

# The Effect of E-HRM on Workforce Agility in the Jordanian Cement Industry: The Mediating Role of Employee Engagement and the Moderating Role of Digital Innovation

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## Abstract

In recent years, the Jordanian cement industry has faced significant challenges, including increased competition, regulatory pressures, and the urgent need for operational agility. These factors have highlighted the importance of effective human resource management in maintaining competitiveness and adaptability. This study examines the impact of electronic human resource management (E-HRM) on workforce agility within this sector, emphasizing the mediating role of employee engagement and the moderating influence of digital innovation. The research identifies key E-HRM practices that enhance employee engagement, such as personalized training programs and performance tracking, which contribute to overall organizational performance. Additionally, the study explores the barriers to effective E-HRM implementation in Jordanian cement companies, including outdated IT infrastructure and resistance to change. Findings indicate that E-HRM is critical for fostering a responsive and adaptable workforce, enabling organizations to swiftly navigate market demands and technological advancements. By leveraging digital innovations, cement companies can optimize HR processes and create a more engaged workforce that is better equipped to meet challenges. This research contributes to a deeper understanding of the strategic role of E-HRM in enhancing workforce agility in the Jordanian cement industry. It provides valuable insights for industry stakeholders on how to implement effective E-HRM practices that not only improve employee engagement but also drive organizational success and resilience in an increasingly dynamic business environment.

**Keywords:** E-HRM, Workforce Agility, Employee Engagement, Digital Innovation, Jordanian Cement Industry

**Introduction**

In the face of unprecedented changes in the global business landscape, organizations across various sectors are increasingly compelled to adopt innovative strategies that bolster their competitiveness and adaptability. This urgency is particularly pronounced within the Jordanian cement industry, where companies are navigating a complex interplay of technological advancements, heightened market competition, and evolving workforce dynamics (Cascio & Montealegre, 2016; Warner & Wäger, 2019). The adoption of electronic human resource management (E-HRM) has emerged as a transformative strategy, presenting a critical opportunity for cement companies to enhance workforce agility—a vital capability necessary for thriving in a constantly shifting environment (AlNawafleh et al., 2022; Halid et al., 2022).

E-HRM, or electronic human resource management, encompasses the use of web-based technologies designed to enhance and automate various human resource processes. This innovation facilitates not only operational efficiency but also supports data-driven decision-making, which is crucial for organizations navigating the complexities of the modern business landscape (Dulebohn & Stone, 2018; Marler & Parry, 2016). By automating tasks such as recruitment, onboarding, performance management, and payroll processing, E-HRM systems reduce administrative burdens on HR professionals, allowing them to focus on strategic initiatives that drive organizational performance.

Moreover, E-HRM plays a vital role in fostering a more adaptable workforce. It does so by providing tools and platforms that encourage innovation, collaboration, and continuous learning. For instance, E-HRM systems can facilitate employee training and development through e-learning modules, which can be tailored to individual learning preferences and career goals (Bondarouk et al., 2017). This personalized approach not only enhances employee skills but also boosts morale and engagement, as employees feel more supported in their career progression.

In the context of Jordan's expanding industrial sector, particularly within the cement industry, the strategic implementation of E-HRM has become increasingly vital. The cement industry is characterized by its significant contributions to the national economy, but it also faces unique challenges such as environmental regulations, fluctuating demand, and the need for sustainable practices (Kuepper et al., 2020). As companies in this sector strive to optimize their human resource practices, E-HRM systems emerge as essential tools for promoting organizational agility—enabling businesses to swiftly adapt to market changes and innovate in response to emerging trends.

The adoption of E-HRM also enables better data management and analytics, providing organizations with valuable insights into workforce performance and engagement. This data-driven approach allows for more informed decision-making and enhances the ability to forecast workforce needs in alignment with business goals (Aladwan et al., 2023). Furthermore, by utilizing real-time analytics, organizations can identify skill gaps, monitor employee engagement levels, and assess the impact of HR initiatives, ultimately driving continuous improvement and adaptability.

The growing recognition of E-HRM's importance in the Jordanian cement industry aligns with global trends, where organizations are increasingly leveraging technology to enhance their HR functions and foster a culture of agility. As the industry confronts challenges related to operational efficiency, talent retention, and sustainability, E-HRM offers a pathway to not only streamline HR processes but also cultivate a workforce that is ready to respond to change and contribute to long-term organizational success. In this evolving landscape, the strategic implementation of E-HRM can serve as a critical enabler for cement companies seeking to thrive in a competitive and dynamic environment. Despite the documented benefits of E-HRM, its implementation within the Jordanian cement industry has encountered significant obstacles, including outdated IT infrastructure, resistance to change, and a shortage of trained HR professionals (Al-Qaisi & Saadon, 2023; Hamad et al., 2019). These challenges have been exacerbated by high rates of employee layoffs, which have severely impacted workforce stability and operational efficiency (Ministry of Labour, 2023; Jarrar & Jaradat, 2022). Notably, the situation at Lafarge Cement Jordan illustrates the detrimental effects of insufficient workforce agility, where substantial workforce reductions have underscored the urgent need for effective human resource management practices (Kuepper et al., 2020).

To address these pressing challenges, this study seeks to explore the impact of E-HRM on workforce agility within the Jordanian cement industry, emphasizing the mediating role of employee engagement and the moderating influence of digital innovation. Employee engagement—the emotional commitment and involvement employees have toward their organization—is crucial in enhancing workforce agility by fostering motivation, performance, and a willingness to embrace organizational change (Kaur & Mittal, 2020; Saks, 2006). Moreover, as organizations increasingly adopt digital innovations such as artificial intelligence, data analytics, and cloud computing, E-HRM practices can be tailored to support a more engaged and adaptable workforce (Halid et al., 2022; Kosyva et al., 2024).

### **Objectives of the Study**

1. To identify the impact of E-HRM adoption on workforce agility within the Jordanian cement industry.
2. To evaluate the mediating role of employee engagement in the relationship between E-HRM practices and workforce agility in international cement firms operating in Jordan.
3. To assess the moderating effect of digital innovation on the relationship between E-HRM implementation and workforce agility in the context of the Jordanian cement sector.
4. To explore the specific E-HRM practices that contribute most significantly to enhancing employee engagement and organizational performance in the Jordanian cement industry.
5. To analyze the challenges and barriers faced by Jordanian cement companies in implementing E-HRM systems and their impact on workforce adaptability and performance.

## Literature Review

The existing literature provides a comprehensive overview of the relationship between electronic human resource management (E-HRM), workforce agility, and digital innovation, revealing significant insights and gaps in empirical research. E-HRM has been widely studied for its impact on organizational performance, with studies consistently demonstrating a positive correlation (Altaf et al., 2019; Masum et al., 2020; Njoku et al., 2019; Thatsara & Sutha, 2021). These studies primarily employed questionnaires for data collection, affirming that effective E-HRM practices enhance organizational performance.

Recent research has begun to explore the interplay between E-HRM and sustainable competitive advantage (Alqarni et al., 2023). These findings underscore the critical role of E-HRM in fostering a competitive edge within organizations. Additionally, various studies have investigated the impact of E-HRM on employee productivity (Iqbal et al., 2020; Ishrata et al., 2020; Nurshabrina & Adrianti, 2020; Zain & Ali, 2023). However, despite these advances, there remains a limited empirical focus on workforce agility as a crucial determinant of organizational success in dynamic environments.

The concept of workforce agility is increasingly recognized as essential for organizations to adapt to technological advancements, globalization, and market volatility. While several studies emphasize the importance of workforce agility in talent attraction and retention (Alagah & Tende, 2017; Munteanu et al., 2020), research specifically linking E-HRM to workforce agility, particularly in developing countries like Jordan, is sparse. Al-Fugaha et al (2023), identified a positive relationship between E-HRM and workforce agility in the Jordanian banking sector; however, this insight does not extend to the cement industry, which faces unique challenges.

### *HRM in Jordan's Cement Industry: Challenges and Demands*

According to Al-Ghussain et al (2018), the cement industry is a key sector in Jordan, producing approximately 10.9 million metric tonnes of cement annually and significantly contributing to CO<sub>2</sub> emissions. As this industry faces increasing competition and evolving market demands, cement companies in Jordan, like many organisations, are seeking ways to enhance their competitiveness and adaptability. This need for improvement is driven by technological advancements and changing workforce dynamics, leading to fundamental transformations in processes, products, and services (Choudhary & Pandita, 2022). To manage these challenges effectively, E-HRM practices have become essential. In this context, E-HRM has emerged as a crucial strategic function for organisations striving to remain competitive and agile in a rapidly changing environment (Alqarni et al., 2023; Choudhary & Pandita, 2022).

The implementation of E-HRM is one of the most critical factors influencing organisational success in this digital age (Berber et al., 2018). This era has witnessed a profound shift towards technology-driven processes and solutions, which is reshaping the way cement companies operate globally (Coskun-Setirek & Tanrikulu, 2021; Woetzel et al., 2017). This technology-driven procedure is strategic in this era of rapidly advanced technological and business environments. Jordan, a country with a growing industrial sector, including the cement industry, is not immune to the winds of change brought by digitalisation (Abdelrahim, 2023). As such, the adoption and usage of E-HRM is critical to

optimising HR procedures in the cement industry, adding to its overall efficiency and growth. The cement industry can streamline HR procedures by enhancing communication and informed decisions. Hence, the adoption of E-HRM has become crucial within the Jordanian cement industry, particularly given the companies' considerable environmental challenges and the need to improve competitiveness and long-term market viability.

The cement industry plays a vital role in economic growth and is recognized as a crucial pillar of the modern Jordanian economy (Jarrar & Jaradat, 2022). Cement companies in Jordan, like their global counterparts, are increasingly aware of the need to modernize their human resource management (HRM) practices to remain competitive, maintain an agile workforce, and respond effectively to market dynamics. However, recent studies have reported various challenges related to workforce reductions and labour unrest in the Jordanian cement sector. Table 1.2 illustrates significant workforce reductions within this industry and their implications for operational efficiency, employee engagement, and workforce agility. The layoffs at Qatrana Cement, Al-Rajhi Cement, JCF, and Arabian Cement Company highlight the industry's vulnerability to economic downturns, where workforce reductions are often seen as the sole response to operational challenges. For instance, Lafarge Cement Jordan experienced 500 layoffs in 2019, exemplifying the consequences of inadequate workforce agility. The company's inability to adapt quickly to financial difficulties resulted in protests and a decline in employee morale (Kuepper et al., 2020).

These events demonstrate the need for improved workforce agility to adapt quickly to changing work conditions and demands. The implications for these companies include lower employee morale, loss of key talent, and a potentially slower recovery in operations due to a lack of flexibility and innovation. Employee dissatisfaction, as seen in Lafarge's prolonged protests, further emphasises the necessity for strong employee engagement to maintain productivity and organisational loyalty (Jordan News, 2021). To address these implications, E-HRM systems could play a crucial role. By providing enhanced communication, real-time feedback, and training opportunities, E-HRM can improve employee engagement, foster a more adaptable workforce, and enable companies to respond more effectively to market shifts, thereby mitigating the negative impact of workforce reductions. The implementation of such systems could also lead to more sustainable and strategic workforce management in the future (Al-Hamad et al., 2021).

Table 1.2  
*Workforce Reductions in Jordan's Cement Industry*

| Company Name                  | Employees Laid Off | Location              | Year | Context  | Implications                                     | References                              |
|-------------------------------|--------------------|-----------------------|------|--|--|---|
| Lafarge Cement Jordan         | 500                | Rashadiyah, Amman     | 2019 | Layoffs due to financial losses of 62.2M JOD (\$87M).  | Weak agility; protests and decreased morale.     | Kuepper et al., 2020; Jordan News, 2021 |
| Qatrana Cement                | 100                | Qatrana Plant         | 2020 | Workforce reduction due to production slump.           | Loss of talent; affects innovation and capacity. | Al-Hamad et al., 2021                   |
| Al-Rajhi Cement               | 50                 | Ma'an Plant           | 2021 | Restructuring due to low demand for cement.            | Reduced flexibility; longer recovery times.      | Al-Hamad et al., 2021                   |
| Jordan Cement Factories (JCF) | 150                | Various (incl. Amman) | 2018 | Downsizing to optimize costs during market downturn.   | Weakened engagement; potential talent flight.    | Kuepper et al., 2020                    |
| Arabian Cement Company        | 75                 | Aqaba Plant           | 2021 | Cost-reduction layoffs in response to declining sales. | Loss of skills; diminished innovation capacity.  | Al-Hamad et al., 2021                   |

E-HRM enables businesses to link their workforce strategy with their environmental goals, promoting a harmonic balance of growth and sustainability. The concept of E-HRM gained prominence in this context, reflecting the ability of organisations to adapt swiftly and effectively to changing circumstances. In this regard, E-HRM is not only imperatively strategic but also a hallmark of resilience in the face of business dynamism and uncertainty. Moreover, cement companies in Jordan must continuously enhance their competitiveness to secure long-term market viability in a globally competitive environment. E-HRM enables firms to quickly respond to market changes, foresee future trends, and develop a dynamic workforce as well as promote an innovation culture (Alqarni et al., 2023). The ability to adapt not only encourages business survival but also encourages business prosperity in the face of challenges encountered by the changing environment of the cement industry. Going by these, E-HRM has progressed beyond a mere technology instrument in the Jordanian environment. It has evolved into a strategic necessity, a driving force behind process optimisation, sustainable practices, and competitiveness (Salameh, 2024). The role of E-HRM goes beyond HR management; it acts as a catalyst for organisational growth and resilience in the face of ongoing change. As the digital era shapes the future of business,

Jordan's cement sector must recognise that adopting E-HRM is crucial for achieving a more successful and sustainable future.

E-HRM represents a transformative shift approach, which harnesses technological potential to drive overall performance and work agility (Muzaffar et al., 2024). To accomplish these organisational goals, E-HRM provides a crucial organisational function, which serves as a channel for businesses to cultivate and retain talent, as well as ensuring that employees are not only competent but also supportive of the company's strategic objectives (Alwis et al., 2022; Zhang & Chen, 2024). E-HRM solutions play a crucial role in improving HR processes in the cement sector, nurturing effectiveness and expansion through a range of functions like talent recruitment, employee development, performance assessment, payroll management, adherence to regulations, and safety measures (Alkhodary, 2021).

Qin and Nembhard (2015), noted that workforce agility is a broad and dynamic subject of study that has gained sustained attention over the last few decades. Several techniques for establishing workforce agility have been proposed in the literature. Each of these techniques serves a distinct purpose in the development of an agile workforce, allowing organizations to better adapt to changes in the dynamic environment. Staffing, training, empowerment, incentives, and the use of technology are all part of the process of cultivating workforce agility (Das et al., 2023; Munteanu et al., 2020). These factors explain employees' ability to adapt to changes and uncertainty in the work environment. To flourish in a fast-changing world, the Jordanian cement industry must make a holistic commitment to developing a culture that values adaptability and continuous improvement of its workforce.

Workforce agility is undeniably crucial in today's dynamic business environment. The ability of firms to adapt, innovate, and survive in a time of rapid technological change and market disruptions depends greatly on their workforce agility. Successful businesses stand out in this fast-paced environment due to their ability to react quickly to changing conditions, accept changes, and take opportunities brought by the changing business landscape.

Saeed et al (2022), noted that there is no precise or universally accepted definition of what constitutes workforce agility. Workforce agility is a complex subject with varying definitions across industries and organizations. What remains consistent is the essential need to develop a workforce capable of handling ambiguity, adopting new technology, and remaining resilient in the face of unexpected challenges. Although difficult to precisely quantify, adaptability is the foundation of workforce agility. Another approach towards workforce agility is to understand how flexible an organisation is to maintain an agile workforce. This viewpoint emphasises the symbiotic relationship that exists between an organisation's human resources flexibility and workforce agility. Al-Kasasbeh et al (2016), pointed out that an organisation's capacity to keep an agile workforce is dependent on its ability to react to changing conditions. This adaptability can be created by encouraging collaboration, building employee loyalty, and improving workforce competence. Employees' different backgrounds, talents, intellectual capacities, and innate willingness to accept change and innovation all contribute to these characteristics.

The successful use of E-HRM techniques is essential for improving workforce agility and promoting sustainable business practices. To maintain an agile workforce, E-HRM functions seek to provide management solutions that increase human resource efficiency. These solutions include a wide range of digital tools and platforms that automate HR processes, such as staff hiring and training, performance reviews, and employee interaction (Mitrofanova et al., 2019). By automating routine tasks and providing real-time data, E-HRM enables management to make informed decisions, allocate resources wisely, and build a workforce that can swiftly respond to changes and the development of services and processes (Khammadee, 2023). The quest for workforce agility is a complex path entwined with organisations' adaptability, which is made possible by the successful use of EHRM principles. As the business landscape changes, the cement industry that values workers' agility and engages in E-HRM is better positioned to succeed in a constantly changing environment.

The agility of the workforce is becoming increasingly vital in the context of the cement business in Jordan. This industry faces numerous challenges, such as shifting market demand, pricing competition, and changing regulatory requirements, as one of the main industries assisting the nation's infrastructure development (Kuepper et al., 2020). Being able to quickly adjust to changes in manufacturing processes, market demands, or technology improvements has become crucial for maintaining competitive advantage in such a dynamic environment.

According to Ardian et al (2023), employee engagement is essential to workforce agility. Employees who are engaged are usually more driven to solve problems, start process changes, and continue to produce at a high level even under pressure or in uncertain situations. Especially in sectors where market dynamics and operational efficiency are critical, such as cement manufacturing, highly engaged workers can make a big difference in an organisation's capacity to overcome obstacles and take advantage of opportunities.

High levels of employee engagement also promote organisational resilience to recover from setbacks and adapt to new situations (Ojo et al., 2021). In the Jordanian cement sector, where external factors such as construction activity fluctuations, labour market shifts, and economic volatility are crucial (Kuepper et al., 2020), resilient and engaged employees can improve an organisation's ability to absorb these shocks while maintaining performance. Employees who are engaged are more inclined to accept organisational change, work in cross-functional teams, and look for new methods to improve operational practices. These behaviours have a direct impact on workforce agility because they encourage employees to be proactive in responding to industry volatility and changing company conditions.

Furthermore, employee engagement in the Jordanian cement sector is critical since it influences the adoption of new technology and agile work processes. With the increasing integration of digital technologies in cement production, such as automation, data analytics, and smart manufacturing, the workforce must be able to adapt and upgrade swiftly. Engaged employees are more prone to see technological improvements as possibilities rather than dangers, as highlighted by the study of Ojo et al. (2021). Their



positive emotional attachment to the organisation makes them more open to change, including the implementation of new work practices that improve agility.

In the Jordanian cement industry, where employees often work in physically demanding and high-stakes environments, personalised development opportunities are key (Mesmoudi & Kermia, 2022). E-HRM platforms can provide access to training programs, career development resources, and online learning modules, allowing employees to acquire new skills and enhance their competencies at their own pace. This helps employees feel more empowered and valued by their organisation, increasing their emotional commitment and engagement.

From a different perspective, digital innovation is also essential to maintain an agility-focused workforce within a functional E-HRM system (Al-Alawi et al., 2021; Halid et al., 2022). Industry structure as well as the very nature of labour have changed because of the advancement in technology and the pervasive impact of digitalization. In this regard, digital innovation forms the cornerstone of contemporary HRM procedures, laying the foundation for the development of E-HRM. The transition from traditional HRM to E-HRM can be driven by digital innovation. The cement industry in Jordan may completely transform its HR processes (from hiring and developing employees to employee performance engagement and management) by using cutting-edge technologies. This endeavour may radically redefine HR, making it more effective and data-driven. Similarly, digital innovation may emerge as a catalyst for improving workforce agility in the context of the cement sector. The cement industry is well known for its distinctive environmental peculiarities, which are typified by the need for innovation. The integration of E-HRM solutions can streamline the way employees operate and adapt to changing industrial needs. Hence, digital innovation may provide tools to improve HR processes and develop a workforce that is flexible in industrial evolution.

Digital innovation steers human resources management (HRM), leading to E-HRM. Digital innovation can be suggested as a catalyst for enhancing workforce agility in the cement industry through the integration of E-HRM solutions to optimise workforce processes and responses to industrial demands. The present cement industrial landscape is characterised by volatility and complexity; thus, companies need to continuously seek innovative and environmentally sustainable solutions. Digital innovations use new technologies to resolve these business problems and practices to achieve new business models, products, and services (Nottbrock et al., 2023). Given the crucial role of innovation in the cement industry, a strong relationship between E-HRM and worker agility can be established by strategically leveraging digital innovation—a comprehensive approach that encourages creativity, resilience, and adaptation at all organisational levels. Thus, positioning the cement industry in Jordan as agile market leaders capable of navigating the turbulent cement industry terrain by fostering a culture of constant learning and change.

#### *Review of Prior Studies on E-HRM and Agility*

Prior investigations, such as those by Alqarni et al (2023), Chowdhury (2024), and Hamidianpour et al (2016), have discussed E-HRM's relationship with organizational agility, emphasizing the mediating role of agility. However, distinguishing between organizational agility—focused on structural adaptability—and workforce agility, which emphasizes

employee flexibility, is crucial for industry-specific applications (Munteanu et al., 2020; Thathsara & Sutha, 2021). Given the particular challenges faced by the cement industry, prioritizing workforce agility is essential for ensuring employee adaptability, skill development, and compliance with industry regulations.

Furthermore, the moderating role of digital innovation in enhancing E-HRM's effectiveness on workforce agility has received limited attention. While Al-Fugaha et al. (2023), focused on the direct effects of E-HRM on workforce agility, this study aims to address the gap regarding digital innovation as a moderating variable. Understanding digital innovation's role is vital, given the contemporary work environment's emphasis on technological integration and its implications for workforce performance.

Research by Doz (2020), highlighted that strategic agility involves not just analytical approaches but also specific management practices, skills, and values that enable organizations to adapt to change. Similarly, Radu (2023), found that a positive workplace culture significantly impacts organizational agility and performance. Halid et al (2022), emphasized the necessity of building digitally capable teams to achieve strategic goals, underscoring the importance of continuous training and development.

The literature also suggests that HR practices can support agility within organizations (Moh'd et al., 2023). Empowering employees is identified as a key driver of organizational agility, especially during uncertain times (Sajuyigbe et al., 2023). Research by Battour et al. (2021) and Mugerwa (2020), examined the role of strategic agility in sustainable competitive advantage, demonstrating that HRM strategies and E-HRM practices contribute significantly to organizational effectiveness.

Despite the increasing recognition of the potential of E-HRM, there is a lack of structured discussions in existing studies on how to address the challenges related to E-HRM across the Middle East regions (Al-Youbi et al., 2020). Specifically, studies addressing the roles of E-HRM in enhancing workforce agility within the cement industry remain limited. Existing studies tend to focus on broader industrial sectors, often overlooking the environmental and operational challenges faced by cement producers. Furthermore, the relationship between E-HRM and workforce agility, particularly how it can be driven by digital innovation as a moderating factor in this highly competitive and environmentally sensitive sector, is under-explored. This gap highlights the need for a focused study on how E-HRM practices can be strategically leveraged to enhance workforce agility in the cement industry, particularly within the context of Jordan's evolving market environment. Addressing this gap will provide a valuable understanding into optimising workforce adaptability in an industry that is critical to Jordan's economic development.

While considerable progress has been made in understanding E-HRM's impact on organizational performance, gaps remain in exploring its influence on workforce agility, particularly in the context of the cement industry in Jordan. This literature review lays the foundation for further investigation into how digital innovation moderates the relationship between E-HRM practices and workforce agility, addressing industry-specific challenges and contributing to a more nuanced understanding of these dynamics.

### *Theoretical Underpinnings*

This section reviews the fundamental theories that provide the conceptual framework for understanding the dynamics of E-HRM, workforce agility, and digital innovation. A robust theoretical basis is crucial for guiding the analysis and interpretation of findings. Two prominent theories examined in detail are the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT). By drawing from Barney's RBV (1986) and Teece et al.'s DCT (1997), this study seeks to elucidate the complex relationships among E-HRM, workforce agility, and digital innovation. It posits that the strategic deployment of E-HRM, coupled with digital innovation, serves as a significant driver of workforce agility, contributing to sustainable competitive advantage within the cement industry.

#### *Resource-Based View (RBV) Theory*

The Resource-Based View (RBV) posits that an organization's sustained competitive advantage is derived from its unique resources and capabilities (Kruesi & Bazelmans, 2023). This study employs RBV to investigate how specific resources within the Jordanian cement industry, particularly E-HRM practices, enhance workforce agility. According to RBV, organizations can secure a competitive edge by developing resources that are valuable, rare, unique, and difficult for competitors to imitate (Alghamdi & Agag, 2024; Bhatti et al., 2022). The theory emphasizes the optimal utilization of these strategic resources for superior performance and sustained competitive advantage (Cooper et al., 2023; Kruesi & Bazelmans, 2023).

Integrating RBV into E-HRM allows for a strategic focus on human capital, which is crucial for promoting workforce agility. E-HRM functions—including E-performance management, E-recruitment, E-training, and E-knowledge management—are essential for fostering an agile workforce (Ajgaonkar et al., 2022). This alignment of E-HRM with RBV principles enables organizations to cultivate a competitive advantage by enhancing employee skills and responsiveness.

Moreover, digital innovation represents a key resource that E-HRM can leverage to navigate evolving technological landscapes. As noted by Sasmoko et al. (2019), dynamic capabilities extend RBV by emphasizing an organization's adaptability through the transformation of routine activities. Therefore, the integration of digital innovation within E-HRM processes is vital for enhancing efficiency and responsiveness in the cement industry. Ranjan (2024) highlights the role of digital innovation as a moderating variable, showcasing its potential to enhance workforce agility in tandem with E-HRM practices.

#### *Dynamic Capabilities (DC) Theory*

Dynamic Capabilities Theory (DCT) is often seen as an extension of RBV, focusing on the need for organizations to adapt to the uncertainties of evolving technological environments (Zhang et al., 2023). Cuthbertson and Furseth (2022), argue that sustainable competitive advantage is attainable only through the possession of dynamic capabilities that enable continuous innovation and resource development. DCT emphasizes that a firm's success relies on its ability to respond to changing environments and create value.

In the context of the Jordanian cement industry, effective management of E-HRM and digital innovation, framed within DCT, can significantly impact workforce agility. Beigi et al.

(2023), assert that relying solely on static resources is insufficient for achieving optimal performance in today's dynamic business landscape. Organizations must cultivate dynamic capabilities to effectively leverage their resources and adapt to new challenges.

Digital technologies, such as the Internet of Things (IoT) and real-time analytics, are pivotal in this transformation, optimizing operations and fostering a culture of innovation (Walther, 2018). By employing digital tools for HR processes, such as talent acquisition and performance management, the cement industry can enhance workforce development and agility. The integration of digital capabilities within E-HRM practices facilitates data-driven decision-making, ensuring alignment with organizational goals and fostering continuous improvement (Davenport, 2018; Duan et al., 2019).

### *Gap of the Study*

There is a lack of empirical research examining the moderating role of digital innovation and the mediating role of employee engagement in enhancing workforce agility. For instance, Halid et al (2022), explored the role of digital transformation and emphasised the need to build digitally capable teams to meet strategic goals. However, this study did not delve into how digital innovation specifically moderates workforce flexibility and adaptability, especially in industries with unique challenges like the cement sector. Additionally, Sajuyigbe et al (2023), highlighted the importance of employee empowerment in fostering organisational agility, yet the study did not explore how employee engagement could mediate the relationship between digital innovation and workforce agility. This gap underscores the need for further research to investigate how digital tools and innovations can be leveraged to enhance workforce agility, specifically in sectors facing both technological change and environmental challenges.

Second, the studies predominantly focused on organisational agility while neglecting the specific and critical concept of workforce agility. While Doz (2020), and Radu (2023), explored broader organisational agility, their focus was on agility at the organisational level rather than how agility manifests within a specialised workforce. This is a critical issue for industries like cement manufacturing, where workforce roles are specialised and compliance with strict safety and regulatory standards is essential. Mapesa (2023), for example, examined the effects of strategic agility on cement firms' performance but did not address workforce agility specifically. Similarly, while Mugerwa (2020), examined e-HRM's role in organisational sustainability, the study did not specifically investigate how workforce agility can be enhanced through employee engagement or digital innovations.

Furthermore, the key trends and gaps identified in the literature highlight several important focus areas. Many studies have concentrated on the relationship between electronic human resource management (E-HRM) and organisational performance, with researchers such as Altaf et al (2019), and Masum et al (2020), validating the significant impact of E-HRM on enhancing organisational outcomes. However, only a few studies have explored the relationship between E-HRM and workforce agility, such as Al-Fugaha et al. (2023), though these studies are largely limited to specific sectors, such as banking. Additionally, the role of digital innovation as a moderating variable in this relationship has been explored by Binsaeed et al (2023), and Shen (2022), yet its application in the cement industry remains underexplored.

The primary gaps that emerge from this review are twofold. First, there is a lack of empirical research examining the moderating role of digital innovation and the mediating role of employee engagement in the context of workforce agility, particularly within the cement industry. This gap highlights the need for further investigation into how digital tools and innovations can enhance workforce flexibility and adaptability in a sector with unique challenges. Second, most studies have focused on organisational agility rather than workforce agility, which is critical for industries like cement that rely on specialised roles and compliance with strict safety and regulatory standards. This distinction underscores the importance of further research into workforce agility, especially in industries facing high levels of technological and environmental change.

### **Conceptual Framework of the Present Study**

This study explores the relationships between various Electronic Human Resource Management (E-HRM) practices and workforce agility, with employee engagement as a mediating variable and digital innovation as a moderating variable. The framework is based on the Resource-Based View (RBV) and Dynamic Capabilities (DC) Theory. RBV emphasizes how an organization's resource allocation—especially human capital and technology—shapes workforce agility. In contrast, DC Theory focuses on how organizations develop internal processes to adapt to technological advancements and market changes.

The research examines nine variables: seven independent variables (E-Performance Management, E-Performance Appraisal, E-Benefit Management, E-Recruitment and Selection, E-Training and Development, E-Grievance Management, and Knowledge Management), one mediating variable (employee engagement), one moderating variable (digital innovation), and the dependent variable (workforce agility).

Workforce agility, defined as employees' ability to adapt quickly to changes, is influenced directly by the E-HRM practices. Employee engagement, characterized by emotional commitment, mediates this relationship, enhancing workforce agility. Additionally, digital innovation moderates the impact of E-HRM practices, suggesting that organizations embracing digital technologies can better leverage these practices for increased agility. This framework is visually represented in Figure 1, illustrating the influence of E-HRM practices on workforce agility, with employee engagement mediating the relationships and digital innovation moderating the overall effect

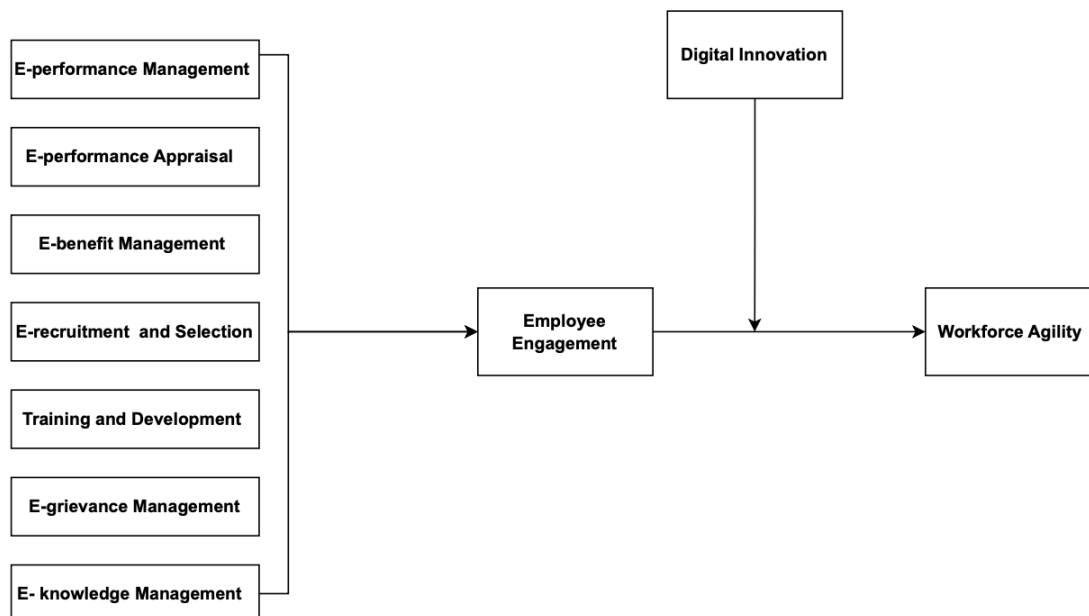


Figure 1 Conceptual Framework of the Present Study

## Conclusion

This study highlights significant gaps in the research on workforce agility, particularly within the context of cross-cultural management in the cement industry. While existing literature has examined the roles of digital innovation and employee engagement separately, there remains a lack of empirical evidence exploring their interplay in enhancing workforce agility. The necessity for organizations to adapt swiftly to technological advancements and environmental challenges makes this an urgent area for further investigation.

Moreover, the focus on organizational agility, often at the expense of workforce agility, underscores the need to explore how agility manifests within specialized roles, especially in sectors with strict compliance requirements. By addressing these gaps, future research can contribute valuable insights into optimizing workforce flexibility and adaptability, ultimately enhancing organizational performance.

The integration of digital innovation and employee engagement into the framework of workforce agility presents a promising avenue for developing strategies that can lead to sustainable competitive advantages in the rapidly evolving cement industry. As organizations increasingly rely on digital tools and innovative practices, understanding these dynamics will be crucial for fostering a responsive and agile workforce capable of thriving in today's complex business environment.

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## References

- Abdelrahim, H. (2023). *The impact of Arabic business culture on trust in open innovation: the case of Jordan* (Doctoral dissertation, Anglia Ruskin Research Online (ARRO)).
- Ajgaonkar, S., Neelam, N. G., & Wiemann, J. (2022). Drivers of workforce agility: a dynamic capability perspective. *International Journal of Organisational Analysis*, 30(4), 951-982.
- Alagah, A. D., & Tende, F. B. (2017). Talent retention and organizational agility of insurance companies in Port Harcourt, Nigeria. *International Journal of Advanced Academic Research/Social & Management Sciences*, 3(8), 1-14.
- Al-Ghussain, L., Ahmed, H., & Haneef, F. (2018). Optimization of hybrid PV-wind system: Case study Al-Tafilah cement factory, Jordan. *Sustainable Energy Technologies and Assessments*, 30, 24-36.
- Al-Kasasbeh, M. M., Alhalalmeh, M. I., & Lehyeh, S. M. A. (2017). Business incubators and its effect on success of incubated firms in Jordan. *International Business Management*, 11(1), 189-193.
- Alkhodary, D., Abu-ALSondos, I. A., Ali, B. J., Shehadeh, M., & Salhab, H. A. (2022). Visitor management system design and implementation during the covid-19 pandemic. *Information Sciences Letters*, 11(04), 1059-1067.
- Al Qaisi, Y. T., & Saadon, M. S. (2023). The Impact of Electronic Human Resource Management Practices on Talent Management in Private Jordanian Universities: The Mediating Role of Top Management Support. *RES MILITARIS*, 13(1), 1819-1839.
- Al-Fugaha, Z. N. A., Al-Husban, N. A., Al-Hawary, S. I. S., Abuaisheh, S. F. Y., Al-Tarazi, D., Mohammad, A. A. S., ... & Al-Adamat, A. M. (2023). Does Electronic Human Resource Management Matter for Workforce Agility? An Empirical Study of the Jordanian Banking Sector. In *Emerging Trends and Innovation in Business and Finance* (pp. 379-391). Singapore: Springer Nature Singapore.
- Aladwan, S. I., Alshami, A. O., Mohammad, A. A. S., Al-Husban, D. A. A. O., Al-Husban, N. A., Hunitie, M. F. A., ... & Al-Hawary, S. I. S. (2023). Impact of Electronic Human Resources Management Practices on Employee Commitment in Five Stars' Hotels in Jordan. In *Emerging Trends and Innovation in Business and Finance* (pp. 405-421). Singapore: Springer Nature Singapore.
- AlNawafleh, E. A. T., Addin al-sharari, F. E., Alsheikh, G. A. A., Al-Ghalabi, R. R., & Hamdan, K. B. (2022). Enhancing The Sustainability Performance Through E-Hrm And Unveiling Of The Labour Productivity And Organizational Agility In The Jordanian Public Universities. *International Journal of eBusiness and eGovernment Studies*, 14(2), 242-263.
- Alqarni, K., Agina, M. F., Khairy, H. A., Al-Romeedy, B. S., Farrag, D. A., & Abdallah, R. M. (2023). The Effect of Electronic Human Resource Management Systems on Sustainable Competitive Advantages: The Roles of Sustainable Innovation and Organizational Agility. *Sustainability*, 15(23), 16382.
- Altaf, M., Rehman, A. U., Sandhu, M. A., & Shahidan, A. N. (2019). Electronic-HRM and firm performance: mediating role of information communication technology (ICT). *Pakistan Journal of Social Sciences*, 39(4), 1659-1672
- Al-Alawi, A. I., Messaadia, M., Mehrotra, A., Sanosi, S. K., Elias, H., & Althawadi, A. H. (2023). Digital transformation adoption in human resources management during COVID-19. *Arab Gulf Journal of Scientific Research*, 41(4), 446-461.

- Al-Youbi, A. O., Al-Hayani, A., Rizwan, A., & Choudhry, H. (2020). Implications of COVID-19 on the labor market of Saudi Arabia: The role of universities for a sustainable workforce. *Sustainability*, 12(17), 7090.
- Ardian, I., Nu'im Haiya, N., & Azizah, I. R. (2023). Investigating the complex relationships between nurses' work factors, Sharia-based nursing care, and patient satisfaction in an Islamic hospital: A PLS-SEM approach. *Belitung Nursing Journal*, 9(6), 530.
- Barney, J. B. (1986c). Types of competition and the theory of strategy: Toward an integrative framework. *Academy of Management Review*, 11, 791–800.
- Battour, M., Barahma, M., & Al-Awlaqi, M. (2021). The relationship between HRM strategies and sustainable competitive advantage: testing the mediating role of strategic agility. *Sustainability*, 13(9), 5315.
- Berber, N., Đorđević, B., & Milanović, S. (2018). Electronic human resource management (e-HRM): A new concept for digital age. *Strategic Management-International Journal of Strategic Management and Decision Support Systems in Strategic Management*, 23(2).
- Binsaeed, R. H., Yousaf, Z., Grigorescu, A., Trandafir, R. A., & Nassani, A. A. (2023). Knowledge Sharing and the Moderating Role of Digital Innovation on Employees Innovative Work Behavior. *Sustainability*, 15(14), 10788.
- Bondarouk, T., Parry, E., & Furtmueller, E. (2017). Electronic HRM: four decades of research on adoption and consequences. *The International Journal of human resource management*, 28(1), 98-131.
- Cascio, W. F., & Montealegre, R. (2016). How technology is changing work and organizations. *Annual review of organizational psychology and organizational behavior*, 3(1), 349-375.
- Choudhary, P., & Pandita, D. (2022, May). Agile HR: The need for the e-business environment. In *2022 7th International Conference on Business and Industrial Research (ICBIR)* (pp. 274-278). IEEE.
- Cooper, C., Pereira, V., Vrontis, D., & Liu, Y. (2023). Extending the resource and knowledge-based view: Insights from new contexts of analysis. *Journal of Business Research*, 156, 113523.
- Cuthbertson, R. W., & Furseth, P. I. (2022). Digital services and competitive advantage: Strengthening the links between RBV, KBV, and innovation. *Journal of Business Research*, 152, 168-176.
- Davenport, T. H. (2018). From analytics to artificial intelligence. *Journal of Business Analytics*, 1(2), 73-80.
- Das, K. P., Mukhopadhyay, S., & Suar, D. (2023). Enablers of workforce agility, firm performance, and corporate reputation. *Asia Pacific Management Review*, 28(1), 33-44.
- Doz, Y. (2020). Fostering strategic agility: How individual executives and human resource practices contribute. *Human Resource Management Review*, 30(1), 100693.
- Duan, Y., Edwards, J. S., & Dwivedi, Y. K. (2019). Artificial intelligence for decision making in the era of Big Data—evolution, challenges and research agenda. *International journal of information management*, 48, 63-71
- Dulebohn, J. H., & Stone, D. L. (2018). The Transformation of Human Resources Management Through Technology And E-HRM. *The Brave New World of eHRM 2.0*, 1.



- Halid, H., Halim, S. N. A., & Ravesangar, K. (2022). Human resource management practices in the digital era. In *Technological Challenges: The Human Side of the Digital Age*(pp. 109-158). Cham: Springer International Publishing.
- Halid, H., Halim, S. N. A., & Ravesangar, K. (2022). Human resource management practices in the digital era. In *Technological Challenges: The Human Side of the Digital Age* (pp. 109-158). Cham: Springer International Publishing.
- Hamad, Y., Burhanuddin, M. A., Abd Ghani, M. K., Elzamy, A., & Doheir, M. (2019). Identifying critical factors to adopt E-HRM based cloud computing system for healthcare organizations. *International Journal of Advanced Science and Technology*, 28(8), 30-46.
- Iqbal, M., Adawiyah, W. R., Suroso, A., & Wihuda, F. (2020). Exploring the impact of workplace spirituality on nurse work engagement: an empirical study on Indonesian government hospitals. *International Journal of Ethics and Systems*, 36(3), 351-369.
- Ishrata, K., Khanb, M. K., Nadeemc, S., & Azizd, A. (2020). The impact of e-HRM practices on employee productivity in hospitals of Karachi. *International Journal of Innovation, Creativity and Change*, 14(7), 462-482.
- Jarrar, N., & Jaradat, S. (2022). The de-industrialisation discourse and the loss of modern industrial heritage in the Arab world: Jordan as a case study. *Journal of Cultural Heritage Management and Sustainable Development*.
- Kaur, P., & Mittal, A. (2020). Meaningfulness of work and employee engagement: The role of affective commitment. *The Open Psychology Journal*, 13(1).
- Khammadee, P. (2023). The relationship between E-HRM practices and organizational performance: The mediating role of organizational agility and sustainable competitive advantage. *Asian Administration & Management Review*, 6(1).
- Kuepper, B., Quiroz, D., Riemersma, M., Walstra, J., & Wikström, L. (2020). A Mapping of HeidelbergCement & LafargeHolcim operations in the MENA region.
- Kruesi, M. A., & Bazelmans, L. (2023). Resources, capabilities and competencies: a review of empirical hospitality and tourism research founded on the resource-based view of the firm. *Journal of Hospitality and Tourism Insights*, 6(2), 549-574.
- Marler, J. H., & Parry, E. (2016). Human resource management, strategic involvement and e-HRM technology. *The International Journal of Human Resource Management*, 27(19), 2233-2253.
- Masum, A. K., Mamun, A. M. A., Islam, M. S., & Beh, L. S. (2020). The Impact of eHRM Practice on Organizational Performance: Investigating the Effect of Job Satisfaction of HRM Professionals. *Journal of Computer Science*, 16(7), 983-1000.
- Ministry of Labour. (2024). *Ministry of Labour – Jordan*. Retrieved from <https://mol.gov.jo/Default/EN>
- Mitrofanova, E. A., Konovalova, V. G., & Mitrofanova, A. E. (2019). Opportunities, problems and limitations of digital transformation of HR management. *European Proceedings of Social and Behavioural Sciences*.
- Moh'd, S., Gregory, P., Barroca, L., & Sharp, H. (2023). Agile human resource management: A systematic mapping study. *German Journal of Human Resource Management*, 23970022231226316.
- Mugerwa, E. (2020). HRM to E-HRM: Change in Human Resource Management; effect to social sustainability.

- Munteanu, A. I., Bibu, N., Nastase, M., Cristache, N., & Matis, C. (2020). Analysis of practices to increase the workforce agility and to develop a sustainable and competitive business. *Sustainability*, 12(9), 3545.
- Muzaffar, R., Muzaffar, S., & Muzaffar, Z. (2024). Digital Culture and the Transformational Impact of E-HRM in the Era of Digital Transformation. In *New Strategy Models in Digital Entrepreneurship* (pp. 320-329). IGI Global.
- Njoku, E., Ruël, H., Rowlands, H., Evans, L., & Murdoch, M. (2019). An analysis of the contribution of e-HRM to sustaining business performance. In *HRM 4.0 For Human-Centered Organizations* (Vol. 23, pp. 21-39). Emerald Publishing Limited.
- Nurshabrina, N., & Adrianti, R. (2020). The effect of E-human resource management (E-HRM) on cost efficiency and productivity of employees in the company. *International Research Journal of Advanced Engineering and Science*, 5(1), 212-215.
- Qin, R., & Nembhard, D. A. (2015). Workforce agility in operations management. *Surveys in Operations Research and Management Science*, 20(2), 55-69.
- Radu, C. (2023). Fostering a positive workplace culture: Impacts on performance and agility. In *Human Resource Management-An Update*. In tech Open.
- Saeed, I., Khan, J., Zada, M., Ullah, R., Vega-Muñoz, A., & Contreras-Barraza, N. (2022). Towards examining the link between workplace spirituality and workforce agility: Exploring higher educational institutions. *Psychology Research and Behavior Management*, 31-49.
- Sajuyigbe, A. S., Anthony Abiodun, E. N. I. O. L. A., Ayeni, A., & Obi, N. J. (2023). The Employee Relationship Management and Organizational Agility: Mediating Role of Employee Empowerment in Consumer Goods Sector. *Journal of Evolutionary Studies in Business*, 8(2), 50-76.
- Saks, A. M. (2006). Antecedents and consequences of employee engagement. *Journal of managerial psychology*, 21(7), 600-619.
- Salameh, O. M. (2024). The Impact of EHRM Practices on Organizational Excellence: An Empirical Study in Jordanian Engineering Manufacturing Companies (Doctoral dissertation, Middle East University).
- Sasmoko, S., Mihardjo, L., Alamsjah, F., & Elidjen, E. (2019). Dynamic capability: The effect of digital leadership on fostering innovation capability based on market orientation. *Management Science Letters*, 9(10), 1633-1644.
- Shen, L., Zhang`3, X., & Liu, H. (2022). Digital technology adoption, digital dynamic capability, and digital transformation performance of textile industry: Moderating role of digital innovation orientation. *Managerial and Decision Economics*, 43(6), 2038-2054.
- Teece, D. J., Pisano, G.P., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*, 18(7), 509–533.
- Thathsara, A. D. S., & Sutha, J. (2021). Investigating the influence of e-HRM practices on organizational performance: The mediating role of organizational agility (with special reference to financial institution). *International Journal of Engineering and Management Research (IJEMR)*, 11(1), 1-8.
- Walther, T. (2018, May). Digital transformation of the global cement industry. In *2018 IEEE- IAS/PCA Cement Industry Conference (IAS/PCA)* (pp. 1-8). IEEE.
- Warner, K. S., & Wäger, M. (2019). Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. *Long range planning*, 52(3), 326-349.

Zain, A., & Ali, Q. M. (2023). The Influence of Electronic Human Resource Management Practices on Employee Productivity in Hospitals Located in Punjab, Pakistan. *Pakistan Journal of Science*, 75(03), 438-449.

Zhang, J., Chen, Y., Li, Q., & Li, Y. (2023). A review of dynamic capabilities evolution—based on organisational routines, entrepreneurship and improvisational capabilities perspectives. *Journal of Business Research*, 168, 114214.