human capital, integration of digital technologies and digital public services</p> <p>Using cluster analysis, EU countries were divided into groups (Generators, Recyclers, Achievers, Innovators) according to their circular behaviour. A subsequent analysis of variance (ANOVA) examined differences in digitisation variables between these groups, which allowed to identify key drivers of variability in OH</p>
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Heubeck, T., & Meckl, R.	2022	Examine the impact of dynamic managerial capabilities (managerial human capital, social capital and cognition) on the innovativeness of firms in the digital economy, with an emphasis on their role in the context of Industry 4.0	The study is based on the theory of dynamic managerial capabilities, presenting them as a key factor supporting innovation in digital firms. It extends existing knowledge on their importance in digital versus non-digital industries	The analysis is based on data from the Industry 4.0 survey of German manufacturing companies. The data was processed using regression analysis to examine the impact of the individual components of managers' dynamic capabilities on firms' innovativeness
Hossain, M., Rahman, M., Cater, T., & Vasa, L.	2024	To provide a model to strengthen the digitization of small and medium enterprises (SMEs) in Bangladesh that focuses on strategic innovation (SI) and its impact on digitization in the context of the digital economy	The study is based on research on strategic innovation (SI) and its impact on digitalisation, highlighting the role of human capital (HC), infrastructure and technological and resilience factors in SMEs	A survey of 180 SMEs in the Bangladeshi manufacturing sector was used to collect data. The analysis focused on identifying patterns between strategic innovation, human capital and digitalization in SMEs
Chaudhuri, R., Chatterjee, S., Vrontis, D., & Vicentini, F.	2023	Empirically examines the relationship between human capital and entrepreneurial ecosystems, focusing on the role of digital knowledge capacity, innovation capacity and technological disruption	The study builds on the theory of the resource-based view (RBV) and absorptive capacity to develop a theoretical model of entrepreneurial ecosystems that incorporates human capital, digital and innovation capacity, and technological turbulence	The study uses literature inputs to develop a theoretical model, which is then validated using structural equation modelling technique, with data collected from start-ups in India
Chen, H., Yuan, B., Li, Z., & Bai, T.	2024	The study elucidates the theoretical mechanism through which the development of the digital economy (DE) affects smog pollution (SP), and empirically examines this relationship using panel data from China	The industrial structure coordination perspective is used to explain the relationship between DE, smog pollution and industrial structure development, incorporating industrial structure rationalization (ISR) and industrial structure advancement (ISA)	Panel data on 214 cities in China over the period 2010-2019 are used for empirical analysis to explore the relationships between the digital economy, industrial structure and smog pollution

<p>Ji, M., Jiao, Y., & Cheng, N.</p>	<p>2023</p>	<p>The study aims to explore how high-quality higher education can provide innovative solutions in economic development decision-making in the digital economy (DE) era, with an emphasis on the role of higher education in economic development and human capital cultivation</p>	<p>The study analyses the role of higher education in economic development, highlighting the importance of human capital for economic development. Innovations are supported by a methodology for assessing the quality of economic development through system indices and regional gap analysis</p>	<p>The methods used are entropy weighting in intelligent decision making, TOPSIS sorting technology, and analysis of regional differences using the average logarithmic deviation, the Theil index, and the Gini coefficient. The data cover the period 2015-2021 for the province of YREZ</p>
<p>Keegan, A., & Meijerink, J.</p>	<p>2023</p>	<p>The study aims to rethink the assumptions of Lepak and Snell's (1999) human resource management (HRM) architecture model, which considers contractors as low-value human capital contractors, in the context of digital technologies and algorithmic management that enable organizations to manage external workers more effectively</p>	<p>The study criticizes the original HRM model, which links the value of human capital to internal hiring and minimal management of external staff. The new perspective emphasizes the importance of external workers who are effectively managed using algorithmic technologies, which enhances their contribution to innovation and the competitive advantage of organizations</p>	<p>The authors draw on an analysis of modern online work platforms and algorithmic management, challenging traditional assumptions about outsourced workers and HRM practices. Based on this analysis, they propose an extension of the original model to include new factors related to digital technologies and outsourcing</p>
<p>Lin, Y., & Li, C.</p>	<p>2023</p>	<p>The study focuses on analyzing the impact of rural e-commerce agglomeration on family farms in the Yangtze River Delta region of China, to explore how digital technologies such as 5G, AI and blockchain contribute to agricultural development and increasing the efficiency of family farms</p>	<p>Drawing on agglomeration and digital transformation theory, the study explores the different mechanisms that enable rural e-commerce to contribute to the development of family farms. Attention is paid to knowledge spillovers, infrastructure sharing and labour adjustment that promote growth and productivity gains</p>	<p>Methods such as fixed effects, GMM, spatial Durbin model, and mediating effects model were used to analyze the impact of agglomeration of rural e-commerce on family farms, using an urban panel dataset from 2015 to 2020</p>

<p>Moncada, R., Carbonero, F., Geuna, A., & Riso, L.</p>	<p>2024</p>	<p>The study examines the impact of investment in digital technologies on labour demand in the manufacturing sector, with an emphasis on the relationship between digital investment and the likelihood of employing workers with different levels of education</p>	<p>The research draws on digitalisation and human capital theory, which examines how investment in digital technologies affects the demand for different worker skills, with an emphasis on technical and science education (STEM)</p>	<p>The Unioncamere Piemonte quarterly survey was used for the analysis, which provided data on investment in digital technology and its impact on employment. The survey focused on a sample of non-microfirms and used quantitative methods to assess the impact of these investments on the demand for employees with different levels of education</p>
<p>Nguyen, H., Pham, H., & Freeman, S.</p>	<p>2023</p>	<p>The aim of this paper is to examine dynamic capabilities as a second-order construct and to identify their antecedents (antecedents) and outcomes. The study examines the impact of various factors such as human capital, organizational learning, environmental dynamics and digital marketing on dynamic capabilities of tourism enterprises in Vietnam</p>	<p>The study is based on dynamic capabilities theory, which examines how firms develop the ability to adapt to changes in the environment and gain competitive advantage. It considers factors such as human capital, organisational learning and digital tools that support this flexibility</p>	<p>The research is based on the analysis of data collected from 242 tourism enterprises in Vietnam, using quantitative methods to assess the impact of various factors on dynamic capabilities and their subsequent impact on the competitive advantage of the enterprises</p>
<p>Petkovski, I., Fedaev, A., & Bazen, J.</p>	<p>2022</p>	<p>The aim of the study is to use the pillars of sustainable competitiveness (social, economic, and environmental and energy) to assess international developments in digitalisation and to understand the patterns between competitiveness and digitalisation</p>	<p>The study builds on the concept of sustainable competitiveness and its relationship to digitalisation, focusing on economic, environmental and energy factors as key determinants of progress in digitalisation</p>	<p>Non-linear regression and artificial neural network (ANN) models applied to annual data from 33 European countries over the period 2010-2016 are used to identify patterns between drivers of sustainable competitiveness and digitalisation</p>

Qin, J., & Lin, J.	2024	<p>The aim of the study is to examine how CEOs' foreign experience influences the digital transformation of firms, while also examining the interaction of this experience with other firm resources</p>	<p>The research draws on senior floor theory, which emphasises the importance of senior leadership experience and education in shaping decision-making processes, particularly in the digital transformation of businesses</p>	<p>The study uses panel analysis with data from 790 Chinese listed firms between 2007 and 2019. The research investigates the impact of overseas CEO experience on digital transformation, taking into account factors such as firm inactivity and the presence of digital leaders</p>
Qin, J., Subramanian, A., & Lin, J.	2024	<p>The aim of the study is to investigate how managerial capabilities influence the impact of research and development (R&D) on the financial performance of high-tech small and medium-sized enterprises (SMEs), and how the external environment (such as the economic situation and the development of the digital economy) influences this relationship</p>	<p>The research uses a combination of resource management perspectives and managerial capabilities research, focusing on how managerial capabilities can mitigate or amplify the impact of R&D on the financial performance of high-tech SMEs</p>	<p>The study uses a moderated model and panel analysis on a sample of 256 Chinese high-tech SMEs from 2007 to 2019. The research examines how managerial capabilities affect the relationship between R&D and financial performance, taking into account factors such as the economic downturn and the development of the digital economy in regions</p>
Ren, S., Li, L., Han, Y., Hao, Y., & Wu, H.	2022	<p>The aim of this research is to examine the impact of digital economy agglomeration on inclusive green growth and to identify the transmission mechanism by which the digital economy affects this growth in China. The study also aims to analyze the impact of the "Broadband China" policy on inclusive green growth at the local level</p>	<p>The research is based on an inclusive green growth model that integrates aspects of ecological, economic and social development. A combination of methodologies such as the Slacks measure of directional distance functions (SBM-DDF) and the global Malmquist-Luenberger index (GML) are used to measure inclusive green growth and the geographical concentration of the digital economy. The transmission mechanism includes factors such as energy consumption, pollution, economic growth, human capital, industrial structure and technological progress</p>	<p>The research uses panel analysis for 282 cities in China from 2004-2019 to measure inclusive green growth. The digital economy is assessed based on geographic concentration. A spatial difference-in-differences (SDID) model is used to analyze policy effects, examining the impact of the "broadband China" policy</p>

<p>Sect, P., Jogulu, U., Cripps, H., & Nejati, M.</p>	<p>2023</p>	<p>This research focuses on exploring the impact of the sharing economy on the employability of women, specifically mothers, through digital peer-to-peer (P2P) platforms. The authors explore how these platforms can influence women's perceptions of employability, improve skills and unlock human capital through technology acceptance</p>	<p>Drawing on human capital theory, the research explores how sharing economy platforms can help women overcome skills degradation issues and improve the signalling of their capabilities to potential employers. In addition, social interactions between mothers are explored, which may support future self-employment or entrepreneurship</p>	<p>The research used a pragmatic approach with a single case study design, applying the Gioia methodology. Data collection was conducted using a semi-structured telephone survey that explored mothers' decisions regarding the use of a new P2P mobile application that supports their employability. The analysis was inductive, using thematic analysis and structural equation modelling using the partial least squares method (PLS-SEM)</p>
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<p>Simionescu, M., Pelinescu, E., Khouri, S., & Bilan, S.</p>	<p>2021</p>	<p>The aim of this paper is to examine the role of innovation, foreign direct investment (FDI) and human capital in promoting the competitiveness of European economies, focusing on their impact on competitiveness growth in the digital economy</p>	<p>The research extends the Cobb-Douglas production function to include competitiveness factors such as foreign direct investment, innovation and human capital. The framework focuses on how these factors affect economic growth and competitiveness at the EU-28 level</p>	<p>The research uses panel data from EU-28 countries over the period 2004-2018 to empirically test the impact of innovation, FDI and human capital on competitiveness. The model extends the traditional Cobb-Douglas function with factors such as GDP per capita, labour force, R&D expenditure, and FDI. The results are analyzed through these extended economic formulas to determine the impact of these factors on economic growth and competitiveness</p>
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Stephany, F., & Teutloff, O.	2024	<p>The aim of this research is to determine which skills are the best investment for workers and firms in the context of technological change, based on the complementarities between different skills. The research aims to analyse how the combination of different skills affects their economic value and to identify the most to increasing workers' wages and competitiveness</p>	<p>Research suggests that the value of skills is determined by the complementarity between different types of skills. Skills that can be combined with other valuable skills have a higher economic value. This approach includes an analysis of Artificial Intelligence (AI) skills, which have particularly high value due to their strong complementarity with other technical skills and the growing demand in the labour market</p>	<p>The researchers analysed a set of 962 skills and found that their economic value is highest when combined with other skills, particularly in areas such as artificial intelligence. The research tested the model on AI-related skills and found that these skills increase workers' wages by an average of 21%. The model was developed to identify the most valuable skills and to provide recommendations for digital reskilling and education and labour market policy</p>
Tang, L., Xu, Z., & Lyu, X.	2023	<p>The purpose of this study is to investigate the impact of the host's reputational asset (host popularity) and human capital (speed of entry and managerial seniority) on the expansion of the shared accommodation business, using resource-based theory. The research focuses on digital micro-entrepreneurs in the shared accommodation industry, specifically on the Airbnb platform</p>	<p>Resource-based theory is used to explain how factors such as host popularity and speed of entry affect expansion in the sharing economy. The research also takes into account managerial seniority, which can affect the success of business expansion</p>	<p>The study uses data collected using a Python web crawler from the Airbnb platform, specifically collected from 2013-2018 in Beijing. The data on 348 hosts were analyzed using ordinary least squares regression model with year fixed effect. This model focuses on examining the impact of host popularity, speed of entry into the business, and managerial seniority on the expansion of hosts' business</p>
Toma, S., & Hudea, O.	2024	<p>The aim of the research was to find out the views of Generation Z students on the skills, abilities and competencies needed in the era of artificial intelligence systems</p>	<p>The research contributes to the literature on the relationship between human capital and the era of artificial intelligence and offers new insights into the structure of necessary skills, competences and capabilities in the digital society</p>	<p>A quantitative research method through an online survey was used, analysing a sample of 352 undergraduate students in Romania. The data were processed using SPSS 17.0 statistical software and the methods used included principal components analysis and correlation analysis</p>

<p>Van, I., Kotaskova, A., Ferraris, A., & Le, T.</p>	<p>2023</p>	<p>The study examines the impact of human capital (manager and employee capital) and orientation (market and entrepreneurial orientation) on accelerating digitalisation and improving business performance. It also examines the role of supply chains as direct and indirect mediators between digitisation and business performance</p>	<p>The research focuses on the importance of human capital and business orientation as key factors for driving digitisation and business performance, highlighting the role of supply chains as intermediaries in this process</p>	<p>The study uses a quantitative ethodological approach and empirical analysis based on a random sample of 368 managers and owners of food processing enterprises in Vietnam. The analysis of the relationships was conducted using structural equation modelling (SEM)</p>
<p>Yang, L., & Liu, Y.</p>	<p>2024</p>	<p>The study examines the impact of building digital infrastructure on the resilience of China's production chain, focusing on the mechanism and spatial impact of digital technologies on the ability of industrial chains to cope with the risks of disruption</p>	<p>The research is based on the assumption that digital infrastructure positively affects the resilience of industrial supply chains, while also examining the heterogeneity of effects across regions depending on the level of economic development, financing and human capital</p>	<p>Panel regression model, quantile regression model, panel threshold model and spatial Durbin model were used for the analysis. These techniques were applied to investigate the internal mechanism and spatial impact of digital infrastructure on the resilience of the production chain in China</p>
<p>Yu, J., Xu, Y., Zhou, J., & Chen, W.</p>	<p>2024</p>	<p>The study examines the impact of digital transformation on business investment in innovation in China, focusing on total factor productivity and the mechanisms that influence this dynamic between 2012 and 2021</p>	<p>The research is based on the premise that digital transformation can promote investment in innovation, but can also have a negative intermediation effect through total factor productivity (TFP), leading to competition for capital and labour inputs between production and innovation</p>	<p>Fixed-effects and random-effects regression methods were used to analyze data from companies listed on the Chinese A-share market over the period 2012-2021. Instrumental variables model was used to control for endogeneity, and panel regression was applied to analyze heterogeneity. These methods allowed us to identify the mechanisms that influence the impact of digital transformation on innovation investment in different groups of firms</p>

<p>Yu, W., Du, B., Guo, X., & Marinova, D.</p>	<p>2023</p>	<p>The purpose of this paper is to examine the relationship between e-commerce and total factor productivity (TFP) at the manufacturing firm level in China from 2015 to 2021, and to empirically test whether e-commerce can improve the productivity growth of manufacturing firms</p>	<p>E-commerce, used directly by manufacturing firms, has the potential to increase TFP growth. This impact is underpinned by two main factors: the supply of quality human capital and more effective market competition between firms. E-commerce contributes to TFP growth through attractiveness for highly skilled human capital and improved market concentration, thereby reducing the intensity of market competition</p>	<p>The research relies on an empirical analysis based on data from 178 manufacturing companies listed on China's A-share market, examining the effects of e-commerce on TFP between 2015 and 2021. Methods include quantitative models to test the impact of e-commerce on productivity and to identify the factors that influence this impact</p>
<p>Zheng, H., & Ye, A.</p>	<p>2024</p>	<p>The purpose of this study is to examine the impact of enterprise digital transformation on technological innovation in Chinese A-listed manufacturing firms between 2010 and 2019. The study focuses on the mechanisms through which digital transformation promotes technological innovation</p>	<p>Digital transformation can support technological innovation in a variety of ways, such as reducing costs, increasing human capital efficiency and deepening R&D collaboration. These factors are seen as key channels through which digital transformation influences technological innovation in enterprises</p>	<p>The research is based on the analysis of data from manufacturing enterprises listed on China's A-share exchange between 2010 and 2019. The study employs quantitative methods and conducts robustness and endogeneity tests to verify the effectiveness and impact mechanism of digital transformation. It also analyzes the heterogeneity of the impact of digital transformation on technological innovation depending on the regional development of the digital economy and the capital intensity of enterprises</p>

Source: compiled by the authors based on the results of the PRISMA analysis

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