Journal of Management and Sustainability; Vol. 14, No. 1; 2024
ISSN 1925-4725 E-ISSN 1925-4733
Published by Canadian Center of Science and Education

Digital Sustainability for Human Resource Management Canvas Meta-Synthesis Approach

Mohammad Kargar Shouraki[1], Hamed Vares[2], Naji Yazdi[3], Mohsen Emami[4] & Alireza Tafreshi Motlagh[5]

[1] Postdoctoral Researcher in Business Management, University of Tehran, Tehran, Iran

[2] Assistant Professor, Department of Management, Faculty of Management, University of Tehran, Tehran, Iran

[3] Assistant Professor, Department of Marketing, Strategy and Entrepreneurship, University Canada West, Vancouver, Canada

[4] Online Sales Manager, Ebrahim Trading and Industrial Development Co., Tehran, Iran

[5] Business Leadership and Sustainability Consultant and Lecturer, Tehran, Iran

Correspondence: Naji Yazdi, Department of Marketing, Strategy and Entrepreneurship, University Canada West, Vancouver, Canada.

Received: January 4, 2024 Accepted: February 25, 2024 Online Published: March 6, 2024

doi:10.5539/jms.v14n1p105 URL: https://doi.org/10.5539/jms.v14n1p105

Abstract

In the era of Digital Transformation (DT) and Sustainable Development (SD), the pivotal role of Human Resources (HR) in addressing business challenges has become increasingly evident. These challenges directly impact different HR departments and processes, prompting a need for a strategic overhaul. HR management should continuously adapt its service delivery model to align with the business model and create a balance between internal and external organizational expectations and employee needs, considering the two fundamental challenges of digital transformation and sustainable development, in an agile manner. The critical role of sustainable human resource management in fostering overall business sustainability is evident. However, in many cases, HR management has failed to recognize and demonstrate its cost structure, revenue flow, and social and environmental benefits transparently for the business. This research focuses on presenting the sustainable digital human resource management canvas and its connection to the business canvas to achieve sustainability in the digital era. Employing a qualitative research methodology, this study conducts a meta-synthesis of two pivotal concepts-sustainable human resource management and digital human resource management- leveraging data from reputable databases including Science Direct, Scopus, and Web of Science. Following meticulous screening and examination, a total of 17 articles from Q1-ranked journals were selected as the final articles for a more detailed and in-depth review. The findings from the meta-synthesis results consist of 5 dimensions and 23 components, ultimately presenting the sustainable digital human resource management canvas by modeling it after the business canvas. The distinct feature of this canvas, compared to other similar and conventional models, is the inclusion of individual sustainability in the value proposition and the creation of a digital value component, including artificial intelligence, the Internet of Things, and big data.

Keywords: Digital Business Model, Sustainable Business Model, Digital Human Resource Management, Sustainable Human Resource Management, Digital Sustainability

1. Introduction

In recent years, organizations have faced two major challenges: sustainability and digital transformation (Jorgensen & Pedersen, 2018; Romero et al., 2021; Vidmar et al., 2021; Li et al., 2020). However, digital transformation can be a process that contributes to sustainability (Chen, Johansson, & Despeisse, 2023; Robertson & Lapina, 2023; Bencsik, Parida, & Gassmann, 2023).

The first challenge is sustainability, and according to the 2023 report of the World Economic Forum, the most significant global risks in the next 10 years are related to environmental and social issues (World Economic Forum report, 2023, weforum.org/reports/globalrisks-report-2023). It should be noted that human activities have increasingly harmed the environment in all dimensions and on a large scale. Therefore, it is necessary to focus human involvement in these activities towards sustainable development goals (Bocken, 2023). In this regard, the challenge of sustainability in the field of human resources has also gained importance and has been given

attention to achieving sustainable HR management (Martinez et al., 2021). Research shows that sustainable HR management leads to an increase in human sustainability and the realization of sustainable business (Cachón-Rodríguez et al., 2022; Mohiuddin et al., 2022; Hronová & Špaček, 2021; Bush, 2018; Aust et al., 2020) and has a positive impact on organizations' competitive advantage with the goal of organizational sustainability (Battour et al., 2021; Westerman, 2021; Stahl et al., 2021). However, it has not been successful so far (Stahl et al., 2021). One of the main reasons for the lack of success in HR management in sustainability is the lack of awareness among HR managers and professionals in this field, and in practice, only a few of them have a good understanding of the concept of sustainability, although they can have a significant contribution to the sustainability of businesses (Willard & Hitchcock, 2015). In the field of sustainability, sustainable HR management and the Triple Bottom Line (TBL) provide opportunities for HR to play a strategic role in organizations (Westerman, 2021).

The second challenge is digital transformation, which is related to both the external and internal environment of organizations and creates technology-driven opportunities for businesses (Jorgensen & Pedersen, 2018; Romero et al., 2021; Verhoef et al., 2019). Businesses need innovation in digital technology-based business models to address global risks, especially in the sustainability domain (Robertson & Lapina, 2023) The digitalization challenge in the era of Industry 4.0 is also evident in the field of human resources (Hronová & Špaček, 2021; Črešnar & Nedelko, 2020). Considering the digital advancements across all business domains, isn't it the time for fundamental change and transformation in HR management units? Don't HR units need reorganization to create more added value? (Maar, 2018). However, no coherent conclusions have been drawn so far regarding the effectiveness of implementing digital HR management approaches (Wang et al., 2022). Perhaps the greatest challenge on the path to the currently unfolding sustainability is how to develop digitally educated and skilled employees in the evolving business environment (Sen, 2020). Businesses in the digital age lack credibility without suitable human resources, and those with a skilled and digitally talented workforce will have a greater competitive advantage (Maar, 2018).

Is HR management a cost center or a position for profitability and value creation? HR departments have become accustomed to seeing themselves as cost centers (Anderson, 2015). This is because HR functions are often perceived by those within organizations as cost-generating processes or cost centers (Westerman, 2021). HR professionals and managers are still influenced by the prevailing mindset of industrial economics, which emphasizes increasing production efficiency, work processes, and adherence to standards (Sen, 2020). However, HR experts can effectively demonstrate that HR management can create value by identifying quantitative criteria and indicators (Stewart & Brown, 2019). How does their involvement contribute to business success and profitability? Yet, they have been less focused on this aspect. This is why senior executives often ask them superficially, "What impact have you had on our bottom line?" (Anderson, 2015). International consultants believe that business modeling based on the business canvas in HR management leads to reimagining in this field and provides a new approach to team management in HR, which can enhance employee retention, performance improvement, and profitability (Clark & Hazen, 2017). That's right! HR professionals can have a significant impact on the bottom line and value creation for businesses, but they perceive themselves as cost centers. One reason for this is their lack of sufficient alignment and harmony with organizational goals and strategies in an operational manner, without providing a clear and clear pattern and model. HR managers think of themselves as experts in areas such as service recovery, attraction and recruitment, employee communications, and learning and development within organizational silos, rather than as individuals whose aim is to improve their organizations' bottom line (Anderson, 2015). This very mindset poses a significant challenge in responding to the organization regarding the advantages of HR best practices. It will be the main barrier to the success of HR management in articulating its strategic values and achievements. Therefore, the best approach is to explore how HR management can contribute to financial outcomes (Stewart & Brown, 2019). The business canvas is a practical tool that is essential for both the organizational domain and HR management, teams, and even individuals. The business canvas in HR management helps employees understand the organization's intended goals, become aware of vital dependencies within it, and understand their role, particularly in terms of income flows and cost structures (Clark & Hazen, 2017).

The research gap in this study lies in the fact that while a significant number of studies have been conducted on the topics of sustainable HR management and digital HR management, the number of studies specifically addressing sustainable digital HR management has been very limited, and none of them have presented the sustainable digital HR management canvas by emulating the business canvas with the goal of alignment. Therefore, the research questions of this study include the following:

- What are the dimensions of sustainable HR management?

- What are the key digital tools that have an impact on HR management?
- Which HR management processes are influential for digital sustainability?
- How does the sustainable digital HR management canvas work?

2. Theoretical Framework

The theoretical framework used to present the final model in this study is a Resource-Based View (RBV), which encompasses both sustainable HR management and digital HR management (Chan et al., 2021; Hronová & Špaček, 2021). According to this theory, organizational capital, capabilities, knowledge, processes, and other organizational attributes are derived from internal resources, and effective and efficient utilization of such resources leads to value creation in organizational performance (Erkman et al., 2020). Based on the resource-based theory, human resources serve as a strategic asset that contributes to gaining sustainable competitive advantage (Singh et al., 2020; Hronová & Špaček, 2021). Furthermore, the study explores the concepts of the business/sustainable/digital model and its alignment with HR/sustainable/digital management, highlighting the necessity of employing them in business for sustainability in the digital age.

2.1 Business Model

Many good strategies fail due to a lack of a comprehensive and integrated management system (Kaplan & Norton, 2008). Therefore, business models bridge the gap between strategy and organizational execution processes, enabling the realization of strategic objectives through operational processes [32,33] (Da Silva & Trkmen, 2014; Rachinger et al., 2018). A business model is a framework that outlines how a company creates value for the market (Chernev, 2017). It is a pattern that helps businesses understand how to consistently create value for customers while also capturing value for themselves (Johnson, 2018). The business model represents the way a company conducts trade and creates value, as well as its ability to capture, deliver, and exploit value for the business (Teece, 2018). Business models consist of value proposition (Li, Cao, Liu, & Luo, 2019; Johnson, 2018), value creation, value delivery, and value capture components (Aagaard, 2019; Parida et al., 2019; Bocken et al., 2020; Bocken, 2023). The main dimensions of the business model are illustrated in Figure 1.

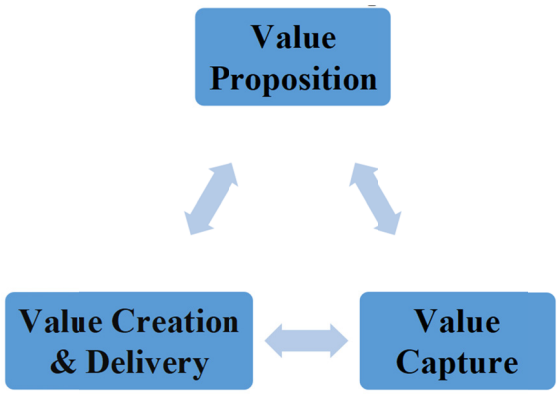

Figure 1. The main dimensions of the business model (Bocken et al., 2019; Johnson, 2018)

2.2 Sustainable Business Model

Companies strive to realize their sustainability strategy through innovation in various aspects, including their business models. Therefore, sustainable business model innovations focus on transforming the systemic aspects of businesses towards sustainability (Hernández-Chea et al., 2020). The concept of innovation in sustainable business models is primarily associated with the fourth industrial revolution and digital transformation technologies for implementing the circular economy and has gained traction in organizational literature (Shakeel et al., 2020). In recent years, the concept of digital transformation has emerged as a prominent and influential dimension for the development and survival of contemporary organizations. In general, digital transformation can be defined as the adaptation or compatibility of business models driven by the rapid pace of technological advancements and innovations, which lead to changes in consumer behavior and society (Kotarba, 2018).

Since 2015, with the adoption of the United Nations' 17 Sustainable Development Goals (SDGs) and the imperative to realize them in the coming years, business models have also been influenced by the sustainability

challenge. Sustainability has become one of the fundamental challenges for businesses, and its integration into business models is increasing in importance. The dimensions of sustainability include people, planet, and profit (Aagaard, 2019).

A nine-component business canvas was proposed by Osterwalder and Pigneur (2010) (Bocken, 2023; Snihur & Bocken, 2022). Additionally, the sustainability-based business canvas, developed by Osterwalder and Pigneur (2010), is illustrated in Figure 2 (Bocken, 2023).

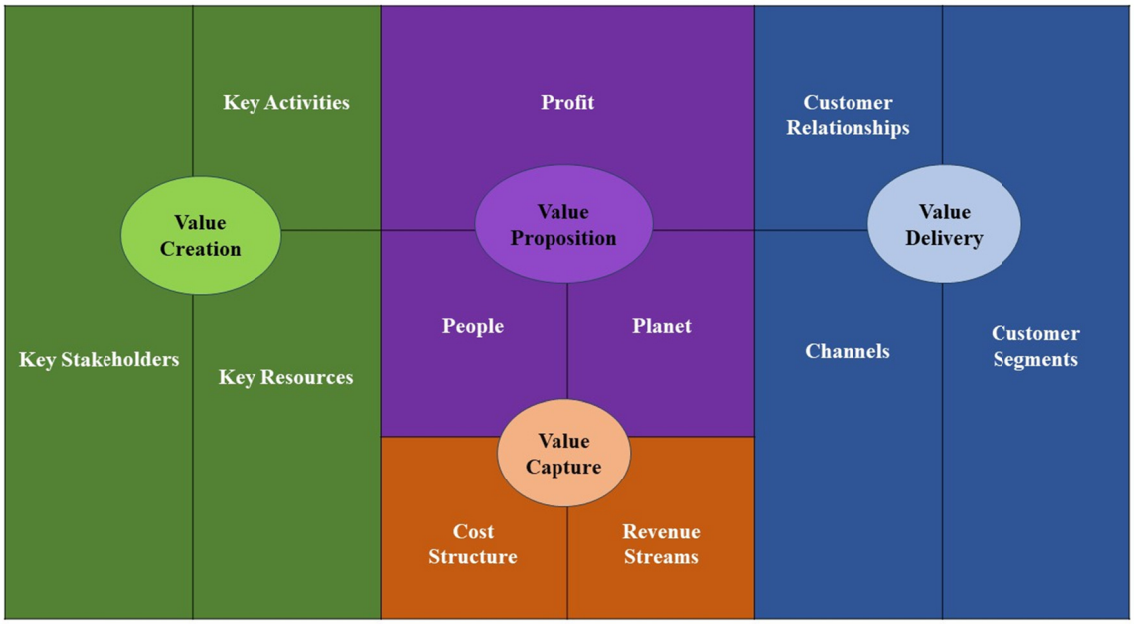

Figure 2. Sustainable business canvas (Bocken, 2021, 2023; Hernández-Chea et al., 2020)

2.3 Sustainable Digital Business Model

The Internet of Things, cloud computing, big data, and data analytics enable companies to leverage digital technology for innovation in their strategies, particularly in the implementation of business models (Paiola & Gebauer, 2020). Consequently, the constant external changes in the digital age have prompted businesses to move towards digital sustainability strategies (Jorgensen & Pedersen, 2018; Vidmar et al., 2021). The increasing challenges in the sustainability domain (Shakeel et al., 2020) have led organizations to rapidly engage in successful reformation and innovation towards the development of sustainable business models as a crucial factor in gaining sustainable competitive advantage and enhancing sustainable performance (Geissdoerfer et al., 2018). This important fact has been particularly emphasized in the era of digital transformations, urging organizations to focus on innovating business models and improving sustainability based on digital technologies (Bocken, 2023; Fellenstein & Umaganthan, 2019).

One of the applications of digital transformation technologies is the transformation of people's lifestyles towards protecting and preserving the environment and reducing various types of pollution, including water, soil, and air pollution, as well as promoting gender equality, eliminating discrimination, and achieving social justice through providing equal and clear access to limited resources (Brenner, 2018). To develop a digital sustainable business model, there needs to be harmony and synergy between the two fundamental domains of sustainability and digital transformation to maximize the benefits of digital sustainability in business. According to the sustainability-based business canvas, organizations need to consider all dimensions of sustainability, including responsibility towards society, people, and the environment, and economic profitability, alongside their value proposition (product/service) and effectively leverage digital transformation technologies (Bocken, 2023). Furthermore, the sustainable business canvas can be conceptualized as a three-layer framework comprising economic, social, and environmental dimensions within the value exploitation segment, encompassing costs, benefits, and objectives (Karlsson et al., 2018).

The field of human resource management is one of the resources and activities considered in the value creation

aspect of the business model and can contribute to value creation. This value creation is based on human resource management processes and can involve key activities, key partners, internal customers, internal organizational units, and even external stakeholders, where service delivery, cost assessment, and evaluation of revenues are necessary. The movement of human resource management towards digital human resource management and how it can contribute to sustainable human resource management through digital technologies, aligning with the achievement of sustainable strategies, is crucial. Therefore, this section addresses the two main concepts related to the research topic, namely digital human resource management and sustainable human resource management.

2.4 Necessity of Using Human Resources Management Model (Canvas)

The fundamental question is how can we ensure that human resources are on the scene and not on the sidelines? A human Resource-Based strategic map can clarify and make the value creation in this area explicit and clear for the organization (Ulrich, Becker, & Huselid, 2001). Therefore, human resources require a roadmap that demonstrates how this function creates value for customers and contributes to the profitability of the organization (Anderson, 2015). Research shows that effective alignment and coordination between organizational strategies and human resource programs are lacking in two-thirds of businesses (Kaplan & Norton, 2004). Aligning employees' goals and programs with the organization's objectives and strategies is crucial for the success of businesses, especially in the era of digital transformation (Wiraeus, 2019). In such circumstances, organizations will understand the extent of the services and value that human resources create for the organization, and ultimately, the revenue stream and cost center will be totally clear (Anderson, 2015). Experiences have also shown that by linking human resource processes with business strategy, the value of the human resource function has significantly increased. This is realized when there is a map or model for aligning human resources with business strategy (Kaplan & Norton, 2006).

2.5 Sustainable Human Resource Management

The emergence of the concept of sustainable development has led to an increased interest in areas related to sustainable human resource management and its outcomes (Mazur & Walczyna, 2020). For example, employee diversity is a critical topic in organizations that can have both positive effects (creating harmony and synergy) and negative effects (generating destructive conflicts) within the organization (Du et al., 2021; Talavera et al., 2021). The principles of sustainable human resource management can contribute to better-managing employee diversity. Sustainability in human resource management encompasses managing employees to support the implementation of a sustainable strategy and sustainable development, with a focus on the role of human resource management in developing sustainable organizations (including Economic, Social, and Environmental dimensions), as well as managing and utilizing human resource systems for the sustainable performance of an organization (Vraˇnaková et al., 2021). The primary focus of sustainable human resource management is on the relationship between policies and management practices to effectively manage people (Fan et al., 2021). Sustainable human resource management involves activities that prioritize long-term orientation and social responsibility in the areas of recruitment, hiring, development, and learning, along with achieving sustainable economic performance of employees (Ehnert, 2014). Research indicates a significant relationship between human resource management and sustainability strategies (Bombiak & Marciniuk-Kluska, 2019). According to the resource-based theory, human resources play a crucial role in effectively implementing business strategies and influencing the sustainable competitive advantages of an organization (Chen et al., 2021). Furthermore, other studies show that human resource management can enhance business competitiveness in addition to sustainable performance (Djalic et al., 2021). Like other areas of business, human resource management is constantly evolving and improving, and one aspect of this is paying attention to the sustainability challenge and the impact that human resource management can have on achieving sustainable business strategies. Sustainable human resource management provides an ideal platform for providing leadership and guidance for innovation, convincing organizational stakeholders to adopt more sustainable approaches and practices (Chen et al., 2021). The primary goal of sustainable human resource management is not only to pursue and achieve sustainable strategies in business but also to go beyond organizational boundaries and address the achievement of global sustainable development goals by practicing "common good HRM" (Aust et al., 2020).

Sustainable human resource management focuses on the optimal and appropriate utilization of human capital within an organization while preserving human dignity and respect, establishing a clear relationship between the business strategy and the environment in which it operates, and creating a human resource strategy. Sustainable human resource management consists of four dimensions: Sociological, Psychological, Ecological, and Strategic (Mazur & Walczyna, 2020).

Table 1. Dimensions of sustainable human resource management (Mazur & Walczyna, 2020)

Dimensions	Psychological	Sociological	Strategic	Ecological
	New job designs based on innovation and learning	Triangular balance including employee, employer, and society	Role of human resource management in sustainable competitive advantage	Role of human resources in creating and developing a greener organization

In the initial stage of sustainable human resource management, the focus and goal of social responsibility are emphasized. Subsequently, green human resource management has been introduced in organizations. With the declaration of the seventeen Sustainable Development Goals by the United Nations in 2015 and the requirement for businesses to move towards sustainable practices and provide sustainability reports, the Triple-Bottom-Line (TBL) approach to human resource management has emerged. It aims to ensure that the focus and objectives of human resource management extend beyond the internal business environment and encompass the well-being of people and the preservation of the planet, rather than just focusing on employees within the organization and the environmental aspects within the organization. The concept of "common human resource management" has been introduced to address these broader perspectives (Aust et al., 2020).

Table 2. Trends in Sustainable Human Resource Management (Aust et al., 2020)

Dimensions	Socially Responsible HRM	Green HRM	Triple Bottom Line HRM, and	Common Good HRM
Evolution of sustainable human resource management	Human resource management with an organizational social responsibility approach	Human resource management focusing on the creation and development of a green organization	Human resource management with a triple bottom line approach emphasizing economic, environmental, and social value creation in business	Human resource management with an effective participation approach in addressing sustainability challenges within and outside the organization

2.6 Digital Human Resource Management

In the digital age, organizations are seeking to make faster decisions in employing digital technologies, especially digital enablers such as artificial intelligence, the Internet of Things, big data, cloud computing, blockchain, social networks, etc. to enhance their effectiveness and gain a competitive advantage over their rivals. This evolutionary process in the digital age is shaping and transforming the field of human resources (Maar, 2018; Sen, 2020). Digital Human Resource Management is an evolutionary advancement from previous concepts of human resource management, based on digital technologies, and provides a conceptual foundation for future programs and initiatives regarding human resources in the digital domain (Strohmeier, 2020). The fundamental progress and changes in digital technologies have profoundly transformed various aspects and domains of human society, and in response to these changes, a modern approach has emerged to the formation and development of human resources in the field of economics (Zabrovskaia et al., 2020). Consequently, digitalization and digital transformation across all domains, including the human factor, have led to the emergence of the concept of Digital Human Resource Management. This concept is associated with concepts such as human resource management in the digital age, digitalization of human resources, and digital transformation in human resource management (Strohmeier, 2020). As organizations move towards digitization, Human Resource Management has also evolved accordingly. Therefore, it is necessary to conceptualize Digital Human Resource Management in alignment with the digitalization of businesses (Amladi, 2017; Bondarouk et al., 2017).

The evolutional trend of Human Resource Management over the last two decades is illustrated in Table 3. In Electronic Human Resource Management, none of the digital tools and technologies have been utilized in formulating HR strategies or HR processes. These tools were primarily utilized for the conversion of paper documents into electronic formats or for eliminating paper from the HR systems. However, in the second stage, digital tools and technologies have been employed to optimize operational processes in the field of Human Resource Management. Yet, in the third stage, the alignment between digital tools and transformation technologies has gained importance, but the main focus in this stage has been on digital support during the execution phase, rather than developing HR strategies. Therefore, the overall idea for value creation has been developed without considering the potential for digitization and digital transformation. Following the formulation of HR strategies, another facet of this stage emphasizes on aligning digital technologies with these strategies to provide support and facilitate their implementation. However, in the final stage, namely the fourth

stage, the focus lies on developing and executing HR strategies that align with the organization's strategies to support value creation within the organization.

Table 3. Levels of Digital Human Resource Management Concepts (Strohmeier, 2020)

Levels	Electronic Human Resource Management	Digital Tools-Based Operational Human Resource Management	Alignment in the Use of Digital Tools and Technologies in Human Resource Management	Achievement of Organization Strategies Based on Digital Human Resource Management
Evolution of digital human resource management	Replacing paper documents with electronic documents	Partial and sporadic use of software and digital tools in Human Resource Management	Integrated and systematic utilization of digital tools and technologies in creating value in HR processes	Digital transformation of HR processes and establishment of digital HR management to achieve organizational goals in the digital era

Human resource processes, including recruitment, learning and development, performance evaluation and improvement of employees, occupational belonging of employees, safety, and well-being, can benefit from digital technologies when human resources become data-driven in the business. Data-driven human resources are not only valuable resources within the HR unit but also play a crucial role in helping companies achieve their goals and implement strategies (Mar, 2018). Therefore, the digital world not only requires changes in HR tasks based on data-driven approaches but also leverages digital technologies to enhance the digitalization of HR operations. Organizations that have a suitable roadmap for digital HR management and have established effective models can thrive in the digital era. Hence, such companies focus on new technologies and invest in them (Sen, 2020).

Digital human resource management necessitates the development of digital skills alongside traditional employee skills. To achieve this, it utilizes processes such as employee assessment, job design, training, performance evaluation systems, knowledge management, and service compensation (Margherita & Bua, 2021).

Prior studies have separately addressed the areas of sustainable human resource management and digital human resource management. However, there's a notable gap in research that combines these domains, providing insights for developing a comprehensive digital sustainability-focused human resource management canvas. Thus, this research seeks to fill that gap by integrating the principles of digital sustainability into the business canvas, specifically exploring their practical application in the field of human resource management.

3. Research Methodology

This study utilized a meta-synthesis approach, characterized by an exploratory and inductive research design (Hoon, 2013). Meta-synthesis is an integrated method for synthesizing qualitative research findings to integrate, evaluate, and interpret the findings of multiple qualitative research studies to develop theories, patterns, or understandings of phenomena (Peñarroya-Farell & Miralles, 2021; Saini & Shlonsky, 2012). It combines primary qualitative studies to create a comprehensive understanding using techniques such as causal network analysis, content analysis, and cross-case analysis to collect and interpret primary and final findings (Rauch, 2020). Meta-synthesis aims to use qualitative content analysis to integrate and merge key concepts from studies to reach insights beyond individual studies (Metsola et al., 2020; Hoon, 2013). It appears as an ideal method for identifying common concepts and constructing conceptual frameworks that are conceptually greater than the sum of their parts (Sarkar & Mateus, 2022; Rauch, 2020).

Therefore, meta-synthesis is a qualitative research methodology that focuses on understanding and describing key points and concepts of a research phenomenon. Unlike quantitative synthesis methods (e.g., meta-analysis), qualitative meta-synthesis does not seek a specific and standardized criterion by reducing findings. Instead, its goal is to integrate concepts and insights obtained from studies into a higher-order combination to enhance a broader understanding of the entire research body while preserving the integrity of each study (Curtis & Boe, 2023).

Considering the objective and desired outcome of presenting a model, this study has incorporated a qualitative research method. Among the diverse qualitative research methodologies available, the meta-synthesis approach has been employed by the researcher. The main reason for this choice is to utilize the latest reliable articles in the field of sustainable human resource management and digital human resource management to extract and categorize the latest findings without any alteration. Based on the researcher's expertise, these two concepts are

systematically classified and integrated to ultimately present the final digital sustainable human resource management canvas. Hence, the meta-synthesis method and its utilization in this study are significant. It is a technique that initially selects, collects, screens, and summarizes previous research studies on the research topic. By collecting and analyzing the findings obtained from previous articles, it enables a comprehensive visual evaluation and categorization from a research perspective, leading to the presentation of a new model.

In this research, we employed the seven-step meta-synthesis method developed by Sandelowski and Barroso (2006), outlined as follows:

Step 1—Formulating the review question to initiate the meta-synthesis process, we addressed the questions of what, who, when, and how:

1) The primary objective of this study is to identify the activities associated with Digital Sustainable Human Resource Management (what?).

2) The target population for this research consists of all experimental and theoretical studies available in Science Direct, Scopus, and Web of Science (who?).

3) The review aims to encompass all experimental and theoretical studies published in the field of Digital Sustainable Human Resource Management between 2010 and 2023 (when?).

4) The selection criteria, as presented in Table 4, were utilized to determine which studies should be included or excluded from the research (how?).

Table 4. Inclusion and exclusion criteria of the research

Criteria	Inclusion	Exclusion
Language	English	Non-English
Date of publication	01/01/2010 - 01/06/2023	Before 01/01/2010 or after 01/06/2023
Research subject	Digital / Sustainable Human Resource Management	Other
Research type	Article	Other (book, news, reports, etc.)

Step 2—Systematic Search: Following the guidelines provided in the inclusion and exclusion criteria (Table 4), relevant keywords were carefully selected based on the subject matter (Table 5). Subsequently, these chosen keywords were then used to conduct a comprehensive and systematic search.

Table 5. Keyword selection

NO	Title\Keywords	ScienceDirect	Scopus	Web of Science	Total
1	Sustainable Human Resource Management	19	140	126	285
2	Digital Human Resource Management	1	32	22	55
Total		20	172	148	340

Upon searching using the specified terms in the titles, abstracts, and keywords of articles published in Science Direct, Scopus, and Web of Science, a total of 340 articles were initially identified. However, after eliminating duplicate entries, the number was reduced to 256 unique articles.

Step 3—Screening and Selecting Appropriate Sources: To ensure the selection of relevant and high-quality sources, we conducted the screening process in four stages (Figure 3). In the final stage of screening, the Critical Appraisal Skills Program (CASP) was utilized to assess the sources' quality. The CASP tools facilitated the evaluation of the accuracy, validity, and significance of the selected sources. As depicted in Figure 3, out of the 23 sources that reached this stage, 6 were subsequently excluded based on the evaluation, resulting in 17 articles that were deemed suitable for the final review.

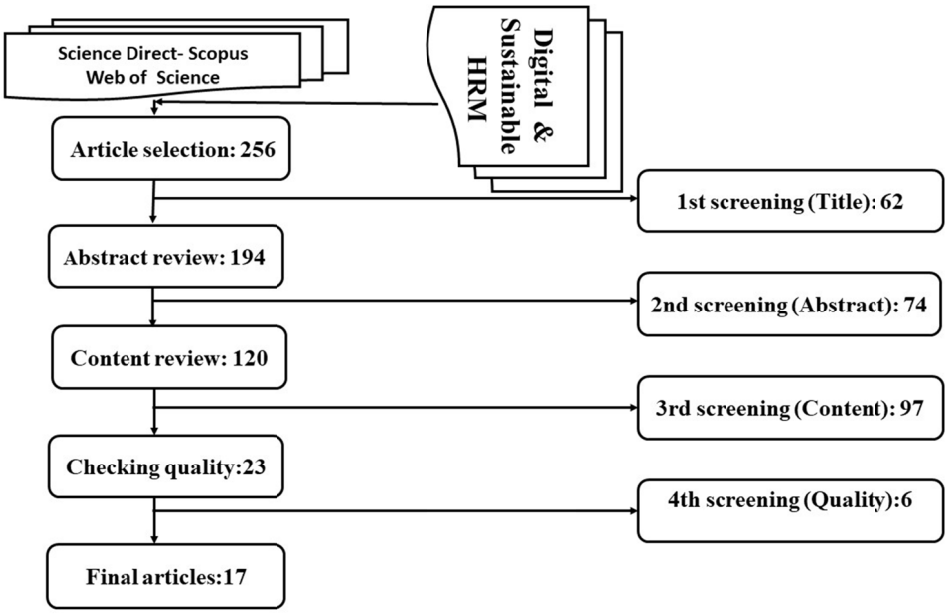

Figure 2. Source screening process

Step 4—Extraction of findings: During this stage, the 17 chosen sources underwent a thorough thematic analysis, involving multiple reviews using the content analysis method. The content analysis conducted at this step resulted in 31 initial codes, and the outcomes are presented in Table 9.

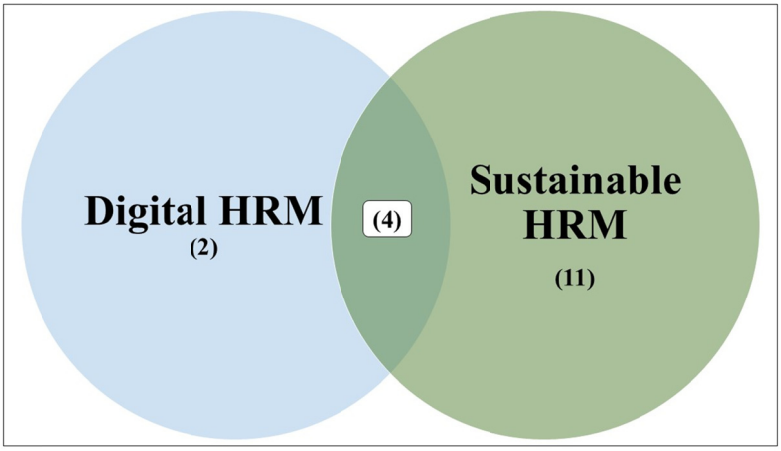

Figure 3. The number of final sources discussing each core concept of the research subject

Additionally, the selected articles were categorized according to their respective publication years, and these categories are visually represented in Figure 4.

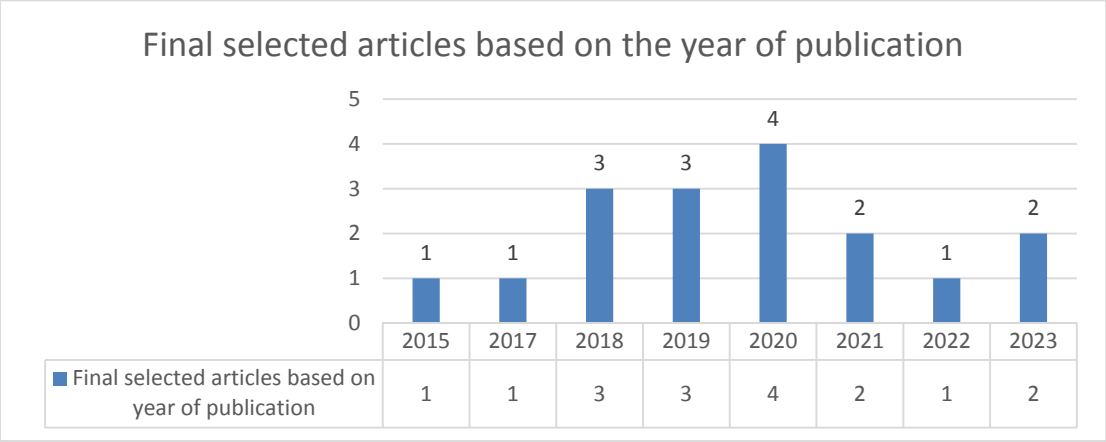

Figure 4. Final selected articles based on the year of publication

Table 6. Selected articles and their relationship with Keywords

NO	Title	Author	Year	Journal	Digital HRM	Sustainable HRM
1	Building a sustainable ecosystem of human resource management research: reflections and suggestions	Dickmann et al. [75]	2023	The International Journal of Human Resource Management	*	*
2	Future of Digital Work: Challenges for Sustainable Human Resources Management	Dabic et al. [76]	2023	Journal of Innovation & Knowledge	*	*
3	Sustainable Human Resource Management in the Supply Chain: A new framework	Ramalho & Martins [77]	2022	Cleaner Logistics and Supply Chain		*
4	Human Resource Development as an element of Sustainable HRM- with a focus on Production Engineers	Plwowar-Sulej [78]	2021	Journal of Cleaner Production	*	*
5	Algorithmic Human Resource Management: Synthesizing Developments and cross-disciplinary insights on digital HRM	Meijerink et al. [79]	2021	The International Journal of Human Resource Management	*	
6	Working in the digitized economy: HRM theory & practice	Connelly et al. [80]	2020	Human Resource Management Review	*	*
7	Digital Human Resource Management: A Conceptual Clarification	Strohmeier [62]	2020	German Journal of Human Resource Management	*	
8	Common Good HRM: A paradigm shift in Sustainable HRM?	Aust et al. [15]	2020	Human Resource Management Review		*
9	Sustainable Human Resource Management and the triple bottom line	Westerman et al. [81]	2020	Human Resource Management Review		*
10	On the importance of sustainable human resource management for the adoption of sustainable development goals	Chams & García-Blandón [82]	2019	Resources, Conservation & Recycling		*
11	Sustainable HRM strategies and employment relationships as drivers of the triple bottom line	Lopez-Cabrales & Valle-Cabrera [83]	2019	Human Resource Management Review		*
12	Enhancing the role of human resource management in corporate sustainability and social responsibility	Stahl et al. [84]	2019	Human Resource Management Review		*
13	Win-Win-Lose? Sustainable HRM and the promotion of unsustainable employee outcomes	Bush [14]	2018	Human Resource Management Review		*
14	Systematic Literature Review on Sustainable Human Resource Management	Macke & Genari [85]	2018	Journal of Cleaner Production		*
15	Sustainable human resource management as a driver in tourism policy and planning: a serious sin of omission?	Baum [86]	2018	Journal of Sustainable Tourism		*
16	Analyzing Factors Affecting Implementation Success of Sustainable Human Resource Management (SHRM)	Tooranloo et al. [87]	2017	Journal of Cleaner Production		*
17	Sustainable human resources: Examining the status of organizational work-life balance practices in the United Arab Emirates	Parakandi & Behery [88]	2015	Renewable and Sustainable Energy Reviews		*

Table 7. Classification of final articles based on the credibility of journals based on the website www.resurchify.com

Title	Number	Impact Score	h-Index	SJR	Classification
Human Resource Management Review	6	12.68	111	3.106	Q1
Journal of Cleaner Production	3	11.90	268	1.981	Q1
The International Journal of Human Resource Management	2	6.70	130	1.571	Q1
Journal of Innovation & Knowledge	1	20.31	39	2.649	Q1
German Journal of Human Resource Management	1	4.79	14	0.928	Q1
Resources, Conservation & Recycling	1	13.22	170	2.682	Q1
Journal of Sustainable Tourism	1	13.72	127	2.966	Q1
Renewable and Sustainable Energy Reviews	1	17.42	378	3.232	Q1
Cleaner Logistics and Supply Chain	1	9.50	10	1.329	Q1

Table 8. Important points found from the final articles

Author	The most important points presented
Dickmann et al.	To create a sustainable ecosystem of HRM research, our focus will be on developing a human-centered HRM research program that aims to comprehend and influence policies and practices within diverse political, economic, social, and technological contexts. Different sub-fields of HRM research can collaborate, support, and interact with one another to establish a robust and expanding research program. This program will have both intellectual and practical value, reflecting the changing world of work and demonstrating the scientific significance of our research to society.
Dabic et al.	The changing nature of work in the digital era, particularly concerning work polarization, non-standard employment, unemployment, and platform work. Guidelines for change aimed at minimizing the negative impacts and harm to workers caused by digitalization. These guidelines focus on developing appropriate capabilities to adapt to the new digital environment. Practical implications for public policies at the macro-level to foster positive change in the digital labor market, as well as sustainable HRM practices at the micro-level to effectively manage digitalization within workplaces. Our research findings underscore the importance of sustainable HRM practices in the digitalization era to ensure workers' motivation and promote their capacity building.
Ramalho & Martins	Sustainable Human Resource Management (SHRM) is a practice that involves effectively balancing an organization's activities while taking into account environmental, economic, and social aspects. By doing so, SHRM contributes to promoting corporate sustainability and responsible business practices.
Plwowar-Sulej	The concept of sustainability has been gaining significance and shaping the approach towards Sustainable Human Resource Management (SHRM) for employees. The ongoing changes in the modern economic landscape, encompassing the evolving notion of sustainability and the advancements of the Fourth Industrial Revolution, are intertwined with remarkable technological progress and form a crucial part of sustainable human resource management.
Meijerink et al.	An exploration of how digital HRM, in general, and algorithmic HRM, more specifically, are revolutionizing and reshaping the HRM field.
Connelly et al.	The gig economy has introduced HR to new challenges and transformations. These include worker retention, determining employment status, performance management, compensation and benefits, and job design.
Strohmeier	The conceptual elucidation of Digital Human Resource Management and its associated ideas, such as the digitization of human resource management, digitalization of human resource management, digital transformation of human resource management, and digital disruption of human resource management, centers on incorporating digital technologies into various facets of HR management within businesses. These concepts collectively encompass a series of transformative approaches that harness digital tools and platforms to optimize HR processes and adapt to the continually evolving digital environment The terminology and typology provide a clear understanding of Digital Human Resource Management and its related concepts. They reveal Digital Human Resource Management as a progressive evolution of previous conceptualizations of technology-based human resource management. Additionally, they establish a conceptual foundation for future research and advancements in the field of Digital Human Resource Management. The introduction of the strategic integration of digital technologies, known as "digital HR strategy," has paved the way for the development of the concept of the digital transformation of Human Resource Management (HRM). Furthermore, merging the digitalization of HRM with the broader digitalization of organizations represents a significant conceptual advancement. As a result, Digital HRM represents a progressive evolution in the conceptualization of technology-based HRM.
Aust et al.	Types of Sustainable HRM: Type 1 Socially Responsible HRM, Type 2 Green HRM, Type 3 Triple Bottom Line HRM, Type 4 Common Good HRM, the various types of Sustainable Human Resource Management (HRM) can be classified as follows: Type 1: Socially Responsible HRM

Author	The most important points presented
	Type 2: Green HRM Type 3: Triple Bottom Line HRM Type 4: Common Good HRM
Westerman et al.	Sustainable HRM poses an exceptionally complex challenge in the HR field. It urges us to expand our HRM theories, models, systems, and processes beyond a focus solely on profit, to encompass a triple bottom line (TBL) orientation with social and environmental considerations. This endeavor is crucial, as the well-being of future generations relies on the responsible development of new businesses. The sustainable HRM model adopts a multi-stakeholder approach, emphasizing environmental and social performance alongside economic outcomes.
Chams & García-Blandón	A multi-dimensional approach to Sustainable Human Resource Management (SHRM) involves thoroughly examining each aspect of sustainable development at different levels: individual, organizational, and national. This approach assesses the influence of SHRM on the three pillars of sustainability: economic, social, and environmental impacts.
Lopez-Cabrales & Valle-Cabrera	The contributions of Strategic Human Resource Management (SHRM) to the sustainability and competitiveness of firms are significant. One reason why corporate sustainable strategies may not yield the desired outcomes is the lack of integration of HRM in their strategic planning and implementation processes. By identifying strategic proposals for corporate sustainability, a typology of sustainable HRM strategies can be developed.
Stahl et al.	human resource management (HRM) has a potentially vital role to play in contributing to a firm's corporate sustainability (CS) / corporate social responsibility (CSR) efforts, but so far has failed to deliver. We explore the reasons for this failure and discuss ways for HRM to play a more prominent role in the design and implementation of a firm's CS/CSR strategy. Building on earlier attempts to integrate corporate responsibility and sustainability into the HRM performance construct, we propose a multidimensional, multi-stakeholder approach to sustainable HRM that encompasses activities aimed both at avoiding harmful consequences for stakeholders and contributing to positive outcomes along the triple bottom line (i.e., people, planet, and prosperity). Human Resource Management (HRM) has the potential to significantly contribute to a firm's Corporate Sustainability (CS) and Corporate Social Responsibility (CSR) efforts, but it has yet to fulfill its promise. We investigate the reasons behind this failure and discuss methods for HRM to take a more prominent role in developing and implementing a firm's CS/CSR strategy. Building upon previous efforts to incorporate corporate responsibility and sustainability into HRM performance, we propose a comprehensive and multi-stakeholder approach to Sustainable HRM. This approach entails activities aimed at both preventing harmful consequences for stakeholders and actively contributing to positive outcomes across the triple bottom line: people, planet, and prosperity.
Bush	Focusing on sustainability and enhancing the triple bottom line can yield advantages for organizations, employees, and stakeholders. However, it is essential to recognize that such an organizational focus may lead to detrimental employee outcomes like role conflict and role ambiguity.
Macke & Genari	analyze the state-of-the-art of sustainable human resources management and identify key elements and trends. including: The first comprised studies on sustainable leadership, based on individual and group power and embedded in its principles, processes, practices, and organizational values. The second demonstrated the relationship among human resources management, environmental sustainability, and organizational performance. The third category considered the tensions and paradoxes between human resources management practices and sustainability: on the one hand, human resources management should focus on cost reduction and corporate profitability (in the short-term); on the other, their actions should provide long-term sustainability of organizational performance. The last category dealt with the link between human resources management and the social dimension of sustainability, especially about organizational social responsibility and the company's relationship with its stakeholders. The analysis of the current state of Sustainable Human Resources Management reveals several key elements and emerging trends. The first category encompasses research on sustainable leadership, exploring its principles, processes, practices, and alignment with organizational values at both individual and group levels. The second category focuses on understanding the relationship between Human Resources Management, environmental sustainability, and overall organizational performance. The third category delves into the tensions and paradoxes that arise in balancing Human Resources Management practices between short-term cost reduction and corporate profitability, while also ensuring the long-term sustainability of organizational performance. Lastly, the fourth category investigates the connection between Human Resources Management and the social dimension of sustainability, particularly in the context of organizational social responsibility and the company's

Author	The most important points presented
	engagement with its stakeholders.
Baum	importance of capacity, capability and social responsibility issues within workforce policy and planning; inter-dependencies of sector workforce planning with other drivers of the political, social, economic, and cultural policy space; creation of stability and sustainability in workforce terms, making the notion of achieving a decent work culture a realistic proposition for employment. The significance of capacity, capability, and social responsibility considerations in workforce policy and planning cannot be overstated. These factors play a crucial role in shaping the workforce landscape and ensuring a balanced and responsible approach to employment. The inter-dependencies between sector workforce planning and other political, social, economic, and cultural policies are intricate and mutually influential. Workforce planning cannot be viewed in isolation, as it is intimately connected with broader policy domains, necessitating a holistic and coordinated approach. By promoting stability and sustainability within the workforce, organizations can realistically aspire to create a culture of decent work, making it feasible to achieve an environment where meaningful and fulfilling employment opportunities are attainable.
Tooranloo et al.	Sustainable Human Resource Management plays a pivotal role in managing environmental, social, and economic aspects. The sustainability of HRM relies on examining external factors for opportunities, changes, trends, and risks while striking a balance between economic, social, and environmental considerations. Sustainable HRM fosters attitudes in employees and managers to combat environmental degradation. In addition to environmental benefits, sustainable HR managers generate financial savings through cost reduction, macroeconomic policies, and business process reengineering, leading to increased organizational revenue. These managers prioritize the well-being of current and future generations, fostering a harmonious living environment, enhancing the quality of life, and addressing social gaps and inequalities.
Parakandi & Behery	Companies are progressively recognizing the importance of implementing policies and practices that promote a sustainable workforce and embracing the concept of work-life balance. They understand its value as a tool to enhance employee productivity, job satisfaction, and retention. This topic holds significant relevance, particularly in today's competitive business landscape, where organizations strive for sustainability and face intense market competition

Step 5—Analysis and Synthesis: the qualitative findings were thoroughly analyzed and synthesized. The initial 31 codes were reviewed twice and then interpreted by two of the primary authors. This process led to the identification of 4 dimensions and 19 components, which are detailed in Table 9.

Table 9. Classification of components (subcategories) according to dimensions (main components)

Dimensions	Component	Author
Results for HRM Sustainability (Value Capture)	Economic	Bush (2018), Aust et al. .(2020), Baum (2018), Baum (2018), Chams & García-Blandón (2019), Dickmann et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Parakandi & Behery (2015), Piwowar-Sulej (2021), Ramalho & Martins (2022), Stahl et al. (2019), Tooranloo et al. (2017), Westerman et al. (2020)
	Social	Bush (2018), Aust et al. (2020), Baum (2018), Chams & García-Blandón (2019), Dickmann et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Parakandi & Behery (2015), Piwowar-Sulej (2021), Ramalho & Martins (2022), Stahl et al. (2019), Tooranloo et al. (2017), Westerman et al. (2020)
	Environmental	Bush (2018), Aust et al. (2020), Baum (2018), Baum (2018), Chams & García-Blandón (2019), Dickmann et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Parakandi & Behery (2015), Piwowar-Sulej (2021), Ramalho & Martins (2022), Stahl et al. (2019), Tooranloo et al. (2017), Westerman et al. (2020)
	Individual	Bush (2018), Aust et al. (2020), Chams & García-Blandón (2019), Dickmann et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Parakandi & Behery (2015), Piwowar-Sulej (2021), Stahl et al. (2019),
Digital Tools for HRM (Value Digital)	AI (Artificial intelligence)	Dickmann et al. (2023), Dabic et al. (2023), Meijerink et al. (2021), Piwowar-Sulej (2021), Connelly et al. (2020), Aust et al. (2020)
	IOT (Internet of Things)	Dickmann et al. (2023), Dabic et al. (2023), Piwowar-Sulej
	Big Data	Dabic et al. (2023), Meijerink et al. (2021),
	HR Strategy	Aust et al. (2020), Chams & García-Blandón (2019), Dickmann et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Meijerink et al. (2021), Piwowar-Sulej (2021), Strohmeier (2020), Tooranloo et al. (2017), Westerman et al. (2020)

Dimensions	Component	Author
(Value Creation)		
	HR Leadership	Chams & García-Blandón (2019), Dickmann et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Piwowar-Sulej (2021), Westerman et al. (2020)
	HR Culture	Aust et al. (2020), Chams & García-Blandón (2019), Dickmann et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Plwowar-Sulej (2021), Tooranloo et al. (2017),
	HR Structures	Dickmann et al. (2023), Dabic et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Tooranloo et al. (2017),
	Talent Management	Dickmann et al. (2023), Dabic et al. (2023), Baum (2018), Chams & García-Blandón (2019), Connelly et al. (2020), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Parakandi & Behery (2015), Meijerink et al. (2021), Tooranloo et al. (2017), Stahl et al. (2019)
	Education & Training	Aust et al. (2020), Baum (2018), Chams & García-Blandón (2019), Connelly et al. (2020), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Tooranloo et al. (2017), Westerman et al. (2020)
	Appraisal & Performance Management	Aust et al. (2020), Chams & García-Blandón (2019), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Tooranloo et al. (2017), Westerman et al. (2020)
(Value Proposition)		
	Rewards and Compensation	Aust et al. (2020), Chams & García-Blandón (2019), Dabic et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Westerman et al. (2020)
	Recruitment and Selection	Aust et al. (2020), Chams & García-Blandón (2019), Connelly et al. (2020), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Tooranloo et al. (2017), Westerman et al. (2020)
	Development & Knowledge and Skill	Aust et al. (2020), Baum (2018), Chams & García-Blandón (2019), Connelly et al. (2020), Dabic et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Westerman et al. (2020)
	Health & Safety and Well Being	Aust et al. (2020), Baum (2018), Chams & García-Blandón (2019), Dabic et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Parakandi & Behery (2015), Tooranloo et al. (2017), Westerman et al. (2020)
	Job Design	Connelly et al. (2020), Dabic et al. (2023), Parakandi & Behery (2015), Tooranloo et al. (2017),
	People (Employees, Stakeholders, Managers, government,	Chams & García-Blandón (2019), Connelly et al. (2020), Dickmann et al. (2023), Dabic et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Meijerink et al. (2021), Parakandi & Behery (2015), Piwowar-Sulej (2021), Ramalho & Martins (2022), Stahl et al. (2019), Strohmeier (2020), Westerman et al. (2020)
(Value Delivery)		
	Engagement	Aust et al. (2020), Chams & García-Blandón (2019), Connelly et al. (2020), Dickmann et al. (2023), Dabic et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Parakandi & Behery (2015), Ramalho & Martins (2022), Stahl et al. (2019),
	HR Relationship	Aust et al. (2020), Chams & García-Blandón (2019), Connelly et al. (2020), Dabic et al. (2023), Lopez-Cabrales & Valle-Cabrera (2019), Macke & Genari (2018), Meijerink et al. (2021), Parakandi & Behery (2015), Piwowar-Sulej (2021), Ramalho & Martins (2022), Stahl et al. (2019), Strohmeier (2020),
	Networking	Dabic et al. (2023), Parakandi & Behery (2015), Plwowar-Sulej (2021), Tooranloo et al. (2017),

Step 6—Quality control: to ensure reliability, a business management expert (the third author) with relevant academic experience performed the encoding and code categorization. The resulting aspects and dimensions were then compared with those obtained in the previous step. The calculation of the kappa index, which yielded a value of 0.78, confirmed the validity of the results.

To establish the process's validity, the opinions of 10 university professors with PhD qualifications were collected as a group of experts. The Content Validity Ratio (CVR) was utilized to assess the validity of dimensions. Additionally, the Content Validity Index (CVI) was employed to evaluate the questionnaire's validity, affirming that all 23 components were valid with a score exceeding 0.7.

Step 7—Presentation of meta-synthesis findings: we completed the synthesis of the findings, which involved finalizing the model dimensions, classes, sequence, and their interconnections, along with the components and their relationships. The outcomes from Table 9 were utilized to develop the research process model, which is illustrated in Figure 5.

4. Discussion

Sustainable human resource management is presented based on the "common good" approach (Aust et al., 2020). Additionally, the dimensions of sustainable human resource management are based on psychological, sociological, strategic, and environmental aspects (Mazur & Walczyna, 2020). Therefore, sustainable human resource management can, like a Triple Bottom Line (TBL) business model, initiate a large-scale and systematic change by measuring the three "bottom lines"—economic, environmental, and social. Human resource management is well positioned to accomplish this task as it plays a significant role in all business functions such as promoting sustainability in recruitment, hiring, training and development, performance evaluation and management, rewards, and compensation. The application of the TBL model is meaningful and effective for all employees (Westerman, 2021). The resource-based view (RBV) theory is employed in the research, as it indicates when the human resource domain incorporates sustainability practices related to human resources and it creates both financial and non-financial value for the company. Based on the RBV framework, the development of competencies and human skills at the individual level and the preservation of natural resources are recognized as the main factors in creating competitive advantage (Chams et al., 2019). This theory is also applied in the context of digital transformation and the utilization of digital technologies as a resource. The present study aims to examine the impact of digital technologies such as artificial intelligence, big data, blockchain, cloud computing, robotics, and the Internet of Things on economic, environmental, and social sustainability, considering sustainability as a competitive resource in commercial organizations (Huber et al., 2022; Ferreira et al., 2023). Aligned with the resource-based view theory, this section addresses the research questions.

What are the important digital tools that influence human resource management? (Digital Value)

Derived from the integrated selection of articles, the three digital technology tools with the highest frequency in the selected integrated articles in human resource management processes are as follows:

The Artificial Intelligence, the Internet of Things, and Big Data.

Application of Artificial Intelligence in Human Resource Management:

Artificial Intelligence (AI) has the potential to create value for consumers, employees, and organizations through human resource management (Chowdhury et al., 2023). AI has an impact on Human Resource Management (HRM) and, in doing so, transforms human resource management, the nature of work, employees, and the workplace (França et al., 2023). Human resource management, with the help of AI, serves as a strategy for enhancing organizational productivity (Tewari & Pant, 2020; Malik et al., 2022), reducing costs (Tewari & Pant, 2020), and ensuring organizational performance sustainability (Alnamrouti, Rjoub, & Ozgit, 2022). AI programs have increased the capabilities of HR functions. AI-enhanced human resource management considers strategic importance for achieving outcomes at both the human resource management and organizational levels to attain sustainable competitive advantage (Prikshat et al., 2023). As a subset of High-Performance Work Practices (HPWP), personalized HRM is implemented at the individual level and indicates that the next generation of HRM is more successful by adopting advanced human resource analytics and AI to provide more suitable HR solutions (Huang et al., 2023). The new role of HR is to create a competitive advantage by acquiring AI capabilities and utilizing them to enhance company capabilities in aspects such as speed and responsiveness (Li et al., 2023). AI has an impact on various human resource management processes, including recruitment and hiring (Aydın & Turan, 2023; Jia & Chen, 2018; Tewari & Pant, 2020; Berhil, Benlahmar, & Labani, 2020), training and learning (Berhil, Benlahmar, Labani, 2020; Jia & Chen, 2018), compensation and benefits (Jia & Chen, 2018; Berhil, Benlahmar, & Labani, 2020), performance management, employee communication management, and strategic planning (Jia & Chen, 2018).

Application of the Internet of Things (IoT) in Human Resource Management:

Nowadays, every organization needs to rely on technology for success in managing its business operations, and human resource (HR) leaders must embrace digital innovations such as the Internet of Things (IoT) in HR functions (Abdussamad et al., 2022). The Internet of Things has a wide range of applications in human resource management processes. It allows people and objects to connect anytime, anywhere, using any service and network appropriately and quickly (Kremer, 2022). Consequently, the Internet of Things (IoT) can help in receiving data from complex and practical operational systems (Zhang et al., 2023). The most important thing to understand is that the Internet of Things has an impact on human resource management. As people spend most of their time connected to the Internet through smartphones, tablets, and other devices in the workplace, the Internet of Things has a positive influence on human resource management and leads to better organizational performance (Abdussamad et al., 2022). For example, the Internet of Things affects processes such as employee

well-being and experience in the organization (Gaur, Shukla, & Verma, 2019), recruitment and hiring (Mohanty & Mishra, 2020; Venkatesh, 2017; Mira, 2021), performance assessment and management (Mohanty & Mishra, 2020; Barman & Das, 2018), training and learning (Pathak & Solanki, 2021), employee compensation and benefits (Venkatesh, 2017), and employee health and safety (Kremer, 2022; Venkatesh, 2017), as well as talent management and selection [108] (Mira, 2021).

Application of Big Data in Human Resource Management:

Today, the use of big data has become an important aspect of human resource management in companies. The traditional model of organizational human resource management can no longer meet the development and improvement needs in the era of big data (Ma, 2023). Data analytics in human resource management (HRM) has gained significance due to its ability to provide insights based on data-driven decision-making processes (Shet et al., 2021). Research in the field of human resource management is undergoing a paradigm shift from the era of traditional small data to the era of emerging big data. Therefore, the adoption of a big data approach for HRM research has gained increasing importance (Zhang et al., 2021). "Big data" refers to a massive volume of data with diverse and complex structures that cannot be managed using traditional data management methods. Big data analytics has found extensive applications in business process management (BPM) and human resource management (HRM) (Rabhi et al., 2019). The integration of human resource management practices with big data enables sustainable capabilities and ultimately leads to sustainable company performance (Singh & El-Kassar, 2019). Big data has an impact on various human resource processes such as talent management (Ma, 2023; Nocker & Sena, 2019), performance management (Yuan, 2022), human resource planning, employee training and development, performance management, compensation and benefits management, and employee communications management (Ma, 2023).

What are the dimensions of sustainable human resource management? (Value Capture)

One of the factors in achieving value capture in an organization is the individual level, where organizations aim to empower individuals based on customer understanding and perspective to deliver sustainable products (Bencsik, Parida, & Gassmann, 2023). Personalized human resource management is a unique resource that contributes to sustainable competitive advantage for a company and provides greater positive performance effects alongside other high-performance work practices (HPWP). Based on theories of individual differences and person-organization fit, it can be concluded that personalized HRM is better than standardized traditional HRM in terms of productivity, suitable human resource environment, flexibility, HRM return on investment, and financial performance of the company (Huang et al., 2023). According to the findings from the integration process, in addition to the three common dimensions at the organizational level, namely economic, social, and environmental sustainability, individual sustainability is also considered. Therefore, in this section, more attention is given to individual sustainability, which can influence the other three dimensions of sustainability.

Sustainable human resource management, considered as a challenge in dominant human resource management models, involves adopting human resource management strategies and approaches to simultaneously achieve financial, social, environmental goals, and human resource regeneration (with an emphasis on the individual level) to respond to the competitive demands of various stakeholders (Poon & Lao, 2022). Discussions on the concept of corporate social responsibility (CSR) indicate that organizations must pursue the goals of various stakeholders, and human resource management, with its pluralist ideological underpinnings, provides a good position to support these efforts (Podgorodnichenko et al., 2020). These efforts need to start at the individual level because, at the individual level, the implementation of more innovative and flexible work practices in pursuit of sustainable human resource management encourages employees to adapt and change their behavior and assume greater responsibility while fulfilling multiple roles (Aust et al., 2020). However, individual sustainability has its concerns, one of which is that emphasizing sustainable human resource management through a triple-bottom-line approach and balancing economic, social, and environmental outcomes may create conflicts for employees and influence their attitudes and job-related behaviors, as well as reduce the likelihood of joining or remaining in the organization (Aust et al., 2020; Bush, 2020). Sustainable human resource management, as the foundation of a suitable cycle and process, is capable of promoting SDGs (Sustainable Development Goals). Integrating sustainability at the organizational level is understood as an intermediate link between individuals and the environment. From one perspective, it creates the necessary environment for the development of individual characteristics and competencies in employees to behave responsibly toward the company in social and environmental ways, contributing to the creation of a connected community and a protected environment (Chams & García-Blandón, 2019).

Which HR processes and functions have an impact on digital sustainability?

The relationship between sustainability and human resources has shown that HR processes, including recruitment, hiring, training, evaluation, payment, rewards, and compensation are powerful tools for aligning employees with organizational strategies, leading to long-term social sustainability (Cachón-Rodríguez et al., 2022). Sustainable HR processes should be developed by the HR management department to assist leaders and employees in successfully managing the tensions between triple bottom line (TBL) goals and creating new cultural values and attitudes (Westerman, 2021). The various HR processes and functions form the core of the sustainable digital HR management canvas, which includes value delivery, value proposition, and value creation. Each of these dimensions and its components are explained below.

Value Delivery: In this section, customers in the human resource management domain are initially selected as recipients of services, categorizing them into two main groups: employees and other stakeholders (shareholders, society, government, and environment).

Research has shown that sustainable human resource management can lead to customer satisfaction (Wikhamn, 2019). Sustainable HRM can help achieve both external stakeholder and shareholder satisfaction, as well as meet the needs of internal employees. This can be achieved by strengthening employees' commitment and attachment to corporate social/corporate social responsibility (CS/CSR) activities, participating in realizing it, integrating CS/CSR principles into existing HRM processes, and fostering stakeholder alignment (both internal and external) (Stahl et al., 2019).

Sustainable human resource management in the digital age and Industry 4.0 requires networking and emphasizes communication skills and teamwork (Piwowar, 2021). Social networks are one of the key factors in establishing connections between different groups and stakeholders (internal and external), which can contribute to achieving social sustainability (Tooranloo et al., 2017). After selecting the target customers, the distribution and delivery of services to them will be the most important process, based on the results section of the meta-synthesis networking process within and outside the business. To have effective and efficient networking, the use of digital technology tools is undoubtedly necessary. It is important to consider networking as a process for delivering and distributing HR services while considering individual employee sustainability and economic sustainability for the organization and shareholders, as well as social and environmental sustainability for society and the government.

In sustainable human resource management, effective and appropriate work communications contribute to employee retention and social sustainability (Naim & Lenka, 2018). Sustainable HRM activities, with the help of effective communication, are vital for fostering employee commitment and attachment to CS/CSR (Stahl et al., 2019). Effective communication also leads to mutual awareness and better understanding, and employees' improved relationships with individuals and direct interactions enhance organizational performance (Ahn & Park, 2018). Therefore, in the final part of value delivery, effective communication and attachment between selected customers in individual/organizational/community and environmental domains are considered for the goal of sustainability for each of these customers, utilizing digital technology tools to their fullest potential.

Value Proposition: The value proposition in the human resource management domain consists of three aspects: profit, planet, and people. Therefore, sustainable development requires the presence of three concepts: human responsibility (People), corporate efficiency (Profit), and natural resource management (Planet) (Chams et al., 2019). This value includes all the services that human resources provide to internal stakeholders (employees) and external stakeholders (shareholders, society, environment, and government) with the goal of sustainability and utilizing digital technology. These services include job design, recruitment and hiring processes, training, learning and development, performance evaluation and management, welfare, health and safety, salary, compensation and rewards, and talent management and succession planning. To deliver these services better and more effectively, the use of digital technology tools is necessary, with a focus on individual and organizational sustainability.

Regarding the concept of sustainability from the perspective of human resources, a complex framework for SHRM is developed that enables the achievement of financial, social, and environmental goals through the formulation of strategies and HRM actions, influencing both internal and external aspects of the organization, in a long-term timeframe (Ehnert et al., 2016; Chams et al., 2019).

Therefore, the relationship between HRM and SDGs can be clarified by providing three main interpretations:

First, a stakeholder-based approach grounded in the open system model (people value) includes employee well-being, community welfare, and work-life balance.

Second, corporate goals are based on efficiency and innovation (profit value), focusing on the connection between economic outcomes and sustainability. This is the same value that can be interpreted as a balance between profit and cost.

Third, a substance-oriented approach towards responsible consumption and resource regeneration for future organizational survival (Chams et al., 2019)

In summary, sustainable human resource management emphasizes long-term relationships with employees and the provision of HR services such as training, development, fair compensation, talent management, and a suitable work environment (Dabic et al., 2023).

Value Creation: The obstacles to implementing sustainability in businesses include a lack of strong structure, supportive culture, effective leadership, and the absence of suitable strategy-based reporting. HR managers need to overcome these challenges by identifying the mentioned obstacles and implementing suitable strategies to address these operational issues (Chams et al., 2019). Furthermore, the main drivers for organizations that have adopted sustainable HRM strategies include organizational change (values and behaviors), workplace institutions and systems (employment policies and rewards), occupational development and organizational learning (training and skill development), employee consultation and participation (innovation), work-life balance, culture, leadership, and management style. These factors have a significant impact on HR processes such as development and well-being, voluntary satisfaction and commitment, environmental behaviors, and organizational outcomes such as productivity and profitability (Gollan, 2013). This section focuses on four components: leadership, strategy, culture, and structure for value creation.

In today's world, with the challenges of sustainability and digitalization, the awareness of how human resources can realize strategies and create value for businesses has become more important than ever for organizations (Sen, 2020). Businesses need to develop their leadership competencies to achieve sustainability strategies in the digital age (Imran et al., 2020; Shevyakova et al., 2021; Crešnar & Nedelko, 2020). The characteristics of leaders can play a role in guiding sustainable outcomes, and excellent leadership assists this process through suitable leadership styles (Bush, 2020). The digital age has led to an increasing need for new leadership styles and interdisciplinary competencies, allowing leaders to enhance networked team leadership (Temelkova, 2018). Additionally, new leaders should strategically guide their business objectives beyond maximizing profits or economic performance and align their vision and strategy towards preserving and improving the environment, as well as advancing social responsibility (Suriyankietkaew et al., 2022).

Good common HRM implementation entails creating common value in all areas, including structure (Aust et al., 2020; Hoffmann & Shipper, 2018). By providing an appropriate structure, direction, clarifying expectations, and promoting goal achievement, a leader defines and organizes the role of a follower to move the organization towards sustainability (Bosch, 2018). This requires HR management to take on a new role in developing an organizational culture aligned with creating good common values (Aust et al., 2020; Hallensbe et al., 2014). Sustainability culture has been defined as "a culture in which individuals are aware of major environmental (and social/economic) challenges, behave in sustainable ways, and are committed to sustainable living for both the present and the future" (Marans & Callewaert, 2013). Additionally, delivering services using digital technologies requires a digital culture (Khin & Ho, 2018; Borda & Bowen, 2019).

Therefore, establishing shared values begins with key partners who serve as organizational leaders and are responsible for effective HR leadership. These leaders will help encompass the second part of creating good common value, which includes key activities such as formulating HR strategies and programs and establishing an appropriate structure for creating shared value. Moreover, these leaders contribute to the creation and development of key resources (organizational culture).

Both current performance and future organizational development depend on the characteristics of its leaders. For sustainable management of an organization, not only is a vision and effective communication with that vision necessary but also leadership skills to inspire people (employees) (Piwowar-Sulej & Iqbal, 2022). Transformational leadership plays a catalytic role in promoting employees' social behaviors. For example, actively sharing environmental values, addressing sustainable development issues, and encouraging employee participation in social events are aspects positively associated with HR leadership's proactive behaviors (Chams et al., 2019). Additionally, digitalization and its accompanying complexities have given rise to new approaches to leadership, requiring leaders to acquire new skills in the digital transformation era (Henderikx & Stoffers, 2022). Therefore, active leadership, innovative culture, flexible structure, and transparent reporting facilitate environmental sustainability (Chams et al., 2019). In summary, HR leadership, through participation in strategy development and establishing an appropriate organizational structure, is a key driver and supporter of cultural

development. This enables the creation of value, allowing HR management to better deliver its proposed services to selected customers. Importantly, when discussing leadership, strategy, structure, and culture, the digital transformation and sustainability should also be considered. Thus, sustainable and digital leadership, strategy, structure, and culture are emphasized.

How does the digital sustainable HRM canvas work?

Based on the previous discussions, the digital sustainable HRM canvas is presented by modeling it in alignment with the business canvas presented in Figure 5. This canvas consists of five main components: value proposition, value creation, value delivery, value capture, and digital value. This canvas includes digital value, which is not present in conventional canvas. The goal is to utilize digital transformation tools such as artificial intelligence, the Internet of Things, and big data to transform HRM in the digital age and enhance sustainability in the field of HRM. There are elements of economic, social, and environmental sustainability, along with the introduction of a novel aspect known as personal sustainability.

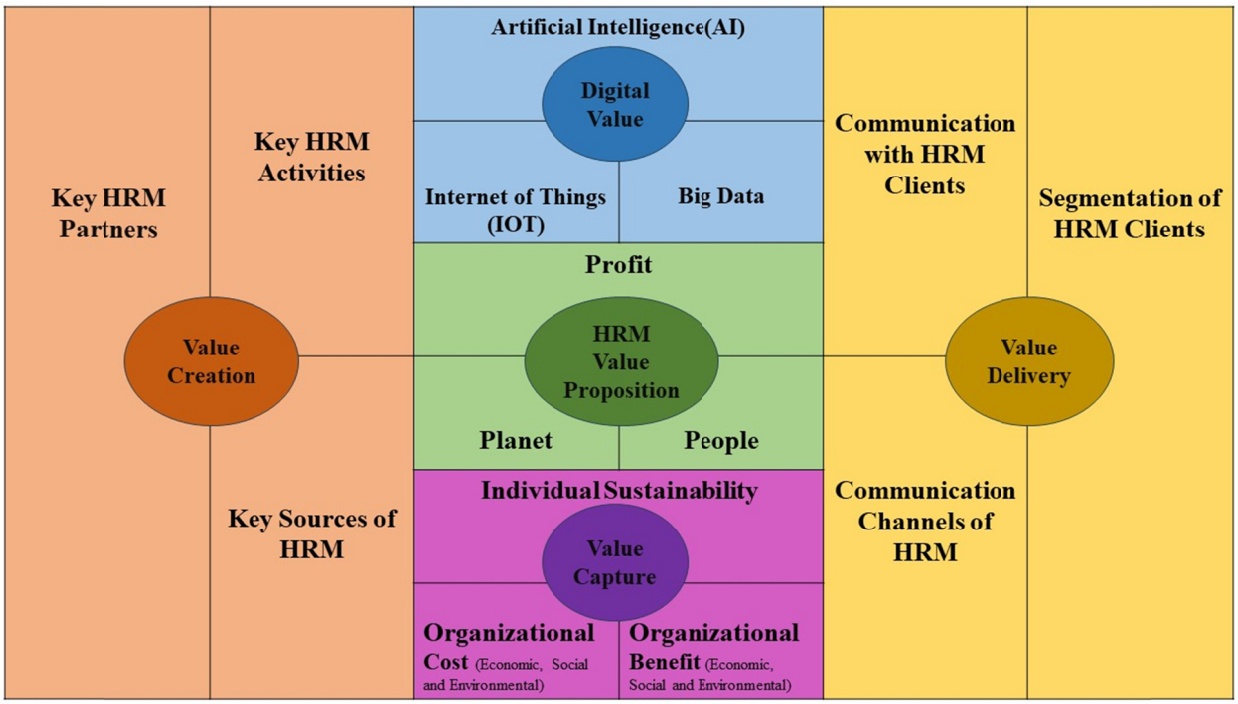

Figure 5. Research process model resulting from the meta-synthesis

5. Limitations and Suggestions for Further Studies

This research has several limitations, with one of the most important limitations being the number of keywords. This study was based on two keywords: sustainable human resource management and digital human resource management. The second limitation was the use of the English language for article search. The third limitation was related to the research method, which solely utilized a qualitative-meta-synthesis approach. The fourth limitation was the examination of the impact of certain digital transformation tools such as artificial intelligence, the Internet of Things, and big data in the field of human resource management. The fifth limitation was the selection of final articles only from Q1-ranked journals, and the last limitation of this study was establishing a connection between the emerging concepts of digital transformation and sustainability in the field of human resources. Furthermore, the combination and application of these concepts in establishing a connection between human resource management and the business canvas are still relatively new and there is no theoretical consensus in this regard. Reliable resources that encompass all of these concepts have not yet been published.

Businesses need innovations that create a sustainable economy to overcome the great challenges of the United Nations Sustainable Development Goals. Business model innovation can play an important role in improving sustainability in the digital age by creating innovative and sustainable products and services (Böttcher et al., 2023). Therefore, it is recommended that in future research, indicators for each dimension and component of the

canvas be used to assess the current state of human resource management with an emphasis on sustainability and digitization more accurately. Until a process is developed for monitoring and evaluating this canvas, it cannot be improved. Additionally, the main approach of presenting the business canvas for human resource management has focused on improving performance in economic, environmental, and social indicators.

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