

Digital wind of changes: navigating competitiveness in the maritime sector through the transformation in human resource development

Yuthana Autsadee, Jagan Jeevan and Nurul Haqimin Mohd Salleh

*Faculty of Maritime Studies, Universiti Malaysia Terengganu,
Terengganu, Malaysia, and*

Mohamad Rosni Othman

*Faculty of Defence Science and Technology,
Universiti Pertahanan Nasional Malaysia, Kuala Lumpur, Malaysia*

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Abstract

Purpose – The maritime industry, a linchpin of global trade, has embarked on a transformative journey catalysed by the relentless advance of digitalisation. There is a discernible gap in the literature concerning the specific consequences of digitalisation within the maritime sector. This research aims to examine the current body of literature on the influence of digitalisation in human resource development (HRD) on the competitive advantage of organisations and its potential within the maritime industry.

Design/methodology/approach – This research paper conducts a comprehensive bibliometric analysis.

Findings – The findings of this research explore the literature landscape encompassing digitalisation in HRD, its influence on HR operations, learning and development, performance management, employee experience, and strategic alignment within maritime organisations.

Originality/value – This research provides valuable recommendations for maritime organisations and HRD practitioners seeking to leverage digitalisation to gain a competitive edge. Thus, the maritime industry can adopt digital HRD practices to streamline operations, improve performance, and align HR strategies with broader organisational goals.

Keywords Digitalisation, Human resource development, Organisational competitiveness, Maritime sector, Bibliometric analysis

Paper type Literature review

1. Introduction

Throughout history, the maritime sector has held a significant position in facilitating worldwide trade and business activities, acting as a fundamental element in the advancement of economies and global logistics. In the past few years, there have been notable changes in the sector, which may be attributed to the continuous progress of digital technology (Almpak and Toraman, 2023). The incorporation of digitisation into diverse aspects of maritime operations has brought about significant transformations in logistics and navigation, as well as extended its influence on the domain of HRD (Autsadee *et al.*, 2023a; Kaleem Awan and Ghamdi, 2019). The maritime sector, similar to various other industries, confronts the task of adjusting to the digital transformation in HRD while maintaining competitiveness in a swiftly changing worldwide environment (Autsadee *et al.*, 2023c; Wu and Kao, 2022).

The maritime sector is at a critical juncture, where the adoption of digitalisation in HRD can significantly impact its ability to thrive in the modern world. With the global economy becoming increasingly interconnected and fast-paced, maritime organisations should navigate the ways of digital transformation strategically. Understanding the dynamic



nature of digital HRD in this context is of utmost importance. Moreover, as the maritime industry faces unique challenges such as crew management, safety regulations, and compliance with international standards, the consequences of digitalisation in HRD are likely to differ from those in other sectors (Mouschoutzi and Ponis, 2022; Tong, 2022; Di Vaio *et al.*, 2021). Thus, to ensure the long-term viability of maritime enterprises, it is crucial to gain insights into how digitalisation affects HRD practices and, in turn, influences the competitive advantage of these organisations.

The existing body of literature has extensively examined the influence of digitalisation on HRD and its subsequent effects on organisational competitiveness across diverse industries. However, there is a discernible gap in the literature concerning the specific consequences of digitalisation within the maritime sector (Banmairuoy *et al.*, 2022; Chatterjee and Mariani, 2022; Lewandowska *et al.*, 2023). Organisation possesses distinct characteristics in terms of its requirements, obstacles, and prospects, hence warranting a focused examination of the integration of digitalisation in HRD and its effects on organisational competitiveness (Alam and Dhamija, 2022; Fernandez and Gallardo-Gallardo, 2021; Thite, 2022). In order to bridge this knowledge gap, the main aim of this research is to perform an extensive bibliometric analysis that examines the current body of literature on the influence of digitalisation in HRD on the competitive advantage of organisations and its potential within the maritime industry.

Comprehending the dynamic nature of digital HRD is of utmost importance for maritime enterprises seeking to maintain their competitiveness in the global arena. Moreover, the outcomes of this investigation will provide a valuable contribution to the current corpus of knowledge by elucidating the distinct dynamics and obstacles associated with the process of digitalisation in HRD within the maritime sector. This research endeavours to shed light on digitalisation in HRD dimensions, with the objective of enhancing the ability of HRD practitioners and policymakers in the maritime industry to make well-informed decisions.

This research paper is organised in the following manner: after the introduction, the literature review section will be presented in section two. Following this, the methodology part will provide a comprehensive account of the research approach employed and the methods used for data collection. Subsequently, the ensuing piece of discourse will thoroughly explore the analysis and comprehension of the obtained results, their ramifications, and their juxtaposition with pre-existing scholarly works. In conclusion, the final section of this research will provide a comprehensive summary of the significant discoveries and contributions made, as well as propose potential directions for future research within this particular field of study.

2. A comprehensive review of digitalisation in HRD and its impact on organisational competitiveness

The phenomenon of digitalisation in the field of HRD has emerged as a powerful and influential force that has garnered considerable interest in diverse sectors. The fundamental concept of digitalisation in HRD is the incorporation of digital technologies into many aspects of talent management, training, skill enhancement, and organisational learning (Dorasamy, 2021; Varshney, 2020). The aforementioned transformation has been instigated by the widespread use of various technological advancements, including but not limited to e-learning platforms, data analytics, artificial intelligence (AI), and virtual reality (VR) (Otoo-Arthur and van Zyl, 2020; Sengupta *et al.*, 2021). The utilisation of these technologies has not only brought about a significant transformation in the manner in which businesses address HRD but has also played a crucial role in augmenting the competitive advantage of enterprises within the current business environment (Akdere *et al.*, 2023; Malini and Srinivas, 2020; Otoo-Arthur and van Zyl, 2020).

The focal point of this discourse revolves around fundamental concepts and theories pertaining to HRD and its impact on competitiveness. HRD plays a crucial role as a strategic component inside companies, with a primary focus on enhancing organisational performance through the development of human capital, knowledge, and skills (Akdere and Egan, 2020; Chakraborty and Biswas, 2019; Rasool *et al.*, 2019). The connection between HRD and competitiveness can be based on the notion that firms can enhance their competitive advantage by cultivating a workforce that possesses both talent and adaptability (Colakoglu *et al.*, 2019; Menéndez Blanco and Montes-Botella, 2017). The idea of the Resource-Based View (RBV), for example, emphasises the strategic significance of human resource (HR) in terms of their role as a sustainable source of competitive advantage (Donnellan and Rutledge, 2019; Freeman *et al.*, 2021).

In the broader landscape of digitalisation across various sectors, several overarching themes and trends have emerged that extend beyond HRD. One prevailing theme is the transformative power of digital technologies in enhancing operational efficiency and productivity (Martínez-Caro *et al.*, 2020; Papadopoulos *et al.*, 2020). Industries across the board are adopting digital tools and automation to streamline processes, reduce costs, and improve overall performance. Another critical theme revolves around the growing importance of data and analytics. Data-driven decision-making has become a cornerstone of success in many sectors, enabling organisations to gain valuable insights into customer behaviours, market trends, and operational patterns (Campi *et al.*, 2021a; McIver *et al.*, 2018).

In addition to these themes, several prominent trends are reshaping sectors globally. One significant trend is the increasing emphasis on sustainability and environmental responsibility, driven by concerns about climate change and resource conservation. Organisations are implementing digital solutions to reduce their carbon footprint, monitor energy consumption, and optimise resource utilisation (Borowski, 2021; Hrustek, 2020; Sarker *et al.*, 2021). Moreover, the ongoing evolution of AI is profoundly impacting industries by enabling predictive analytics, autonomous processes, and personalised customer experiences (Ameen *et al.*, 2021). AI-powered chatbots, for instance, are enhancing customer support across various sectors (Malik *et al.*, 2022; Qamar *et al.*, 2021).

Furthermore, the expansion of remote work and digital collaboration tools, accelerated by the global events of recent years, has transformed the way businesses operate (Orzeł and Wolniak, 2022). Virtual meetings or cloud-based project management have become essential components of modern work environments, facilitating flexibility and agility (Awwad *et al.*, 2022; Schmidtner *et al.*, 2021). The integration of augmented reality (AR) and VR technologies is also gaining traction, not only in HRD but across industries like healthcare, real estate, and entertainment (Gupta *et al.*, 2022; Oriti *et al.*, 2023; Podshivalov, 2022). These immersive technologies are creating novel opportunities for training, product design, and customer engagement (Kozinets, 2023).

While the broader literature on digitalisation in HRD is substantial, limited attention has been directed toward its maritime sector applications. The maritime industry, characterised by its unique challenges such as crew management, safety, and compliance with international regulations, necessitates a distinct examination (Mouschoutzi and Ponis, 2022; Tong, 2022; Di Vaio *et al.*, 2021). Few studies have ventured into this specialised domain, and those that have often provided valuable insights into the maritime workforce's readiness to embrace digital HRD practices, technology adoption trends, and the industry's overall digital maturity.

The maritime sector encompasses various industries related to shipping, port, logistics, and offshore operations, where efficiency, safety, and compliance with international regulations are paramount (Jeevan, 2021). Today, digitalisation in HRD may be increasingly essential for improving the competitiveness of the maritime sector. Digital HRD may also play a pivotal role in addressing the unique challenges of the maritime sector. By leveraging digital technologies such as e-learning platforms, data analytics, and AI, maritime companies

may enhance their crew's skills, knowledge, and adaptability. This, in turn, may lead to improved operational efficiency, safety measures, and compliance, all of which are critical factors for competitiveness in the global maritime industry. Furthermore, as the industry evolves, the ability to embrace digitalisation in HRD may position maritime companies as leaders in innovation and sustainability, aligning them with changing market demands and ensuring long-term competitiveness.

Thus, notable gaps persist in the literature. A comprehensive overview of the literature reveals that there is still a dearth of studies that systematically analyse in the maritime sector's readiness for digitalisation in HRD. Furthermore, the relationship between digitalisation in HRD and organisational competitiveness, particularly within maritime contexts, remains underexplored. These gaps underscore the need for this research to provide a comprehensive bibliometric analysis that consolidates and synthesises existing knowledge, paving the way for a more informed understanding of the subject matter.

3. Methodology

The present study utilises a bibliometric analysis methodology to comprehensively evaluate and amalgamate the extant literature pertaining to the influence of digitalisation in HRD on the competitive advantage of organisations operating within the maritime industry. Bibliometrics is a research methodology that employs quantitative analysis to examine publications, citations, co-citations and co-word analysis in order to delineate the intellectual framework of a specific field of study (Dede and Ozdemir, 2022; Su and Rungruang, 2024). Within the scope of this research, the utilisation of co-word analysis enables the identification of prominent research themes, trends, and patterns within the existing body of literature. This analytical approach provides valuable insights into the subject matter being examined (Jan *et al.*, 2023; Maghsoudi *et al.*, 2023).

The Scopus database, renowned for its extensive coverage of scholarly publications across multiple fields, serves as the principal data source for this bibliometric analysis (Bakhmat *et al.*, 2022). In order to ensure consistency and accessibility, it is necessary to exclusively consider publications in the English language. The criteria for selection encompass scholarly publications published in peer-reviewed journals, conference papers, books, and book chapters that explore the junction between digitalisation in HRD and organisational competitiveness. The search's temporal reach extends to publications from 2000 to 2022, thus ensuring the incorporation of contemporary research contributions.

The procedure of data collection entails using a thorough search strategy that incorporates pertinent keywords and Boolean expressions to get applicable papers from the Scopus database. The utilised keywords encompass a range of variations and synonyms pertaining to concepts such as "digitalisation," "HRD," and "organisational competitiveness." The objective of the search method is to locate articles that specifically address the correlation between digitalisation in HRD and the competitive advantage of organisations. Upon completion of data collection, a comprehensive analysis of keywords will be conducted to ascertain prominent research themes and developing patterns within the existing body of literature. The analysis will elucidate the terms and concepts that occur with the highest frequency.

The bibliometric analysis in this research was performed with VOSviewer, a widely acknowledged and user-friendly software programme for bibliometric visualisation and analysis (Adegoriola *et al.*, 2021). The utilisation of VOSviewer facilitates the generation of visual depictions pertaining to bibliometric data, encompassing keyword density maps (Donthu *et al.*, 2021). Additionally, it will enable the discovery of clusters pertaining to the quantification of research themes and trends within the chosen literature.

This research seeks to conduct a comprehensive analysis of the existing literature on the impact of digitalisation in HRD on organisational competitiveness in the maritime sector. To achieve this, a rigorous bibliometric methodology will be employed, and the capabilities of VOSviewer will be utilised. The objective is to provide a systematic and data-driven examination of this topic.

4. Data analysis and findings

The study conducted an analysis of 111 documents retrieved from the Scopus database spanning the period from 2000 to 2022, all of which are pertinent to the research at hand. [Table 1](#) provides an overview of the document sources. Notably, the majority of documents, totalling 4, were sourced from Sustainability. Following closely, Energies, SA Journal of Human Resource Management, and Human Resource Development Review each contributed 3 documents. The remaining sources presented 2 documents each.

This section also presents the findings of our bibliometric investigation, providing useful insights into the convergence of digitalisation in HRD and organisational competitiveness. There exist five distinct topics that can be classified as components, namely, HR operations, learning and development, performance management, employee experience and engagement, as well as strategic impact. First, HR operations play a crucial role in business. The aforementioned issues encompass the incorporation of digital technology in the processes of recruiting and talent acquisition, the mechanisation of repetitive HR jobs, and the utilisation of data analytics for the purpose of workforce planning. The implementation of digital tools has greatly enhanced HR procedures, leading to enhanced operational effectiveness and optimised allocation of resources.

Second, the advent of digitalisation has brought about significant transformations in the realm of learning and development. The key findings of this research reveal an increasing focus on online training platforms, simulations, and VR and AR applications. These technological advancements can have not only improved the availability of educational programmes but have also played a significant role in fostering the growth of a proficient and versatile workforce.

Moreover, the digitalisation of maritime organisations has had a significant impact on performance management. The analysis conducted in our study emphasises the application of performance analytics and real-time feedback methods. The implementation of digital technologies has significantly enhanced the accuracy of performance assessments, thereby enabling organisations to swiftly identify and address areas in need of improvement.

Journal list	Number of documents
Business Horizons	2
Energies	3
Frontiers in Psychology	2
Global Journal of Flexible Systems Management	2
Human Resource Development International	2
Human Resource Development Quarterly	2
Human Resource Development Review	3
International Journal of Human Resource Management	2
Journal of Advances in Management Research	2
SA Journal of Human Resource Management	3
Sensors	2
Sustainability (Switzerland)	4

Source(s): Authors

Table 1.
Source of documents

In addition, the implementation of digital technology in the field of HRD has resulted in significant enhancements in employee experience and engagement. The results of this research indicate that the use of digital platforms for the purposes of employee feedback, recognition, and communication has contributed to the development of a feeling of inclusion and empowerment among the workforce. As a result, this can have a favourable effect on retention rates and the general level of job satisfaction.

Lastly, the advent of digitalisation has significantly influenced the strategic landscape of organisations. The analysis conducted reveals a notable trend towards the use of data-driven decision-making and the alignment of HR policies with wider organisational goals. Any industry can have progressively acknowledged the significance of HR as a strategic resource, utilising digital technologies to synchronise HR strategies with the attainment of competitive benefits, such as enhanced operational effectiveness and safety.

In brief, the bibliometric analysis carried out in this research provides a complete overview of the influence of digitalisation in HRD on the competitive advantage of organisations operating in any industry. [Table 2](#) presents a comprehensive overview of the various themes and their respective effects on HR operations, learning and development, performance management, employee experience, and strategic alignment. [Figure 1](#) also appears to be a visual representation or diagram that illustrates a co-word analysis related to the topics of digitalisation in HRD and organisational competitiveness. These insights are of significant value to both scholars and practitioners operating within the marine industry. The aforementioned discoveries help to our comprehension of the ways in which digitisation is altering HR practises and bolstering competitiveness within this ever-evolving industry.

5. Discussion

One of the salient findings of this research can be the widespread adoption of digital technologies in HR operations within maritime organisations. Digitalisation may contribute to competitiveness in multiple ways in the maritime sector. The maritime sector can integrate digital tools in recruitment, talent management, and workforce planning. The sector can allocate resources more efficiently and make informed decisions regarding talent acquisition and development. This streamlining of processes reduces costs and minimises the risk of talent shortages, enabling organisations to maintain operational excellence. This aligns with the broader literature, which underscores the transformative potential of digitalisation in HRD ([Köchling and Wehner, 2020](#)).

The analysis can also underscore the fundamental role of digitalisation in transforming learning and development practices within the maritime sector. The transition towards online training platforms, virtual simulations, and AR applications demonstrates a steadfast commitment to cultivating a highly skilled and versatile maritime workforce. The focus on ongoing learning and development via digital channels may equip maritime professionals with the expertise and information necessary to effectively navigate the intricacies of the maritime industry. This reinforces workforce competence and adaptability, both of which are paramount for maintaining competitiveness in the context of the globalised maritime landscape. The maritime industry's recognition of the significance of continual learning can align seamlessly with the notion of a learning organisation, wherein the capacity to acquire and apply knowledge serves as a strategic asset ([Ajgaonkar et al., 2022](#); [Mustafa et al., 2019](#); [Sampath et al., 2021](#)).

Moreover, the impact of digitalisation extends beyond HR operations, learning and development. The analysis found that it also influences performance management practices within maritime organisations. The use of performance analytics and real-time feedback mechanisms can enable more accurate assessments of maritime workforce performance. The use of data-driven performance management practices can empower maritime organisations

Author(s)	Impact	Explanation
<i>Theme: HR operations</i>		
Aldulaimi <i>et al.</i> (2021), Almaghaslah <i>et al.</i> (2023), Azeem <i>et al.</i> (2021), Daradkeh (2019), Köchling and Wehner (2020), Rehman <i>et al.</i> (2022)	Enhancing recruitment and talent acquisition	The implementation of digitalisation in the field of HRD enables firms to enhance the efficiency and effectiveness of their recruitment procedures. Organisations have the ability to utilise technology as a means to attract highly skilled individuals, administer online evaluations, and employ data analytics for efficient candidate evaluation. This practise enhances the calibre of recruitment and confers a competitive advantage upon the business through the acquisition of appropriate skills and expertise
Malik <i>et al.</i> (2022), Qamar <i>et al.</i> (2021)	Assisting HR with AI- powered	Digitalisation enables firms to utilise AI-powered HR assistants or chatbots in order to deliver prompt and precise solutions to HR-related enquiries for employees. AI assistants possess the capability to effectively manage and address regular HR enquiries, furnish comprehensive information regarding organisational rules and processes, and aid employees in accessing HR services. This programme increases the delivery of HR services, improves the overall employee experience, and allows HR professionals to allocate their time and efforts towards more strategic endeavours, thereby contributing to the organisation's competitive advantage
Kostev and Dimitrova (2022), Scupola and Pullich (2020), Shukla and Bhandari (2019), Zavyalova <i>et al.</i> (2022), Zhao <i>et al.</i> (2019)	Enhancing efficiency in HR operations	Digitalisation facilitates the automation and optimisation of regular HR tasks, including but not limited to payroll management, benefits administration, and maintenance of personnel records. The use of this approach results in a reduction of administrative costs, a minimisation of errors, and enables HR experts to allocate their attention towards strategic projects. Efficient HR operations have the capacity to effectively utilise time and resources, so allowing firms to allocate more resources towards the development of talent and fostering innovation. Consequently, this enhances their overall competitiveness in the market
<i>Theme: Learning and development</i>		
Ajgaonkar <i>et al.</i> (2022), Kretschmer <i>et al.</i> (2014), Lee and Wo (2022), Mustafa <i>et al.</i> (2019), Pappas <i>et al.</i> (2019)	Improving the agility in learning and development	The process of digitalisation empowers firms to offer adaptable and individualised learning opportunities to their workforce. Online learning platforms, virtual classrooms, and e-learning modules facilitate the acquisition of knowledge and skills at one's own speed, so enabling individuals to enhance and adapt their abilities. This practise strengthens the skills of personnel, ensuring that they remain informed with industry trends. Additionally, it enables businesses to swiftly respond to shifting market demands, ultimately leading to an improvement in competitiveness
Harborth and Kümpers (2022), Khandelwal and Upadhyay (2021), Remondino (2020)	Enhancing training by using VR and AR	Digital technologies, such as VR and AR, have the potential to augment training and development programmes by facilitating immersive learning experiences. VR and AR simulations provide employees the opportunity to engage in skill practise within highly realistic virtual environments, so enhancing their capacity to retain knowledge and improve essential abilities. The integration of VR and AR technologies into training programmes facilitates the cultivation of a proficient workforce within enterprises, hence conferring a distinct competitive edge

(continued)

Table 2.
Impact of digitalisation
in HRD on
organisational
competitiveness

Author(s)	Impact	Explanation
Baral <i>et al.</i> (2022), De Mauro <i>et al.</i> (2018), Mazurchenko and Maršíková (2019), Tortora <i>et al.</i> (2021)	Improving the digital skills for gap assessment	Digitalisation allows firms to evaluate employees' digital skills and pinpoint areas of improvement by utilising online tests and skill evaluation platforms. This facilitates the comprehension of digital competencies within firms and enables the formulation of focused training initiatives aimed at addressing skill deficiencies. Organisations may boost their competitiveness in the digital age by ensuring that their staff has the requisite digital skills
Díaz Redondo <i>et al.</i> (2021), Küpper <i>et al.</i> (2021), Polyanska <i>et al.</i> (2022), Sampath <i>et al.</i> (2021), Sengupta <i>et al.</i> (2021), Skalka <i>et al.</i> (2021)	Enabling gamification and microlearning	Digitalisation facilitates the incorporation of gamification features and microlearning approaches into training programmes. The implementation of gamification strategies has been found to have a positive impact on employee engagement, motivation, and knowledge retention. Microlearning is a pedagogical approach that facilitates learning by delivering content in small, easily digestible units. This method enables employees to acquire knowledge and build skills gradually, hence enhancing their overall learning experience. These novel strategies bolster the organisation's competitive edge by cultivating a culture that prioritises ongoing learning
Petrilli <i>et al.</i> (2022), Reina <i>et al.</i> (2021), Wibowo <i>et al.</i> (2020)	Promoting remote onboarding and training	The process of digitalisation enables firms to effectively onboard and provide training to staff who are working remotely. Virtual onboarding programmes, e-learning courses, and video conferencing tools facilitate the rapid assimilation of new employees into the organisational culture and expedite their knowledge acquisition process. The ability to adapt onboarding and training processes to accommodate remote work models facilitates the recruitment of highly skilled individuals from various locations, hence bolstering an organisation's competitive advantage
Cortellazzo <i>et al.</i> (2019), Nurabadi <i>et al.</i> (2022)	Developing digital leadership	Digitalisation enhances leadership development programmes through the provision of online modules for leadership training, virtual sessions for coaching, and digital resources dedicated to leadership development. Digital leadership development programmes have been found to effectively strengthen the leadership capabilities of employees, equipping them with the necessary skills and knowledge to excel in future leadership positions. Moreover, these programmes play a crucial part in bolstering the organisation's competitive advantage by establishing a robust leadership pipeline
<i>Theme: Performance management</i> Akhtar and Sushil (2018), Cardador <i>et al.</i> (2017), Chen <i>et al.</i> (2021), Doll (2022), Meghana and Vijaya (2019), Pillai and Sivathanu (2022)	Continuing efficient performance management	Digital tools and platforms play a significant role in enabling the provision of constant feedback, the establishment of goals, and the monitoring of performance. Real-time performance management systems facilitate the identification of high-performing individuals inside businesses, as well as the identification and resolution of skill deficiencies. Additionally, these systems aid in the alignment of individual goals with the overarching objectives of the organisation. The utilisation of a data-driven approach enhances employee engagement, productivity, and overall organisational performance, hence resulting in a competitive edge

Table 2.

(continued)

Author(s)	Impact	Explanation
Benlian <i>et al.</i> (2022), Tomczak <i>et al.</i> (2018), Vardarlier (2020), Visser (2020), Weideman and Hofmeyr (2020), Wong <i>et al.</i> (2021)	Continuing performance feedback	Digital tools facilitate the transition of businesses from conventional annual performance evaluations to a more iterative feedback methodology. The utilisation of real-time feedback, coaching platforms, and performance monitoring systems provides employees with the means to continuously enhance their skills and performance. The emphasis placed on ongoing improvement and development has a significant role in enhancing the competitiveness of the firm
Caughlin and Bauer (2019), Chapano <i>et al.</i> (2022), Corsaro and Maggioni (2022), McCartney <i>et al.</i> (2020), Votto <i>et al.</i> (2021)	Visualising employee performance data	Digitalisation enables firms to effectively represent employee performance data using interactive and aesthetically pleasing dashboards and infographics. Data visualisation technologies facilitate the enhanced analysis of performance data, enabling HR professionals and managers to efficiently discern patterns and communicate valuable insights to relevant stakeholders. The utilisation of this advanced data visualisation technique enhances the process of decision-making, performance management, and overall competitiveness within a business
<i>Theme: Employee experience and engagement</i>		
Samoliuk <i>et al.</i> (2022), Sumathi and Sujatha (2022), Suseno <i>et al.</i> (2022), Zel and Kongar (2020)	Enhancing employee experience	The implementation of digitalisation in the field of HRD has been found to significantly improve the entire employee experience. This is achieved through the provision of self-service portals, employee engagement platforms, and digital communication channels. These instruments have the capacity to enhance the capabilities of individuals, augment their overall job happiness, and cultivate a conducive work environment characterised by positivity. Organisations that place a high priority on enhancing employee experience are able to acquire a competitive advantage by effectively attracting and retaining highly skilled and talented individuals
Belyaeva and Kozieva (2021), Chand <i>et al.</i> (2022), Ewing <i>et al.</i> (2019), Lyons and Bandura (2022), Surma <i>et al.</i> (2021)	Improving employee engagement	Digital tools and platforms facilitate the enhancement of employee engagement within firms by offering various features, including surveys, feedback mechanisms, recognition programmes, and social collaboration platforms. Enhanced levels of employee engagement have been found to positively correlate with increased productivity, reduced turnover rates, and the cultivation of a more favourable work environment, hence augmenting the competitive advantage of the company
Amankwah-Amoah <i>et al.</i> (2021), Chanana and Sangeeta (2021), Fenech <i>et al.</i> (2019)	Implementing remote employee recognition and rewards programs	The implementation of remote employee recognition and incentives programmes is facilitated by digitalisation. Digital platforms offer employees the opportunity to get acknowledgement for their accomplishments, obtain virtual prizes, and participate in peer-to-peer recognition. The implementation of remote employee recognition strategies has been found to have a positive impact on staff motivation, engagement, and retention, hence enhancing the overall competitiveness of the firm
Dinh <i>et al.</i> (2021), Lalić <i>et al.</i> (2020), Zel and Kongar (2020)	Conducting virtual employee engagement activities and events	Digitalisation enables firms to facilitate virtual employee engagement activities and events. Virtual team-building exercises, online recognition programmes, and virtual social events facilitate the development of a sense of affiliation and connectivity among geographically dispersed and distant teams. The implementation of virtual engagement activities has been found to have a positive impact on employee satisfaction, well-being, and the overall competitiveness of organisations

(continued)

Table 2.

Author(s)	Impact	Explanation
Arriscado <i>et al.</i> (2019), Graham and Cascio (2018), Kucherov and Zhiltsova (2021), Sajid <i>et al.</i> (2022)	Enhancing employer branding	Digitalisation presents a range of possibilities for organisations to effectively demonstrate their culture, values, and employer brand via diverse online channels, including social media platforms and company websites. Organisations that successfully utilise digital platforms for the purpose of employer branding have the ability to attract high-calibre people, distinguish themselves from rival entities, and develop a robust employer brand, thereby gaining a competitive edge in the talent market
Chaudhuri <i>et al.</i> (2020), Orzel and Wolniak (2022), Ruël and Lake (2014), Swart <i>et al.</i> (2022), Vyas (2022), Wu and Kao (2022), Zaki (2019), Zappalà <i>et al.</i> (2021)	Transforming remote work and flexibility	The advent of digitalisation has brought about substantial changes in work practises, facilitating the adoption of remote work and flexible work arrangements. Organisations that adopt digital technologies for virtual collaboration, project management, and communication have the opportunity to access a diverse talent pool on a worldwide scale, achieve cost efficiencies in their operations, and enhance the work-life equilibrium for their workforce. The aforementioned adaptability contributes to the organisation's competitive advantage by attracting a wide range of skilled individuals and accommodating evolving work preferences
Ghobadi and D'Ambra (2012), Hirudayaraj and Matic (2021), Lin <i>et al.</i> (2012), Ma and Li (2022), Nguyen <i>et al.</i> (2018), Swart <i>et al.</i> (2022)	Promoting collaborative and cross-functional work	The process of digitalisation facilitates enhanced collaboration and knowledge dissemination among many teams, departments, and geographical locations. Virtual collaboration tools, project management software, and online communication platforms facilitate the smooth collaboration of employees. Cross-functional collaboration facilitates innovation, boosts problem-solving abilities, and strengthens organisational competitiveness through the utilisation of multiple viewpoints and expertise
<i>Theme: Strategic Impact</i> Campi <i>et al.</i> (2021b), McIver <i>et al.</i> (2018), Tamm <i>et al.</i> (2022)	Enabling data-driven decision making	Digitalisation allows firms to gather and evaluate extensive quantities of HR data. By utilising data analytics, firms have the ability to obtain valuable information pertaining to various aspects of their workforce, such as employee performance, levels of engagement, patterns of attrition, and the demographics of their workforce. The utilisation of a data-driven decision-making method enables firms to optimise their HR strategies, allocate resources in an efficient manner, and make well-informed decisions that contribute to enhancing competitiveness
Chaturvedi (2016), Dhanpat <i>et al.</i> (2020), Hubschmid-Vierheilig <i>et al.</i> (2020), Johnson <i>et al.</i> (2021), Joseph Cho and Daim (2020), Salutina <i>et al.</i> (2021)	Utilising predictive analytics and strategic planning	Through the application of predictive analytics, firms have the ability to anticipate and project their future workforce requirements, discern areas where skills are lacking, and formulate proactive approaches to recruiting and employee retention. The process of digitalisation provides organisations with the ability to effectively integrate their HRD initiatives with long-term strategic objectives. This helps them to maintain a competitive advantage by proactively anticipating and tackling future difficulties related to their workforce

Table 2.

(continued)

Author(s)	Impact	Explanation
Fusarelli et al. (2018) , Griffith et al. (2019) , Jackson and Dunn-Jensen (2021) , Al Suwaidi et al. (2020)	Creating effective succession planning	The process of digitalisation enables firms to effectively identify individuals with high potential, evaluate their preparedness for leadership positions, and develop efficient strategies for succession planning. By leveraging talent analytics and performance data, businesses are able to strategically develop and cultivate potential leaders, thereby facilitating a seamless transition in critical roles. The use of this strategic approach to succession planning enhances the competitive advantage of the organisation through the establishment of a robust leadership pipeline
Arcelay et al. (2021) , Johnson et al. (2021) , Kifor et al. (2021) , Marsh and Farrell (2015) , McIver et al. (2018)	Enabling predictive workforce analytics	The process of digitalisation empowers firms to utilise predictive analytics in order to anticipate future workforce requirements, detect deficiencies in skills, and take proactive measures to mitigate shortages in talent. Through the examination and interpretation of HR data, businesses possess the ability to make decisions based on empirical evidence and formulate plans aimed at ensuring the presence of suitable personnel to effectively address forthcoming needs. Strategic workforce planning plays a pivotal role in enhancing the competitive advantage of a firm
Aamer et al. (2023) , Aljapurkar et al. (2022) , De Alwis et al. (2022)	Improving operational efficiency with integration of automation and AI	The incorporation of automation and AI technology inside HRD procedures has the potential to greatly enhance operational efficiency. Automated workflows, chatbots designed to handle employee enquiries, and AI-driven algorithms utilised for resume screening and candidate matching serve to optimise and enhance HR operations. This automation enables HR professionals to use their time more efficiently, enabling them to concentrate on strategic objectives and make valuable contributions to the organisation's competitive advantage
Gupta et al. (2022) , López-Aguilar et al. (2022) , Mishra et al. (2022) , Tao et al. (2019)	Enhancing data security and privacy	The advent of digitalisation necessitates the implementation of comprehensive procedures to ensure data security and privacy. Organisations have the option to allocate resources towards the implementation of cybersecurity solutions, data encryption measures, and privacy protocols in order to protect employee data and ensure adherence to regulatory obligations. The organisation's reputation and competitive position are bolstered via the demonstration of a steadfast dedication to data security and privacy

Source(s): Compiled from various sources

Table 2.

to identify and promptly address performance bottlenecks. This real-time feedback loop can also lead to improved operational efficiency, ensuring that the maritime sector can respond swiftly to market demands and regulatory changes. This, in turn, contributes to continuous improvement efforts and enhances overall operational efficiency. The role of real-time and data driven performance management in achieving organisational excellence enhances employee engagement, productivity, and overall performance (Doll, 2022; Pillai and Sivathanu, 2022; Tomczak et al., 2018).

In addition, the digitalisation of HRD can have a profoundly positive impact on the employee experience and engagement within the maritime sector. Engaged maritime employees are not only more likely to contribute innovative ideas but also demonstrate a higher level of commitment to the organisation's overarching mission. This heightened engagement can, in turn, significantly enhance the organisational agility and resilience required to navigate the volatile landscape inherent to the maritime sector. The use of digital

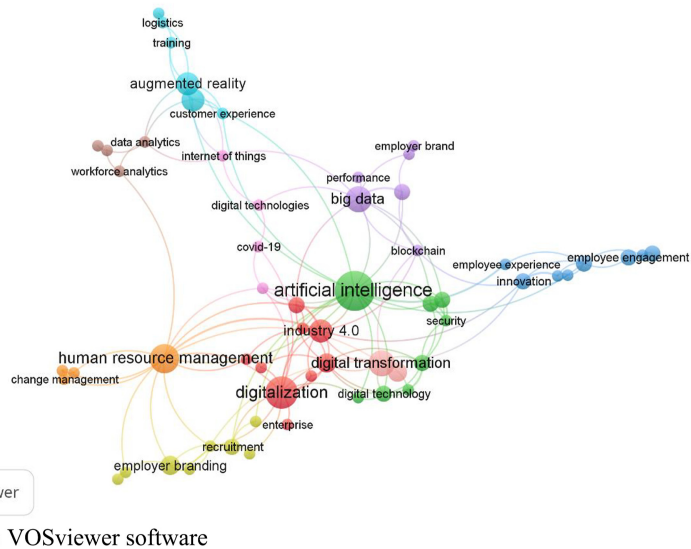


Figure 1. Co-word analysis of digitalisation in HRD on organisational competitiveness

platforms for communication, feedback, and recognition may play a pivotal role in nurturing a sense of belonging and empowerment among maritime personnel. This may foster an environment where job satisfaction soars, and employee retention rates increase—a testament to the paramount importance of optimising the employee experience in today's fiercely competitive labour market (Arriscado *et al.*, 2019; Chanana and Sangeeta, 2021). Thus, engaged maritime employees may not only be valuable assets but also more likely to play a pivotal role in driving in the maritime sector success.

The strategic impact of digitalisation within the maritime sector can extend far beyond its immediate HR operations, learning and development, performance management, and employee engagement benefits. It encompasses a transformative shift towards data-driven decision making, predictive analytics, and strategic planning. Maritime organisations can make informed decisions regarding their workforce composition, skill requirements, and operational strategies. This can enable effective succession planning, ensuring that the right talent is ready to step into critical roles as needed. Furthermore, the integration of automation and AI may enhance operational efficiency, optimising resource allocation and responding to maritime market demands like study by Zeng and Qi (2021). Thus, digitalisation's strategic can impact empowers maritime organisations to navigate the complex and dynamic global maritime landscape with agility, resilience, and a competitive edge.

This analysis highlights the significant advantages of digitalisation in HRD within the maritime industry. However, it is crucial to recognise the difficulties that arise throughout this process. Certain individuals working in the marine industry may possess insufficient digital literacy skills, hence limiting their ability to effectively utilise HRD tools (Autsadee *et al.*, 2023a; Hallam *et al.*, 2018). The implementation of stringent security measures is important in order to safeguard sensitive employee data from potential intrusions (Flaumenhaft and Ben-Assuli, 2018). Moreover, the presence of conventional ideologies and reluctance to embrace innovation could impede the implementation of digital HRD practises (Jones *et al.*, 2021). Furthermore, the implementation of digital HRD projects may necessitate substantial initial investments in both technology and training (Mazurchenko and Maršíková, 2019; Rosenbusch, 2020).

The findings of this research have ramifications that go beyond the realm of academia. The analysis also provides practical recommendations to maritime organisations and HRD practitioners who are interested in efficiently navigating the digital terrain. Maritime organisations should prioritise HRD as a strategic tool to bolster their competitiveness. The incorporation of digital HRD initiatives into wider organisational goals might result in notable benefits in terms of flexibility and effectiveness. Furthermore, it is imperative for HRD practitioners within the maritime industry to prioritise the customisation of digital learning and development initiatives in order to effectively address the sector's unique skill demands. This involves utilising simulations, VR and AR, and internet platforms as means of providing focused training.

Furthermore, it is imperative to enhance the adoption of data analytics in the realm of performance management. HRD professionals in the maritime sector can have the ability to utilise data in order to identify areas of performance that are hindering progress, optimise the allocation of talent, and improve overall operational efficiency. The maritime professionals should persist in utilising digital platforms to cultivate a culture of recognition, communication, and involvement within the maritime workforce. Moreover, it is important to acknowledge the distinct difficulties associated with remote and maritime positions. However, the utilisation of digital tools has the potential to mitigate communication barriers and improve the overall satisfaction of employees. Besides, the maritime industry's prioritisation of safety and adherence to regulations by means of digitalisation ought to serve as a paradigm for other sectors that possess rigorous regulatory obligations. HRD practitioners in the maritime sector may have the opportunity to engage in collaboration with compliance teams in order to facilitate the smooth incorporation of safety measures into digital HRD practises.

The existing literature on digitalisation in HRD within the maritime sector provides valuable insights into the transformative impact of technology on various aspects of organisational functioning. However, it is essential to critically evaluate the limitations and gaps in the current body of knowledge. One key aspect to consider is the need for a nuanced understanding of the cultural and organisational context within maritime companies. The literature often overlooks the unique challenges and dynamics specific to the maritime industry, which can significantly influence the success of digital HRD initiatives. Additionally, the extent to which digital tools can truly replace traditional methods in certain maritime functions remains an area of contention. While the benefits are evident, there is a need to explore potential drawbacks and unintended consequences associated with overreliance on technology, such as the erosion of certain interpersonal skills and the impact on employee well-being.

The insights gained from the literature review reinforce the significance of digitalisation in HRD for maritime organisations. The literature consistently emphasises the positive outcomes associated with the integration of digital tools in recruitment, talent management, learning and development, performance management, and employee engagement. The studies cited underscore the potential for increased operational efficiency, improved decision-making, and enhanced workforce competence. The acknowledgement of challenges related to digital literacy, security concerns, and resistance to innovation also adds a realistic dimension to the discussion. It is evident that successful digital transformation in the maritime sector requires a careful balance between technological adoption and addressing the human factors associated with change.

In summary, the results of this study highlight the significant impact that digitalisation can have on HRD in the maritime industry. [Autsadee *et al.* \(2023b\)](#) also introduced the concept of Maritime Society 5.0 (MS 5.0) that can be proposed as a novel concept for the forthcoming stage of digital advancement within the marine industry. The MS 5.0 represents a comprehensive incorporation of digital technology throughout all aspects of socio-economic

considerations. These also include HR, which comprises HR operations, learning and development, performance management, and employee engagement etc. This concept proposes the integration of advanced analytics, automation, and AI into the maritime industry, with the aim of attaining unparalleled levels of efficiency, safety, and competitiveness.

6. Conclusion

In this final section, this research explores the main conclusions obtained from our extensive bibliometric analysis on the influence of digitalisation in HRD on the competitive advantage of organisations operating in the maritime industry. The aforementioned findings provide significant insights into the dynamic nature of HRD practises and their impact on the competitive advantage of the maritime industry.

The findings of our investigation indicate that the maritime industry is aggressively adopting digitalisation in HRD, utilising various digital technologies and techniques to improve its worldwide competitiveness. The key findings underscore the significant impact of digitalisation on all aspects of HR operations, including learning and development, performance management, employee experience and engagement, and strategic alignment. The significance of digital HRD practises in the maritime industry is highlighted by their acceptance, as they serve as catalysts for organisational agility and success in a dynamic and evolving landscape.

This research makes a valuable contribution to the field of HRD and digitalisation by providing a focused analysis of the maritime sector, which has been relatively neglected in the current body of literature. This research expands our comprehension of the impact of digitalisation on HRD practises and its role in enhancing competitiveness inside a distinct and intricate business. The aforementioned statement highlights the significance of maritime organisations integrating digital HRD practises in a strategic manner in order to sustain their competitive advantage. Nevertheless, it is imperative to recognise specific constraints within this research. The bibliometric analysis methodology, although highly effective in visualising patterns and developments in scholarly literature, is fundamentally dependent on the accessibility and comprehensiveness of published works. It is possible that certain pertinent studies or developing trends were not included in our research due to constraints inherent in the Scopus database or the specific criteria we utilised for selection.

As the maritime sector progresses in its digitalisation efforts, there exist numerous prospects for more study in this field. Further research endeavours may focus on conducting in-depth investigations into particular facets of digital HRD, such as evaluating the efficacy of VR training simulations or examining the obstacles associated with data security within maritime organisations. Valuable insights could be derived by conducting empirical studies across various subsectors of the maritime industry or worldwide areas. Moreover, doing research on the enduring consequences of digital HRD on employee retention, workforce adaptation, and organisational performance measures would enhance our comprehension of the enduring implications of digitalisation. In addition, conducting research that investigates the incorporation of emerging technologies such as AI and blockchain into HRD practises within the marine industry has the potential to provide novel opportunities for fostering innovation and enhancing competitiveness.

In conclusion, this research underscores the pivotal role of digitalisation in HRD in bolstering the maritime sector's competitiveness. By understanding the dynamics, challenges, and opportunities associated with digital HRD, maritime organisations and HRD practitioners can chart a course toward sustained success in an increasingly digital world. This research paves the way for future research endeavours aimed at further enhancing the industry's capacity to thrive amidst evolving global demands.

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Corresponding author

Yuthana Autshadee can be contacted at: yuthana.au@ku.th

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