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Digital transformation and knowledge in sustainable employability: A systematic literature review

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ABSTRACT

Digital transformation, defined as the adoption and application of emerging digital technologies, is becoming a growing trend. However, the academic literature still lacks a comprehensive understanding of the impacts of these technologies in human resource management (HRM) at organisational and individual levels from the perspective of sustainable employability. This study, therefore, aims to systematise relevant studies from 2019 to 2024 that were published in the top HRM, general management and information systems journals. We extracted 86 articles related to digital technologies, HRM and general management from the perspective of sustainable employability and identified two prevailing themes: (i) a human-centred approach and (ii) a changing perception of work. From these two themes, we derive four perspectives on digital transformation and sustainable employability: organisational, leadership, employee–employer and employee's self-view perspectives.

Introduction

Digital transformation (DT) and sustainable employability have attracted increasing attention from scholars and practitioners as digital technologies continue to reshape multiple domains of the economy and society. DT is commonly defined as organisation-wide change driven by the pervasive diffusion of technologies such as artificial intelligence (AI), the Internet of Things, cloud computing and big data in commercial settings, thereby prompting strategic organisational responses (Dąbrowska et al., 2022; Hanelt et al., 2021; Kretschmer & Khashabi, 2020; Verhoef et al., 2021; Vial, 2021). The transformative power of digital technologies has affected multiple facets of the economy and society at large, with digitalisation-induced changes highlighting sustainable employability, in particular, as a key challenge for today's organisations (Schneider & Sting, 2020; Tschang & Almirall, 2021). Sustainable employability is a unique combination of an individual's work ability (i.e. being physically and mentally able to perform one's work), employability (i.e. having the necessary skills, knowledge, and competence to perform one's work), and vitality (i.e. having the motivation and resilience to complete one's work responsibilities) that determines the individual's ability to continue their work and effectively perform essential roles and responsibilities. (Jabeen et al., 2022; Magnano et al., 2019; Van der Klink et al., 2016).

The adoption of digital technologies affects employability in diverse ways. It has the potential to enhance employees' organisational commitment, job satisfaction and workplace engagement by shaping behavioural patterns and motivational drivers (Palumbo, 2022; Silic et al., 2020), thereby contributing to reduced turnover rates (Kretschmer & Khashabi, 2020; Rabl et al., 2023). However, DT has also generated new competency requirements that are insufficiently addressed by existing formal education systems and corporate training initiatives (Colombari & Neirotti, 2022). The impact of digitalisation is particularly pronounced in front-line and middle-skill occupations that typically rely on technical qualifications and experiential learning. Owing to the variety and complexity of tasks—often characterised by interaction, activity and problem-solving—these roles necessitate the development of new skill sets. Accordingly, workers must be upskilled with an emphasis on enhancing digital literacy to perform their responsibilities effectively. Overall, however, the broader implications of these technologies remain ambiguous. It is not yet fully understood whether their diffusion predominantly leads to job displacement or job creation (Tschang & Almirall, 2021), nor are their effects on information processing and decision-making outcomes sufficiently clear (Budhwar et al., 2023). Nevertheless, because it is clear that contemporary organisations are both affected and need to adapt to the presence of these disruptive technologies (Correani et al., 2020; Verhoef et al., 2021), sustainable employment perspectives need to be integrated into HRM practices and other management functions, presenting a unique

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challenge to organisations.

Furthermore, digitalisation can desensitise the social climate within organisations by either recontextualising or individualising work (Chalutz Ben-Gal, 2022). In addition, with the introduction of digital technologies, employees are experiencing heightened career insecurity, with fewer opportunities for progression (Duggan et al., 2022; Spurk et al., 2022) and demand for more upskilling (Jaiswal et al., 2023). These technologies have also brought stress in the form of techno-stressors, for instance, constant connectivity with the workplace, which has blurred the desired boundaries between work and personal life, can lead to burnout and depressive symptoms (Cadieux et al., 2021; Chen et al., 2022; Cram et al., 2022; Shevchuk et al., 2019). Employees are experiencing self-regulation impairments in their work (Chen et al., 2022), and their commitments are affected by role ambiguities (Muylaert et al., 2023), which may weaken trust and undermine perceptions of workplace fairness (van Houwelingen & Stoelhorst, 2023).

Conversely, the use of internal digital communications (Luo et al., 2019; Wuersch et al., 2023), hybrid workspaces (Petani & Mengis, 2023) and digital platforms of work (Grimshaw et al., 2023) can all strengthen interactions between stakeholders. Contemporary organisations can use digitalised talent management decisions through a standardised approach (Wiblen & Marler, 2021), promote more open innovation opportunities through knowledge inflow and outflow (Remneland Wikhamn et al., 2023) and provide boundaryless work opportunities with flexible work arrangements (Duggan et al., 2022). However, these studies also stress a need for more scholarship related to these fundamental changes in work settings, the future of work and implications for both employees and employers (Menges et al., 2024).

In the corporate world, given that organisations are trying to promote innovative work behaviours through increased learning and knowledge sharing (Datta et al., 2023; Nicolini et al., 2022), DT has significantly affected how firms organise work and jobs. This has resulted in changing employment relations (Duggan et al., 2022), requiring a new approach to managing employees with different managerial attention (Bendig et al., 2023; Vrontis et al., 2022). Similarly, these digital technologies have contributed towards new leadership challenges that were unknown in the past. These include managing global virtual teams (Nordbäck & Espinosa, 2019); attaining employee compliance behaviour through trust and support (Jingmei Zhou et al., 2022); developing new managerial control mechanisms for self-managing teams (Khanagha et al., 2022); using datafication technologies for employee-related data gathering, analysis, interpretation; and learning to support digitalised talent management decisions (Schafheitle et al., 2020; Wiblen & Marler, 2021). Therefore, the role of managers requires care and empathy for employees to ensure their compliance with the system (Schafheitle et al., 2020).

In summary, it can be argued, first, that DT has affected both organisations and employees by significantly changing the nature of the relationship between them. A changing perception of work has also changed how people relate themselves to an organisation. Second, given uncertainties about the DT phenomenon, the effects of DT on sustainable employability are currently unclear. Third, DT brings in organisational change through the widespread diffusion of digital technologies, requiring an adaptation to existing theoretical models and different managerial practices—particularly as concerns how DT relates to the previous role of information technology (IT) in organisations (Hanelt et al., 2021). Finally, from a policymaker perspective, given the need to build sustainable workforces and organisations in the future (Boccoli et al., 2023; Cooke et al., 2022), what is required is a stronger theoretical and empirical understanding of HRM practices in these changing empirical realities. Such an understanding requires both blending psychological, sociological and technological interfaces with digitalising operations, as well as considering employees (Hanelt et al., 2021) through a micro-level approach (Kaufman, 2020; Vial, 2021) to enhance understanding of the impact of these technologies on humans. However, to ensure a holistic perspective of the impact of DT in the workplace, more scholarship is required on human–machine cooperation and acceptance (Klumpp & Zijm, 2019; Wiblen & Marler, 2021).

Related work

Previous reviews or meta-analyses have been either narrowly focused—not covering the broader aspects of sustainable employability (Schallmo et al., 2017; Sharma et al., 2022) and with a limited focus on specific DT skills and competencies required to meet organisational demands (Bouwmans et al., 2022; Matriano, 2023; Trenerry et al., 2021) or have covered general economic, environmental and social impacts but, again, without focusing on sustainable employability (Gomez-Trujillo & Gonzalez-Perez, 2022). These latter reviews usually come from outside of the field of management (Vial, 2021). Because the introduction of digital technologies is related to the phenomenon of organisational change through its demand for a shift in the mindsets of individuals, teams and organisations (Trenerry et al., 2021; van Houwelingen & Stoelhorst, 2023), humans are an important element of socio-technical systems (Loske, 2022). The integration of technological and human perspectives has not only resulted in new identities, relationships and trust building (Wuersch et al., 2023), but requires a shift in focus to study more novel perspectives of non-economic sources of wealth, such as social value, justice and happiness (Bacq & Aguilera, 2022; Colombari & Neirotti, 2022).

Nevertheless, it can be concluded from recent studies that very few research publications highlight such societal challenges as inequalities in the workplace and precarious employment contracts (Aguinis et al., 2022; Harley & Fleming, 2021). Rather, the most common themes of research remain centred around employment-related perspectives and the implications for policy given the repositioning of decision-making governance with the contextual influences of digitalisation (Hughes & Dundon, 2023).

Digital transformation and sustainable employability: preliminaries and main definitions

As has been noted, digital technologies have the potential to cause significant change in a commercial setting (Hanelt et al., 2021), with their transformative nature resulting in organisational change and a change in employees' perception of work. This potential has implications with regard to ensuring the sustainable employability of individuals. In most studies, sustainable employability has been measured according to seven work capabilities: a person's job-fit, strengths, opportunities, work ability, work engagement, job satisfaction and task performance (de Wet & Rothmann, 2022; Gürbüz et al., 2022). However, with the aim of ensuring a better understanding of the multi-dimensional construct, Jabeen et al. (2022) defined sustainable employability by integrating personal and social support resources involving three key components of employability, vitality and work ability through the lens of conservation of resources and social information processing theories. According to them, personal resources comprise career competencies, psychological capital, mindfulness, core self-evaluations and emotional intelligence, whereas social support resources are provided by co-workers and the management of an organisation.

Review methodology

The methodology for this study is that of a systematic literature review, and thus includes three main steps: (i) data collection, (ii) data analysis and (iii) synthesis (Crossan, 2010). A systematic literature review approach is considered trustworthy through its use of an easily reproduced procedure (Crossan, 2010; Tranfield et al., 2003), offering the capacity to critically analyse, synthesise and map extant research by identifying the broad themes involved. This process consists of five steps: (i) the definition of the research questions, (ii) the research paper

collection process, (iii) the definition of inclusion and exclusion criteria, (iv) the identification of relevant studies given the inclusion and exclusion criteria, and (v) data extraction and analysis. These steps are explained in more detail in subsections 4.1 to 4.5.

Research questions

The first step involves defining the research questions necessary for examining and addressing the impact of digital technologies on sustainable employability. More specifically, this project aims to facilitate a deep analysis regarding both the impact of digital technologies on the sustainable employability of individuals and their organisational implications. The thesis statement can thus be stated as follows: How does the digital transformation of organisations influence organisational dynamics and individual employment outcomes from a sustainability perspective? Consequently, this review aims to answer two questions:

RQ1. What are the key challenges of digitalisation affecting emerging themes, perspectives and categories of sustainable employability at the organisational level?

RQ2. What are the key challenges of digitalisation affecting emerging themes, perspectives and categories of sustainable employability at the individual level?

Paper collection process

Searches were performed in EBSCO Academic Search Premier and Business Source Premier because these databases allow access to the full-text content of >1300 peer-reviewed journals in the fields of management and economics. In addition, the research related to technological advancements and HRM is mostly published in journals covered by EBSCO (Vrontis et al., 2022), making EBSCO one of the most complete sources of business studies commonly used in literature reviews (Certo et al., 2009; González-Benito et al., 2013). Although the reliance on EBSCO may be considered a limitation of the study, various studies have relied on a single database for reviews (Hanelt et al., 2021; Soykan & Uzunboylu, 2015; Uriarte et al., 2025).

Selection of articles (Exclusion and inclusion criteria)

Selected papers included only peer-reviewed articles published in journals with high impact on the field (Podsakoff et al., 2005). Specifically, we focused on articles published in journals ranked 3, 4 and 4* according to the Association of Business Schools (ABS) Journal Guide 2021, further compiling a list of journals used in other reviews (Hewett et al., 2018; Pisani et al., 2017). These included premier journals in the HRM, international business, international management and general management fields, with these journals providing the foundations of research concerning technological advancements and information systems related to HRM. Table 1 reports the entire list of 30 journals used in the study.

To gain the most up-to-date picture of recent developments concerning the impact of DT on sustainable employability, six years, 2019 to 2024 became the focus of our search. Because our focus is primarily on HRM, general management and technological management, only those studies that overlapped with these concepts were included. Second, having selected publication outlets and following other state-of-the-art systematic reviews, we limited our choices to full-length, academic peer-reviewed publications written in the English language. Within these limitations, empirical, conceptual and review papers were all considered (Leonidou et al., 2020).

Identification of studies

To identify relevant articles, it was important to establish appropriate keywords. This involved an initial search of relevant articles to identify trends in keyword usage as used in previous reviews (Vrontis et al., 2022), which led to the identification of several keywords related to DT and sustainable employability. These keywords were combined with the Boolean operators 'OR' and 'AND' to search for relevant papers in the top-tier HRM, general management, international business, information systems and psychology journals. The keyword search algorithm performed was: "digital transformation" OR "digitisation" OR "digitalization") AND ("sustainability" OR "sustainable") AND "human resource management". Table 2 presents the total number of articles selected from each journal.

Table 1
List of Academic Journals Searched.

Human Resource Journals	General Management Journals
International Journal of Human Resource Management	*Academy of Management Perspectives*
Human Resource Management Journal	*Academy of Management Journal*
Industrial Relations Journal	*Public Management Review*
New Technology, Work and Employment	*Public Administration Review*
Gender, Work and Organization	*Journal of Product Innovation Management*
Industrial and Labour Relations Review	*Academy of Management Discoveries*
International Business Journals	*California Management Review*
Internal Journal of Management Reviews	*R & D Management*
International Journal of Electronic Commerce	*Journal of Business Logistics*
International Journal of Production Economics	*British Journal of Management*
International Journal of Production Research	*Journal of Business Ethics*
Information System Journals	*Studies in Higher Education*
MIS Quarterly	*Academy of Management Annals*
Journal of Management Information Systems	*Journal of Business Research*
Information Systems Journal	*Corporate Governance: An International Review*
Psychology Journals	
Personnel Psychology	
Journal of Occupational and Organizational Psychology	

Table 2
List of Journals and Articles Related to this Study.

S. No.	Journal titles*	No. of articles
1	*The International Journal of Human Resource Management*	16
2	*MIS Quarterly*	09
3	*Human Resource Management Journal*	06
4	*Journal of Product Innovation Management*	05
5	*Academy of Management Discoveries*	05
6	*Public Management Review*	04
7	*Journal of Business Logistics*	04
8	*Academy of Management Perspectives*	04
9	*Journal of Management Information Systems*	05
10	*International Journal of Management Reviews*	03
11	*British Journal of Management*	02
12	*Journal of Business Ethics*	02
13	*Academy of Management Journal*	02
14	*Information Systems Journal*	02
15	*Studies in Higher Education*	02
16	*Gender, Work and Organization*	01
17	*California Management Review*	01
18	*R & D Management*	01
19	*Industrial and Labour Relations Review*	01
20	*New Technology, Work and Employment*	01
21	*International Journal of Production Economics*	01
22	*Academy of Management Annals*	01
23	*Journal of Business Research*	01
24	*Industrial Relations Journal*	01
25	*International Journal of Production Research*	01
26	*International Journal of Electronic Commerce*	01
27	*Personnel Psychology*	01
28	*Journal of Occupational and Organizational Psychology*	01
29	*Public Administration Review*	01
30	*Corporate Governance: An International Review*	01

Note. * Journal titles are presented in descending order of the number of articles.

Initially, our search resulted in 1420 publications. The search results were then refined according to the predefined criteria by initially extracting only those articles published in the journals ranked 3, 4 and 4* according to the ABS Journal Guide 2021. This resulted in 171 articles. We further refined these 171 articles by reading their titles and abstracts to look for relevant studies covering DT and sustainable employment from HRM and management perspectives, which resulted in our final selection of 86 articles published in 30 journals. We screened the full text of these articles to ensure their eligibility with reference to the inclusion criteria. A total of 86 articles were included for data analysis. Of these, there were 46 empirical studies, 26 conceptual papers and 14 review articles.

Data extraction and analysis

To systematise the collected results in a replicable way (Krippendorff, 1980), relevant information was extracted through the screening and content analysis of articles. Then, according to the objectives of our systematic review, the coded data were entered into an Excel spreadsheet and classified into several categories. These included publication details, type of the paper (empirical, conceptual, review), its relevant to our objectives, unit of analysis, effects of DT on sustainable employability, key findings, limitations and the future research directions provided by the author(s) of each study.

Results of the review

As has been shown, digital technologies have consequences, both beneficial and adverse, at the individual and organisational levels (Vrontis et al., 2022). Their consequences at an individual level might affect an employee's wellbeing, and at the organisational level can be operational or transformational, requiring organisations to focus on the training and career development of employees (Ferraris et al., 2019). In line with these points, our data analysis identified two main research perspectives: one concerning an organisational human-centred approach and one concerning an individual changing perception of work.

Considering the rapid developments of digital technologies and their emerging implications for work processes, it is important to develop a portfolio of research opportunities to help scholars engage in impactful research that advances understanding of the effects of DT on working lives and the challenges it presents to the management of organisations. Consideration of the implications of DT according to an organisational human-centred approach has led to the identification of an organisational design perspective (digital talent management, control mechanisms, decision support systems, stakeholder relations and hybrid workspaces), as well as a leadership perspective (shared, transformational, empowering and servant leadership). These points provide the basis for addressing RQ1: What are the key challenges of digitalisation affecting emerging themes, perspectives and categories of sustainable employability at the organisational level?

Conversely, the changing perception of work stemming from DT highlights the need for a transformed employee–employer relationship (digital trust, employee engagement [EE], affective commitment and boundaryless careers), as well as foregrounding the importance of an employee's self-view (psychological safety, professional autonomy, inclusiveness, meaningfulness, IT mindfulness and technology acceptance). As will be seen, these points provide the basis for addressing RQ2: What are the key challenges of digitalisation affecting emerging themes, perspectives and categories of sustainable employability at the individual level?

Emerging themes, perspectives and categories at the organisational level

Adopting an organisational human-centred approach to HRM will contribute to building a sustainable workforce by facilitating investment in the training and development of employees to equip them with employable skills, providing them with decent and sustainable employment opportunities (Cooke et al., 2022). A 'human-centred' approach is in line with societal goals 3 and 8 of the United Nation's 17 Sustainable Development Goals, which are 'good health and well-being' and 'decent work and economic growth, respectively, and which are expected to be achieved by 2030 (United Nations Department of Economic and Social Affairs, 2015). The International Labour Organisation also promotes a human-centred agenda for the future of work, which is aimed at placing employees and the work they do at the core of economic, social and business policies for achieving growth, equity and sustainability for present and future generations (International Labour Organization, 2019).

Adopting an organisational, human-centred lens that accounts for changing contextual factors requires assessing the congruence of DT with established models in organisational studies and leadership. There is, however, a lack of understanding of the implications of DT in organisations for individuals (Davenport & Redman, 2020; Frankiewicz & Chamorro-Premuzic, 2020), particularly with reference to how digital technologies can be designed and implemented in culturally sustainable ways. Consequent investigation should consider the cognitive and social challenges that employees face in organisational DT, given that digital technologies are transforming not only workplace practices, but values and norms (Dąbrowska et al., 2022).

Adopting a human-centred approach provides useful insight into conceptual developments concerning the future of work. Importantly, such an approach emphasises the social nature of work and knowledge sharing among individuals, noting that such work involves a community of practice, defined as a group of people bound together by a common activity, shared expertise and a desire to learn and improve their practices (Nicolini et al., 2022). As has been noted, although DT is changing traditional workplace practices, recent studies have also shown that human processes are still given preference to over those of technologies such as AI e.g., in the case of job interviews and the evaluation of candidates (Mirowska & Mesnet, 2022). Furthermore, with reference to automation and the introduction of new digital technologies to businesses, people remain an inevitable part of the process, making it important to incorporate human factors that fit human requirements and needs in the workplace (Cooke et al., 2022). Given the shift towards automation and the subsequent need to equip the workforce with digital skills (in some cases workers will need to develop entirely new skills), substantial investment in the training and development of employees is essential (Cooke et al., 2022). Conversely, digital technologies such as social media, collaborative technologies, intelligent decision support systems and management support as an organisational characteristic support employee intrapreneurial behaviours, enabling employees to gain new skills by taking the initiative (Rabl et al., 2023).

The displacing employment effects from digitalisation are not limited to manual work, with knowledge-intensive industries also being affected by the DT of businesses. One such example is the large-scale adoption of automation and online banking, which has resulted in the closure of many bank branches (Cooke et al., 2022). Previous research has shown that prevailing organisational culture and experimental and knowledge-focused workspaces help the acquisition of technological capabilities in knowledge-intensive industries, supporting the skills enhancement of employees (Dodgson et al., 2022). Innovation is everyone's responsibility in professional services firms, meaning that strategies and practices with learning intent need to become embedded in learning behaviours of employees.

Given these points concerning DT in the workplace, future research opportunities include understanding employees' resistance to adopting digital technologies in their work and understanding organisational roles for involving employees in the DT of their workplace and, thereby, gaining their investment in the process. These points mean that a human-centred approach to HRM in the context of DT involves treating workers with equity and fairness, and in line with the United Nation's

commitment in the 17 Sustainable Development Goals to leaving no one behind (United Nations Sustainable Development Group, 2016). Given this analysis, a human-centred approach to organisation can be conceptualised along two primary dimensions—organisational design and leadership.

Organisational design perspective

Organisational roles in achieving sustainable employability through digitalisation is a phenomenon of increasing interest. The rise in digital platforms of work, changing career pathways, calls for an agile workforce and conflicting relations between managers and workers require an organisational planning for the future of work, and have created a need for more scholarship. The examination of inter-organisational relationships to explore the effects of contextual factors (e.g., product market rules, sector regulations, labour market conditions) and HRM practices on workers' commitments, skills development and voice has become crucial in the increasing digitalisation of organisations. Organisations are not only in search of talented, energetic and creative people, but they need to adopt innovative ideas and practices for managing people that encompass supportive strategies, compositions, capabilities and cultures (Snell & Morris, 2021). For instance, findings by Park et al. (2023) show that centralised IT investments help organisations during crises by facilitating organisational coordination and providing instructional and technical support to employees. Although more studies are required to understand how organisational factors and the use of digital technologies affect organisations during crises, key points of tension include digital talent management, control mechanisms, decision support systems, stakeholder relations and hybrid workplaces.

Digital talent management. Proactively investing in talent management is of strategic importance given that the ability to recruit and retain talent is the basis of attaining competitive advantage. However, although the development of talent is becoming crucial for promoting innovative work behaviours, it can be challenging for managers to motivate their team members to apply their specialised skills and knowledge and to promote innovative work behaviours among employees in a knowledge economy (Datta et al., 2023). The stakeholders of an organisation define 'talent management' from their perspective, typically considering the organisation's operational needs and strategic goals (Wiblen & McDonnell, 2020). One specialised area within electronic human resource management, as a result of the DT of organisations, is digitalised talent management (DTM). DTM involves all types of HRM activities, with DTM technology providers categorising talent according to data related to essential competencies, personal qualities, technical skills, professional expertise and experience, further assigning labels such as high performer, high potential or success derived from the automated outcomes of a standardised approach (Wiblen & Marler, 2021).

DTM enables the adoption of structured approaches, incorporating clear talent definitions, evaluation standards and ranking algorithms. This standardisation limits human error, fosters transparency and reduces the likelihood of political bias in the talent management process. However, previous studies have shown that human factors influence the adoption and deployment of digital technologies in organisational talent management decisions, highlighting the important role played by social factors in DT and its obligations towards organisations and human resource managers (Wiblen & Marler, 2021). That is, organisational talent identification is affected by the shared perception of the value of technology versus humans as key decision-makers. This means that human resource professionals play a vital role in managing talent, and the integration of technology into their work strengthens their ability to make more informed decisions in talent management (Boudreau & Ramstad, 2005).

Control mechanisms. The role of organisational control in technological adaptation has been much debated in the extant literature, which has argued that giving complete professional autonomy to employees can result in the rejection of technological adoption and decreased learning (Beane, 2019; Bechky, 2020). Conversely, some studies argue that reduced professional autonomy in the use of technology may result from employee resistance (L. D. Cameron & Rahman, 2022). One of the novel ways to explore workers' wellbeing and their behaviours in the gig economy is through studying the impact of the use of algorithmic controls (control provided by a technology interface) on employees, with results showing both challenge (positive) and threat (negative) techno-stressors (Cram et al., 2022).

Organisational leadership needs both diagnostic and interactive managerial controls to promote innovation in agile teams (Khanagha et al., 2022). Khanagha et al. (2022) suggest that, depending on the level of peer pressure within self-managing teams, management control can foster innovative output. That is, in self-managing teams, diagnostic control helps reduce the negative effects of peer pressure. Interactive control also reduces negative impacts, albeit to a lesser extent. However, diagnostic control negatively affects a team's capacity for innovation. Organisations are increasingly moving towards hybrid workplaces that are characterised by elements from traditional managerial control and current high-performance-based approaches, combining algorithmic management with alternative employment relations (Waldkirch et al., 2021). Thus, the top management of an organisation can play a strategic role in technological implementation by adjusting organisational structures or by forming learning hierarchies (Kellogg et al., 2021; Koljonen & Chan, 2023).

Decision support systems. With the introduction of AI technologies in organisations, it has become increasingly unclear as to whether decisions are made by humans or technology (Wiblen & Marler, 2021). Digital technologies, once implemented, influence the decision-making process regarding various HRM functions by using embedded algorithms that represent a 'material property' of DTM technology. In this way, such technologies can influence organisational decision-making processes, which has implications for sustainable employability. For instance, with reference to ensuring employees remain employable, the introduction and adoption of AI technologies require upskilling in the form of data analysis, complex cognitive, decision-making and continuous learning skills (Jaiswal et al., 2023). Contemporary organisations have started seeing technology not as a competitor; rather, they believe in human–AI complementarity by augmenting human capabilities towards enhancing decision-making.

Stakeholder relations. When firms promote knowledge inflow and outflow to support open innovation, HRM activities not only deal with internal employees but also the external stakeholders in the process. Because not all of the involved human resources are employed by a single firm, such activity has important implications for traditional HRM in terms of attracting, evaluating, developing and rewarding people (Remneland Wikhamn et al., 2023). Stakeholders can use digital internal communication strategies for collaborations, strengthening interactions and shaping organisational policies for addressing different societal challenges (Hambrick & Wowak, 2021; Luo et al., 2019; Wowak et al., 2022; Wuersch et al., 2023). Organisations can also use the power of social media channels to acquire knowledge from external stakeholders, providing innovative opportunities to businesses through knowledge exchanges (Barlatier et al., 2023).

Hybrid workspaces. Digital technologies are changing the spaces of work through IT-enabled (physical and virtual) hybrid workspaces. That is, technology is not only a means for new ways of working, but has also increased the number of available workspaces (Petani & Mengis, 2023). However, the use of these technologies to support collaborations and

cohabiting in hybrid workspaces because of distant digital interactions, which also limits HRM's roles in employee motivation and in promoting a sense of belonging and shared corporate values among employees (Petani & Mengis, 2023). Table 3 presents a synthesis of organisational design perspective and related references.

Leadership perspective

Given its changes to traditional workplace practices, DT poses several managerial challenges. Despite the introduction of digital technologies and the automation of manual workplaces, humans remain part of the DT process (Winkelhaus et al., 2022). HR professionals and organisational leaders need to be more responsive and proactive in these challenging times because of an increasingly agile and dynamic work environment. Organisations are facing pressures to adopt and align digital technologies (digital platforms, algorithmic technologies and social media) in their internal operations to support managerial and organisational goals (L. Cameron et al., 2023; Kellogg, 2022). As a result of DT, HR philosophies and policies are strongly influenced by the changing contextual factors, leading to potential discrepancies in the implementation process (Blom et al., 2021). To gain a better understanding of HR philosophies and policies, scholars need to examine the effects of both broad and organisation-specific contextual factors affecting employees and management practices.

Management orientation to worker wellbeing contributes positively to their job performance. Health-specific leadership behaviour (staff care as a core component of health-oriented behaviour) contributes more positively towards employee wellbeing (physical and mental health) than generally constructive leadership behaviours (Klebe et al., 2021). Management can affect employees' health directly through their communication and behaviour, and indirectly through influencing their tasks and working conditions. Examining both HRM practices and leadership where HRM is more focused on the processes and systems in an organisation and leadership is concerned with individual employees can facilitate a better understanding of how HRM and leadership contribute to influencing employee outcomes (Coun et al., 2022). The top management of an organisation also has a strong impact on the introduction and implementation of AI technologies—in particular, the presence of the CIO positively influences AI orientation (Li et al., 2021).

Recruitment practices using digital platforms and new technologies such as algorithmic selection processes have reconfigured the roles of human resource managers, allowing clients to select workers according to work-related as well as personal characteristics. This, however, may result in discrimination in the process of recruitment (Williams et al., 2021). The HRM activities that digital platform organisations are employing for gig workers include recruitment, selection, motivation and control, highlighting how these new technologies are mediating the role of HRM in the gig economy (McDonnell et al., 2021). Effective communication is vital for human resource professionals to secure leadership support and foster stakeholder enthusiasm in HR systems, including data-driven storytelling by HR analysts (Fu et al., 2023).

Because digital technologies continue to drive significant changes to the workplace, the work of management executives in talent management and retention is critical. This work requires significant learning adaptability to collaborate with digital technologies as well as a focus on the human aspect of talent development (Wehrle et al., 2020). Given that employment-related priorities vary across professions, occupational culture and understanding the interpersonal and intrapersonal exchanges of employees with their organisations are important considerations for their retention. Subsections 5.1.2.1 to 5.1.2.4 outline the four prevailing leadership styles identified in this review that have the potential to overcome some of the potential challenges presented by organisational DT. These are shared leadership, transformational leadership, empowering leadership and servant leadership.

Shared leadership. In the context of increased digitalisation of business and the management of global virtual teams, a shared leadership style can be useful. Global virtual teams with different national cultures and leadership expectations challenge the traditional practices of organisational leadership. These challenges can be in the form of unclear shared responsibilities, which may result in potential conflicts. However, previous research has shown that shared leadership and behavioural coordination have positive effects on team effectiveness and on the implementation of leaders' actions especially in the case of global virtual teams—when team members share the same perceptions regarding who has leadership over what (Nordbäck & Espinosa, 2019).

Transformational leadership. Although transformational leadership plays a crucial role in successful DT by fostering a culture of innovation, adaptability and EE, it also needs to address the human side of change by examining social cues to improve the sustainable employability of employees (Jabeen et al., 2022). Transformational leaders are considered the most effective leaders in providing support to their employees and in motivating them for growth (Lyons & Schneider, 2009) however, they face certain challenges during DT, particularly with regard to EE, acceptance of technology and resistance to change.

Empowering leadership. Organisations that aim to increase employees' workplace proactivity need to invest in HRM practices and forms of leadership that support employees and make them feel psychologically empowered that is, accepting greater authority and responsibility for their work—thereby, creating a sense of meaningfulness (Coun et al., 2022). Empowering leaders promote a healthy and productive work context through delegation, trust and autonomy. They promote innovation and agility through upskilling and reskilling employees to ensure they can effectively utilise digital technologies in their work.

Servant leadership. For an open innovation process to be successful, a leader needs people skills beyond technical knowledge and organisational legitimacy, with such skills enhancing EE and wellbeing (Remneland Wikhamn et al., 2023). Servant leaders are considered more humble and helpful in providing guidance and support and are also a great source of information concerning employees' resources and career advancement (Jabeen et al., 2022). Table 4 presents a synthesis of leadership constructs and related references.

Overall, it is clear that DT significantly affects sustainable employability at both organisational and individual levels. These findings

Table 3
Organisational design perspectives constructs.

Construct	Paper(s)
Digital talent management	(Datta et al., 2023); (Wiblen & McDonnell, 2020); (Wiblen & Marler, 2021); (Boudreau & Ramstad, 2005)
Control mechanisms	(Beane, 2019); (Bechky, 2020); (Cameron & Rahman, 2022); (Cram et al., 2022); (Khanagha et al., 2022); (Waldkirch et al., 2021); (Kellogg et al., 2021); (Koljonen & Chan, 2023)
Decision support systems	(Wiblen & Marler, 2021); (Jaiswal et al., 2023)
Stakeholder relations	(Remneland Wikhamn et al., 2023); (Hambrick & Wowak, 2021); (Luo et al., 2019); (Wowak et al., 2022); (Wuersch et al., 2023); (Barlatier et al., 2023)
Hybrid workspaces	(Petani & Mengis, 2023)

Table 4
Leadership perspective constructs.

Construct	Paper(s)
Shared leadership	(Nordbäck & Espinosa, 2019)
Transformational leadership	(Jabeen et al., 2022); (Lyons & Schneider, 2009)
Empowering leadership	(Coun et al., 2022)
Servant leadership	(Remneland Wikhamn et al., 2023); (Jabeen et al., 2022)

connect with RQ2: What are the key challenges of digitalisation affecting emerging themes, perspectives and categories of sustainable employability at the individual level?

Emerging themes, perspectives and categories at the individual level

Digital technologies are not only transforming the nature of work, but also how workers in the gig economy perceive HRM practices in digital platforms of work. Human perceptions are crucial for the successful implementation of digital technologies in organisations, and the expertise and insights of human resources professionals have a substantial impact on this process (Wiblen & Marler, 2021). Learning and development opportunities can be considered an important factor in dealing with evolving work characteristics. Recent studies in management are also calling for a more inclusive approach to HR theorising and practice, particularly given the rise in ethnic minority micro businesses, an under-researched group largely ignored by business support (Ram et al., 2022). Technology can play a significant role in addressing challenges imposed by individual, structural and social influences, facilitating inclusiveness (Suseno & Abbott, 2021). People further perceive the effects of new technologies on spaces and places of work through their interpretations and engagement with them (Menges et al., 2024). However, to gain an in-depth understanding of the future of work given DT, it is important to understand individual (how people imagine their work in the future), organisational (how organisations apply technologies to manage, augment and replace talent) and societal (the narratives and motivations of leaders in and outside organisations) perspectives. These different perspectives on the future of work affect people's perception of their work and the demands of their employers.

Given a shift in focus from the institutional implications of DT towards more individual concerns with organisational implications (Cooke et al., 2021), organisations need to balance employee monitoring and ethical considerations throughout DT. That is, organisations should focus more on the type and bundle of complementary activities or services that enhance employees' perceptions of their work than the potential for efficiency gains. For example, one of the benefits associated with DT is its ability to help managers identify optimal employee-task match capabilities. This results in low turnover and team failures, thereby boosting the return companies make on their investment in employees (Kretschmer & Khashabi, 2020). Therefore, developing a framework that draws linkages between DT and sustainable employability enables future scholars to examine the various ways technology may impact both employee perceptions and HRM practices. This may also enhance understanding of the underlying mechanisms and conditions under which technological advancements will result in certain outcomes. These could be in the form of techno-stressors (challenge or threat techno-stressors) and have implications for behavioural and psychological outcomes concerning employees (Cram et al., 2022). Overall, a human-centred approach to organisation can be conceptualised along two primary dimensions: the employee–employer perspective and employee's self-view perspective.

Employee–Employer perspective

One emerging challenge concerns the work intensification that affects employees' perceptions of their work. Such intensification results in work-related stress from excessive job demands (e.g., increased total working hours, working on weekends, delaying holidays and neglecting exercise) (Wood, 2022). Research has also found that academics in higher educational institutes are suffering from a misaligned work-life balance, 'work-work balance' issues because of working concurrently across different jobs, multiple projects and functional roles simultaneously and are struggling to balance the conflicting concurrent demands made on them (Griffin, 2022).

Although DT is clearly transforming the nature of work and the meaningful connections people have to their work, what matters for the future of work is to investigate whether, when and which work is viewed and experienced as meaningful (Lysova et al., 2023). Following the principles of HRM philosophy, HR policies should facilitate an employee-focused program that influences the choice of HRM practices (Blom et al., 2021). Subsections 5.2.1.1 to 5.2.1.4 introduce four key issues that impact the employer-employee relationship: digital trust, employee engagement, affective commitment and boundaryless careers.

Digital trust. The integration of technological and human perspectives has resulted in new identities, relationships and trust-building among stakeholders, crucial elements in organisational intrapersonal processes, interactions, relationships and functioning (Wuersch et al., 2023). These new technologies have transformed the internal communications of organisations into digital internal communications, resulting in new organisational realities concerning how people make sense of themselves, relate to others and create shared experiences.

Employee engagement. EE has garnered considerable attention in recent years in fields including psychology, human relations, organisational behaviour and HRM. Many studies have highlighted the role of EE in promoting job satisfaction and performance among employees, thus resulting in sustainable employability (Boccoli et al., 2023). Recent studies have shown that gamification experiential outcomes support employee satisfaction and engagement at work, further influencing employee behaviour and motivation (Silic et al., 2020). The concept of EE could be further investigated by seeing it as a social and relational phenomenon rather than a purely psychological one. Therefore, a more social conceptualisation of the construct that accords with social interaction, exchanges and recognition and focuses on the relationship between the self and work-life is required. Because of the dynamic nature of EE and in the context of the widespread use of digital technologies in organisations, future research needs more human-centred, innovative and multidisciplinary approaches to see how individuals' wellbeing and performance could be better balanced (Boccoli et al., 2023).

Affective commitment. Potential negative outcomes for workers from the use of technology are drawing more attention from researchers than potential positive wellbeing and behavioural outcomes (Cram et al., 2022). Cram et al. (2022) reveal important insights into how some techno-stressors can enhance workforce commitment and motivate workers. For instance, organisations are increasingly adopting social gaming applications to encourage employee interactions. This occurs by converting individual tasks into social events through fostering interpersonal competition among employees to increase motivation and improve their task performance (Zhang et al., 2023).

Boundaryless careers. The contemporary gig economy offers ease of access to work and boundaryless opportunities for flexible work arrangements characterised by increased autonomy. However, these precarious roles are often accompanied by fewer career and development opportunities, as well as fewer transferable career competencies such as algorithmic management functions used by platform organisations (Duggan et al., 2022). Table 5 below provides a synthesis of the employee–employer perspective constructs and related references.

Employee self-view perspective

Because of their usability, intrusiveness, dynamic features and insecurity (e.g., the spread of misinformation through websites and

Table 5
Employee–employer perspective constructs.

Construct	Paper(s)
Digital trust	(Wuersch et al., 2023)
Employee engagement	(Boccoli et al., 2023); (Silic et al., 2020)
Affective commitment	(Cram et al., 2022); (Zhang et al., 2023)
Boundaryless careers	(Duggan et al., 2022)

other means of AI), these new technologies may become a source of technostress (Cadieux et al., 2021). The contemporary social, economic and technological developments from digitalisation have challenged employee rights, roles and responsibilities, affecting employee well-being and health. Such developments require more studies to see whether organisations and societies can grow together sustainably (Wilkinson et al., 2021).

Digital labour with flexible work schedules is becoming the new employment trend in the gig economy. The digitalisation of businesses has led to an increase in job insecurity among employees. Although this is often considered a short-term phenomenon, career insecurity can span the entire career and include broader career developmental aspects such as unemployment, career goals and career opportunities (Spurk et al., 2022). Key factors that influence this perspective include psychological safety, professional autonomy, inclusiveness, meaningfulness, IT mindfulness and acceptance of technology.

Psychological safety. Although digitalisation may enhance effective knowledge management in an organisation, adopting digital technologies also carries cognitive and emotional costs by reinforcing existing knowledge networks and having technology professionals start seeing each other as competitors (Lanzolla et al., 2021). Techno-invasion can be associated with self-regulation impairment (i.e., the reduction of one's self-regulatory resources needed to control undesirable impulses), which, in turn, provokes employees' deviant behaviour. This may include wasting time at work, taking workplace belongings without permission or purposefully performing poorly at work (Chen et al., 2022). It is not only important how much a person works, but also when people work. That is, working non-standard hours conflicts with biological and social life by creating adjustment problems, which also bear consequences in the form of poorer health and adverse family outcomes (Shevchuk et al., 2019).

The psychological approach to empowerment focuses on how employees experience their work by making positive assessments in terms of cognitions such as meaning, competence, self-determination and the impact of their work (Coun et al., 2022). Wood (2022) has suggested that human resource practitioners should focus more on identifying the causes of stress, rather than on decreasing the stress level by reducing these excessive job demands to promote individual wellbeing.

Professional autonomy. Although new technologies have provided enormous opportunities in terms of temporal flexibility, working at night has negative effects on workers' wellbeing in the form of low levels of satisfaction with work–life balance and an increase in emotional exhaustion (Shevchuk et al., 2019). Conversely, a study by Coun et al. (2022) shows a positive relationship between professional autonomy, access to knowledge via information and communications technology and empowering leadership, on the one hand, and psychological empowerment on the other. Interprofessional segmentation—meaning the specialisation of work tasks within a professional community—can facilitate organisational technology adoption while balancing professional autonomy and managerial objectives (Tschang & Almirall, 2021).

Inclusiveness. The question of work inclusiveness challenges organisations to consider their purpose of existence as more than a workplace, and leadership as more than a relational process (Antonacopoulou & Georgiadou, 2021). Antonacopoulou and Georgiadou (2021) have defined inclusiveness as a key factor for engaging employees and encouraging participation; breaking down barriers; promoting diversity, empathy and compassion; and celebrating difference—seeing these as essential characteristics of work. Accordingly, policymakers need to consider the reconfiguration of experiences to identify future needs for education and skills to promote inclusivity in workplaces (Hughes & Dundon, 2023). Research has also shown that citizens from different sociodemographic groups vary in their level of participation in online platforms, hence more scholarship is required to check the relevant effectiveness of communication messages to promote inclusivity at the workplace (Berg et al., 2020).

Meaningfulness. According to Bankins and Formosa (2023), meaningful work respects workers' autonomy and their ability to exercise complex skills in helping others. Meaningful work means that workers believe that their work has worth, significance or purpose. Such factors contribute to worker wellbeing, allowing them to flourish as responsible people. The career development processes for digital labourers require more attention from researchers because of the rise in the use of digital platforms by employers as an alternative employment arrangement, which has important implications for sustainable employability (Wong et al., 2020). Research has shown that proactive digital labourers are more motivated to avail themselves of career development opportunities that are in congruence with their career aspirations (Wong et al., 2020). Therefore, meaningfulness in work requires employers to further identify in what ways the use of digital technologies affect employees' perceptions and provide them with career development opportunities rather than just focusing on short-term job features, which are insufficient to bring meaningfulness to work. Managerial communications play an important role in how employees perceive the goals of performance measurement practices, have a sense of meaningfulness in their work and believe that their perspectives are heard and valued (Beer et al., 2022).

IT mindfulness. IT mindfulness (i.e., employees' focus in being creative using IT) brings creativity to work through learning and increasing employee involvement in their work, moderating the relationship between techno-invasion and self-regulation impairment (Chen et al., 2022). However, techno-invasion is associated with self-regulation impairment, which is the reduction in one's self-regulatory resources required to control undesirable impulses, which, in turn, provokes employees' deviant behaviour. Hence, given the effects of IT on personal life, academicians and practitioners need to acknowledge, prevent and manage the undesirable impacts of being continuously exposed (techno-invasion) to these technologies.

Acceptance of technology. An employee's behaviour in response to DT in an organisation varies across individuals given that not all employees respond in the same way (Zaza et al., 2023). Varying cognitive frames (e.g., utilitarian, functional, anthropocentric, traditional and playful) have been used in the manufacturing sector to explain employees' acceptance of digitalisation and their thoughts and feelings concerning DT (Schneider & Sting, 2020). However, despite major advances in digital technologies, the social implications of DT have not been fully understood, including how changing employment practices affect employees' lives. More studies are needed to investigate employees' acceptance of various digital technologies and their influence on the perceived meaningfulness of work and other aspects of employee wellbeing (Dąbrowska et al., 2022). Digital technologies have both positive and negative implications for individuals, and more scholarship is needed on the perception of these technologies from the human perspective (Vial, 2021). Table 6 provides a synthesis of employees' self-view perspective constructs and related references.

Framework development

In accordance with the selected studies, a framework (Fig. 1) has been proposed to explain the impact and implications of DT on sustainable employability from both employee and organisational level perspectives. This model depicts that these advanced technologies transform organisational practices and employees' perceptions of work by highlighting the consequences and challenges that affect both organisations and employees. At an employee level, these technologies

Table 6
Employee's self-view perspective constructs.

Construct	Paper(s)
Psychological safety	(Lanzolla et al., 2021); (Chen et al., 2022); (Shevchuk et al., 2019); (Coun et al., 2022); (Wood, 2022)
Professional autonomy	(Shevchuk et al., 2019); (Coun et al., 2022); (Tschang & Almirall, 2021)
Inclusiveness	(Antonacopoulou & Georgiadou, 2021); (Hughes & Dundon, 2023); (Berg et al., 2020)
Meaningfulness	(Bankins & Formosa, 2023); (Wong et al., 2020); (Beer et al., 2022)
IT mindfulness	(Chen et al., 2022)
Acceptance of technology	(Zaza et al., 2023); (Schneider & Sting, 2020); (Dąbrowska et al., 2022); (Vial, 2021)

clearly affect professional careers and working lives, specifically affecting employees' senses of psychological safety, inclusiveness, acceptance of technology and professional autonomy. Similarly, from the organisational perspective, organisations need to be more adaptive and follow strong work ethics to maintain healthy working relationships with different stakeholders. The integrative framework proposed in this systematic review provides a road map for classifying and formulating a human-centred approach and examining changing perceptions of work in the face of DT. It can also serve as a basis for future research incorporating other technologies and different contextual factors along with their implications for HRM. This framework has extracted important insights for practitioners by relating academic research to the real-life situations that managers are confronting through the widespread diffusion of digital technologies.

Discussion

The main objective of this study was to conduct a review of extant research on the impact of digital technologies on sustainable employability to identify the major implications and challenges of DT for HRM and the general management of organisations. This review resulted in the identification of 86 peer-reviewed articles that provided an overview of the current understanding in this area. However, this review has also made clear that new frameworks are needed to fill in gaps in the extant literature and to better conceptualise the workplace challenges arising from DT, particularly given evolving contextual factors and diverse policy implications for different stakeholders. In particular, this systematic literature review highlights several key findings that address the interplay between DT, organisational dynamics and sustainable employability. As has been shown, DT profoundly reshapes workforce dynamics by influencing job roles, skills requirements and work patterns. The increasing use of new technologies such as AI is affecting traditional roles and leading to increased automation while creating new opportunities. This shift necessitates upskilling and reskilling initiatives to enable employees to adapt to the evolving digital landscape. Furthermore, DT enables remote work and flexible work arrangements through digital platforms of work, affecting work–life balance and overall employee wellbeing.

Effective leadership can shape the work environment by establishing a positive and productive culture. Leaders set the tone for the workplace through their values and behaviours, affecting EE, as well as employee satisfaction and retention. However, this systematic review makes clear that there is a need for a critical assessment of how DT influences organisational dynamics and individuals' employability outcomes. It also foregrounds the need for more conceptualisation concerning the impact of digital technologies on the professional and personal lives of employees and the associated implications for management. For example, in the context of DT, sustainable employment and HRM face several key challenges in ensuring fair and ethical labour practices and promoting workplace inclusiveness. The increasing use of distant digital interactions with the introduction of hybrid workspaces—facilitating the multiplying of work locations—has constrained HRM's roles in motivating employees, fostering their sense of belonging and facilitating their identification with corporate values. Benefits provided by physical workplaces may be eroded when workers no longer cohabit in shared physical workplaces, at least part of their work time. As with any new technology, AI may have varied effects on HRM. Although it has clear potential to be beneficial, its full consequences are unknown. In the face

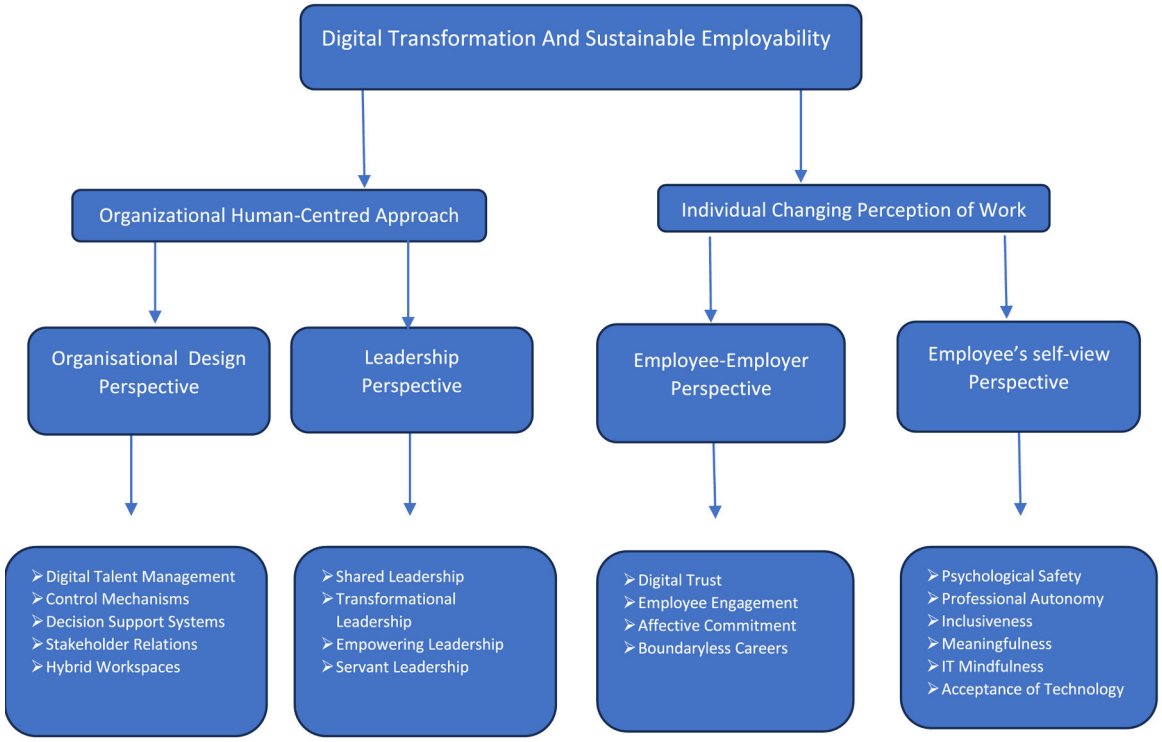

Fig. 1. Framework summarising the reviewed literature.

of DT, organisations also need to balance employee monitoring and ethical considerations, further focusing on the type and bundle of complementary activities or services that can support employees through DT rather than just on the potential for efficiency gains (Kretschmer & Khashabi, 2020). All of these challenges require HRM to develop innovative strategies to prioritise employee wellbeing by integrating sustainable employment considerations into their HRM practices.

Together these points mean that digitalisation should not merely be considered an operational issue with implications for efficiency and market competitiveness but should rather also consider how employees experience and make sense of their interactions with a firm (van Houwelingen & Stoelhorst, 2023). Therefore, to achieve sustainable employability, contemporary organisations need an effective utilisation of personal and social support resources (Jabeen et al., 2022) and leaders should be empowered to induce workplace proactivity among employees (Coun et al., 2022). More specifically, management practices need to be transformed to cope with the challenges presented by these technologies, given that DT demands more employee trust and commitment and a shift in values to address changing workplace demands (Chalutz Ben-Gal, 2022). Accordingly, policymakers need to consider such reconfigurations of employee experiences to identify future needs for education and skills—for instance, those relating to AI. This involves focusing more on the competency development of employees to prepare them for more sustainable careers in the future.

Overall, research gaps in DT concern the influences of the temporal, situational and geographical dimensions of DT and their policy implications for sustainable employment. Empirically operationalising the framework would test its applicability in the context of societal challenges like diversity, inclusion, precarious work, data privacy concerns and global poverty.

Theoretical contributions

The theoretical arguments in this article have critically engaged with the evolving landscape of employment relations in the context of rapid DT. By considering DT, organisational dynamics and sustainable employability as key concepts for this study, the article situates its analysis within a multidisciplinary framework, blending insights from HRM, organisational behaviour, strategic management and technology management. In particular, by drawing on socio-technical theory (Trist & Bamforth, 1951) and conservation of resources theory (Hobfoll, 1989), this review identifies two broad themes: the need for a human-centred approach and changing perceptions of work. The perspectives gained from the interdisciplinary approach, the theories and two themes contribute to understanding the diverse impacts and implications that digital technologies have both for industries and employees, specifically considering employees' wellbeing and organisational effectiveness.

The lens of the socio-technical approach is used to clarify the nature and the process of DT as an organisational approach and to assess the linkages between digitalisation and sustainable employability from organisational and individual perspectives. The significance of society and the social aspects in an organisation were also acknowledged (Bauer & Herder, 2009) with individuals considered a resource to be developed through the intersection of three primary dimensions: social, technical and environmental (Trist, 1981). This focus resulted in the first theme concerning the need for a human-centred approach. This was a reminder that technology adoption and implementation are never solely about technology, but also concern technology's interaction with human behaviours, organisational structures and social contexts. Therefore, a human-focused perspective is needed to explain the novel and complex elements of the organisational realities of how people in digital organisational settings make sense of themselves, relate to others and create shared realities (Wuersch et al., 2023).

The second theme, the changing perception of work, was extracted through the lens of the conservation of resources theory, which states that humans are motivated to protect their existing resources and acquire new resources (personal, social and structural resources; Hobfoll, 1989) because of their instrumental and intrinsic value. Individuals who lack resources or lose resources may experience stress, burnout and negative health outcomes. Therefore, individuals strive to manage stress by protecting and building resources. The DT of organisations is, however, altering organisational structures, processes and business models (Gebayew et al., 2018). It also exerts increased pressure on individuals to adapt to changing labour market demands, as well as demanding higher competency requirements to ensure their sustainable employability (van Harten, 2016). Research has shown that higher levels of self-efficacy beliefs and increased competence make individuals more employable (Betz & Voyten, 1997). In this review, both the conservation of resources theory and the socio-technical framework are drawn on to determine how employees perceive the DT of organisations and how this affects their perception of the value of resources. Also of interest are perceptions concerning DT's implications for sustainable employability—both within and outside organisations—given that digital technologies can be both a resource and a potential source of stress, thereby offering both resource gains and losses.

Finally, the rise in digital platforms for work and hybrid workplaces, as well as potential increases in professional autonomy, changing stakeholder relations, more open innovation opportunities, automated decision-making and an increase in career insecurities, all require a different management approach (Bendig et al., 2023; Vrontis et al., 2022). Such an approach would foreground supportive strategies, compositions, capabilities and culture (Snell & Morris, 2021). Therefore, as outlined in empowerment theory (Coun et al., 2022), such an approach would enhance management care, empathy and commitment and facilitate the introduction of different modes of organisational control in the workplace (Cooke et al., 2022; Dodgson et al., 2022; Schafheitle et al., 2020).

Practical implications

A human-centred approach to HRM promotes investing in the training and development of employees to equip them with employable skills and provide them with decent and sustainable employment opportunities (Cooke et al., 2022). Thus, the management of organisations needs to conduct specific training and assessments to develop a better understanding of the behavioural patterns related to the adoption of digital technologies (Rabl et al., 2023). Further, interactions between humans and machines (Aversa et al., 2021; Winkelhaus et al., 2022) can result in a lack of trust (Klumpp & Zijm, 2019), affecting behavioural and psychological outcomes (Cram et al., 2022) and significantly affecting firm performance. Therefore, a carefully crafted management process, sympathetic to existing culture and practices, is needed (Dodgson et al., 2022). Similarly, organisational performance measurement practices can both affirm and challenge perceptions of work as worthy by influencing whether employees can accomplish their work tasks, see the impact of their work and believe they have a credible and valued voice in their interpersonal interactions (Beer et al., 2022).

The role of digital technologies in HRM for training purposes is significant given the use of online digital platforms, contributing towards enhanced learning environments. Organisations can thus promote the use of digital technologies through a continuous focus on training and career development (e.g., upskilling and reskilling), which may be executed through collaboration with the public sector, private sector and research centres (Ferraris et al., 2019). Adopting a contingency approach, and through the identification of key knowledgeable individuals, HRM practitioners can further facilitate the knowledge-absorptive capacity of employees and outcomes by altering working conditions (Sjödin et al., 2019). For instance, providing targeted education programs and on-the-job training can help employees acquire new external knowledge and augment their existing knowledge

base, ensuring employees possess the sufficient technological knowledge for sustainable employability.

Limitations and future research directions

There are some limitations to this review. First, it includes only peer-reviewed articles from one database, which means that some important sources of data published in non-peer-reviewed papers, books and book chapters may have been missed. It is also important to recognise that, because of problems with database accessibility or human mistakes, the search may not have found every article pertinent to the subject (Cooke et al., 2017). Nonetheless, we are certain that the bulk of the publications in prestigious research outlets are included in the pool of chosen articles, with articles in these outlets only excluded if they did not clearly link DT to sustainable employability from the perspective of the general management or HRM literature. Second, our search might not have identified all academic peer-reviewed articles related to our topic in these outlets given that our collection of articles followed a specific time frame, specifically covering the last six years (2019 to 2024). Third, the keyword formula used might not have allowed relevant articles to surface.

Future research needs more human-centred approaches to see how individuals' wellbeing and performance may best be balanced (Boccoli et al., 2023). As this study has indicated, the role of advanced technologies in sustainable employability is a multifaceted issue associated with a variety of academic disciplines. Along with adopting a multidisciplinary approach, HR and management researchers could benefit from collaborating with organisational psychology and sociological scientists to analyse the impact of advanced technologies in decision-making processes. Finally, developing an understanding of how the use of advanced digital technologies affects employees may show how these effects can diverge according to organisational policies and managerial practices. These differences mark a future avenue for research.

Conclusion

Organisational DT has caused significant changes to how HRM works in an organisation, requiring more evidence-based investigations concerning the implications of the changes these digital technologies have brought to the workplace (Dickinson & Yates, 2023). Thus the objective of this paper was to conduct a review of research related to DT and sustainable employability. We searched for potentially relevant studies in 30 top-tier HRM, general management, international business, information systems and psychology journals to clarify the impact of DT in organisations with reference to sustainable employability. The selection process led to the identification of 86 articles that offered an overview of the current understanding of this topic. Recommendations for future research were also provided, which noted opportunities for the theoretical and empirical advancement of the field by taking employee and organisational level perspectives.

Collectively, we hope that the contributions of our study will advance the next generation of research, which will be meaningfully extended and validated in practice. Our review provides insight into the implications of the introduction of advanced digital technologies into workplaces, highlighting the need to shift the focus of future HRM research towards individual concerns with organisational implications relevant to HRM practices (Cooke et al., 2021). Such insights can help managers implement digitalisation-induced change in organisations.

CRediT authorship contribution statement

Mian Ali Noor Shah: Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Lapo Mola:** Writing – review & editing, Supervision, Conceptualization.

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