

Digital Human Resource Management in Maritime Enterprises

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Abstract. This study investigates the adoption of Digital Human Resource Management (DHRM) systems in the maritime industry of the Riau Islands (Kepri), Indonesia. Through qualitative research involving interviews, observations, and literature reviews with HR leaders from marine tourism, fisheries, and port logistics, the study identifies eight key areas of DHRM adoption: Digital Recruitment, Digital Performance Management, Digital Training and Development, Digital Communication, Employee Data Management, Digital Employee Engagement, Digital Diversity and Inclusion, and Adoption of New Technology. The findings reveal significant opportunities for enhancing efficiency, improving objective performance tracking, and streamlining recruitment processes. However, challenges persist, including limited human resources, reliance on centralized decision-making, inadequate technological infrastructure, and a predominant focus on seagoing workforce development. These barriers impede the full implementation of DHRM. Despite these challenges, the research underscores DHRM's potential to foster digital innovation and gain a competitive edge within the maritime sector. In conclusion, addressing these challenges through targeted strategies will be essential for maximizing the benefits of DHRM and advancing the digital transformation of human resource practices in the industry

1 Introduction

The Riau Island /Kepulauan Riau (Kepri), Indonesia is blessed with a strategic geographic location, making it an ideal maritime center in Southeast Asia. Situated along busy international shipping routes such as the Malacca Strait and the Singapore Strait, Kepri has easy access to both global and regional markets. With a coastline stretching 2,408 km and numerous islands rich in natural resources, Kepri offers tremendous opportunities for various maritime activities.

According to the Central Bureau of Statistics (BPS) of Kepri in 2023, the maritime transport sector contributed 17.92% to Kepri's Gross Regional Domestic Product (GRDP). This highlights the significant potential of the maritime industry in Kepri to drive economic growth and create employment opportunities. Recognizing Kepri's substantial potential as a maritime hub, the Indonesian government has taken steps to promote its development. In 2022, President Joko Widodo issued Presidential Regulation No. 87 of 2021 concerning the Galang Batang Special Economic Zone (SEZ), located in Kepri.

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The strategic geographic location, abundant natural resources, and government support provide Kepri with all the necessary elements to become a major player in the global maritime industry. Kepri can become a maritime hub for international and regional trade, a maritime logistics center, and an attractive marine tourism destination. Marine cultivation and fisheries also hold significant potential, with a cultivation area of 13,138 hectares and a production volume of 155,000 tons in 2022. Other maritime industries, such as shipbuilding, offshore oil and gas, and marine engineering, also have promising prospects, as evidenced by the presence of PT Industri Kapal Indonesia (Persero) shipyard in Tanjungpinang. These factors position Kepri as a potential key player in the global maritime industry.

As times evolve, digital transformation has started to permeate various industries, including maritime. One area of management that has begun to adopt digital tools is Human Resource Management (HRM). HRM in the maritime industry differs from HRM in other industries due to its unique challenges and requirements. Key differences include the demanding nature of the work, high turnover rates, compliance with safety standards, cultural and linguistic diversity, and the need for ongoing training and certification [1]. The maritime industry faces several complex HR challenges, such as data security and cybersecurity issues, given the sensitive nature of information held by maritime companies. Skill gaps in technical, soft, and digital skills also pose challenges, as employees must adapt to new technologies and work in dynamic environments [2,3]. Budget constraints hinder investment in technological infrastructure, software systems, and training initiatives needed to enhance HR capacity. Effective strategic planning and change management are crucial to aligning digital tools with HRM objectives and ensuring smooth adoption by employees[1]. Additionally, compliance with data privacy laws, equal employment mandates, and labor laws is essential to avoid legal and reputational risks. Addressing these challenges holistically and sustainably is key to building resilient and competitive HR in the maritime industry. These factors necessitate tailored HRM strategies and digital tools to meet the diverse needs of the maritime workforce [4,5].

Unfortunately, research on Digital Human Resource Management (DHRM) in the maritime industry is still very limited, but the urgency of digital transformation in maritime industry is more crucial [6]. Both globally and nationally, studies on DHRM remain scarce. Therefore, research on DHRM in the maritime industry is necessary to enrich the knowledge base and technological development, especially in HRM.

This study will focus on identifying the adoption, challenges, and opportunities faced by the maritime industry in the Riau Island in implementing DHRM. Through qualitative approaches, this research will collect data from various sources, including interviews with stakeholders, surveys of maritime industry employees, and secondary data analysis related to maritime industry trends and information technology.



Fig. 1. Passenger and Logistics Transport Ports in Bintan Island

The primary objective of this research is to explore the adoption of DHRM within the maritime industry in Kepri. Specifically, this study aims to identify the opportunities and challenges associated with DHRM adoption. By examining the current practices, tools, and technologies utilized in managing human resources, the research seeks to provide insights that can help maritime companies enhance their HRM strategies in the digital age.

In this study, two notable maritime companies that have successfully adopted DHRM are Bintan Resort Cakrawala/BRC (<https://bintanresortcakrawala.com/>) and PT. Pelni (<https://www.pelni.co.id/>). Bintan Resort Cakrawala has implemented a comprehensive digital recruitment process that streamlines candidate selection through advanced applicant tracking systems, enabling the company to efficiently identify and onboard qualified personnel in the competitive tourism sector. Additionally, PT. Pelni, a prominent player in maritime transportation, has embraced digital performance management tools that enhance employee evaluations and foster a culture of continuous improvement. These initiatives have not only optimized their HR practices but have also significantly contributed to increased operational efficiency and employee engagement. By including these companies as research objects, this study highlights practical examples of DHRM adoption within the maritime industry in Kepri, offering valuable insights into the transformative potential of digital HR practices. But apart from BRC and PT Pelni, other maritime companies in the Riau Islands are also the object of research to enrich the findings.

The importance of this research extends beyond the development of technology and best management practices in the maritime industry. It also supports economic growth and sustainable development in the Kepri. Through collaboration between UMRAH, the Provincial Government of the Kepri, and other stakeholders, this research is expected to make a significant contribution to advancing HR and innovation in the maritime industry and serve as a foundation for further development in this field in the future.

2 Research Method

This study adopted a qualitative approach to explore the phenomenon of Digital Human Resource Management (DHRM) adoption within the maritime industry of the Kepri. This approach was selected to gain an in-depth understanding of the context, perspectives, and interpretations of key stakeholders involved in the process. Data will be collected through in-depth interviews and participatory observations with various relevant parties, including HR managers, employees, and other industry stakeholders. Following data collection, thematic analysis will be conducted to identify the primary themes and sub-themes that emerge. This process involves coding the data, identifying motifs and patterns, and interpreting the meanings of the findings. To facilitate this analysis, NVIVO software will be utilized, as it provides a systematic and efficient way to organize, analyze, and interpret qualitative data. By adopting this approach, the study aims to gain valuable insights into the challenges and opportunities of DHRM adoption in the maritime industry of the Kepri.

In addition to interviews and observations, the study incorporated an observational method using a checklist instrument to gather data. A network of students participating in internships assisted with this process, collecting data via a checklist that captured relevant DHRM indicators specific to this research. For the interview section, HRD leaders and managers were selected purposively, as they possess extensive knowledge of DHRM implementation within their organizations. Ethical considerations were carefully addressed, with prior agreements made with the companies involved. While full data access was not granted, the researchers were provided with applications and screenshots that demonstrated the DHRM systems in use. The information gathered from the informants was sufficiently detailed, offering a comprehensive overview of the DHRM practices currently in place.

professionals, such as HR practitioners, to implement significant strategic and operational changes to harness digital potential and create value for the organization.

From the coding with NVIVO 12 results and the division of DHRM, several relevant scopes for the maritime industry have been identified, forming the basis for designing interview and observation instruments:

1. **Digital Recruitment:** Interview questions pertain to the use of online platforms for recruitment and the number of applicants sourced through digital platforms.
2. **Digital Performance Management:** Interview questions focus on the digital performance management system, periodic performance feedback, and the digital metrics used to assess employee performance.
3. **Digital Training and Development:** Interview questions include aspects such as online training modules, employee participation in digital training, and routine evaluations of training effectiveness.
4. **Digital Communication:** Interview questions cover the use of digital communication tools (e.g., email, intranet), employee responsiveness to digital communications, and the ease of accessing important information through digital platforms.
5. **Employee Data Management:** Interview questions involve the management of employee data with adequate security and privacy, accessibility of employee data for analysis, and the integration of employee data across various systems.
6. **Digital Employee Engagement:** Interview questions pertain to digital employee satisfaction surveys, participation in engagement programs, and trends in employee satisfaction over time.
7. **Digital Diversity and Inclusion:** Interview questions focus on the use of digital tools to support diversity, tracking and analyzing employee demographic data, and implementing diversity programs through digital platforms.
8. **Adoption of New Technology:** Interview questions explore the adoption of new technologies by employees, the availability of training and support for new technologies, and improvements in employee productivity resulting from these technologies.

3.2 Adoption of DHRM in Maritime Enterprises

Adoption of DHRM in maritime enterprises refers to the acceptance or active use after the implementation of DHRM. The focus is on how people or organizations accept and start using DHRM or the new adaptation process. This synthesis presents the results of in-depth interviews, observations, and literature reviews conducted through official websites, journal articles, online news, and videos, focusing on maritime companies in the Kepri, specifically representatives from the marine tourism sector, fisheries enterprises, and port and logistics services. Here is a comprehensive analysis of DHRM adoption in these maritime enterprises.

Digital Recruitment: HR practitioners emphasize that technology plays a crucial role in the recruitment and selection of employees by aggregating a wealth of information and analyzing the profiles of potential hires. Digital recruitment is essential for enhancing efficiency in identifying suitable candidates, especially in the maritime enterprises, which may face challenges in sourcing qualified human resources. While online platforms and data-driven systems can streamline the hiring process—particularly beneficial when faced with a high volume of applicants—there remains a significant gap in digital literacy among the local population in the Kepri. Consequently, companies often employ a hybrid approach, combining traditional and digital methods for recruitment. In state-owned enterprises (BUMN), the recruitment process is typically centralized at the headquarters, conducted

through the main website, except for contract workers, who are often sourced via third parties, limiting direct recruitment efforts.

Digital Performance Management: Currently, performance evaluations within companies are conducted using simple tools like media dashboards and Google Sheets for monitoring employee performance. The application of DHRM in the media, marketing, and finance divisions has demonstrated increased productivity through digital performance evaluations. Integrated digital performance management systems allow for a more objective assessment of employee performance, enabling the identification of areas for improvement and development. In larger industrial firms or BUMNs, specialized applications for employee performance evaluations are already in place. However, many smaller companies still focus primarily on basic performance assessments without adequately addressing employee welfare through surveys on work-life balance, job satisfaction, and overall happiness.

Digital Training and Development: There is currently a lack of specialized training or development programs for DHRM; however, a clear need exists to enhance employees' understanding of existing technologies and systems. Digital training and development are critical to ensuring that employees possess the necessary skills to adapt to DHRM systems. A gap may arise if companies demand the use of digital tools without providing adequate educational support. Training programs that leverage technology can significantly improve employee competencies and encourage the adoption of new technologies. Some training continues to be conducted offline, and there is limited use of digital platforms or Learning Management Systems (LMS). Nevertheless, larger firms are increasingly prepared to implement LMS for employee development, while BUMNs foster a culture of knowledge sharing to assist workers struggling to adapt to LMS usage.

Digital Communication: Discussions with relevant divisions prior to the implementation of new systems indicate effective communication. However, fostering more open and transparent communication can enhance employee acceptance. Effective digital communication is pivotal in managing organizational change, ensuring that all stakeholders are engaged in the implementation process and have a clear understanding of the goals and benefits of DHRM. Currently, much of the communication occurs through informal channels like WhatsApp groups, with formal communication methods such as group emails or project management software yet to be fully realized.

Employee Data Management: A clear need for tools to support systematic employee performance tracking has been identified, but comprehensive implementation remains a challenge. Digital employee data management facilitates efficient storage, management, and analysis of HR data. This information can be used for better strategic decision-making and to enhance the overall employee experience. While many companies have begun collecting employee data digitally, they have not fully leveraged this data for demographic research and analysis that could inform decision-making processes.

Digital Employee Engagement: There has been no notable resistance from employees regarding the adoption of new systems, suggesting that their engagement in the technology adoption process has been adequately addressed. Employee involvement in utilizing DHRM is critical for successful implementation. Tools and platforms that facilitate employee interaction can enhance engagement and job satisfaction. However, while generations such as Gen Z and millennials may find digital engagement straightforward, challenges persist for individuals who are less tech-savvy, potentially diminishing their involvement with digital tools.

Digital Diversity and Inclusion: Some companies have not provided specific insights into their diversity and inclusion strategies. It is essential to ensure that all employees feel included in the DHRM implementation process. An inclusive and diverse DHRM fosters optimal decision-making through varied perspectives, ultimately creating a more productive

work environment. While issues of inclusivity are often framed around gender, there is still significant work to be done regarding disability inclusion within DHRM frameworks.

Adoption of New Technology: Most companies face challenges in adopting DHRM due to limitations in human resources and technological readiness. Nevertheless, top management plays a vital role in driving this adoption. Successful technology integration requires support through training, managerial backing, and organizational readiness. Companies need to cultivate a culture that embraces innovation and change to facilitate DHRM adoption. Interestingly, while no companies in this study have utilized artificial intelligence (AI) for HRM analysis, those in the shipping sector have implemented augmented reality (AR) technologies for training and learning methods. Furthermore, the COVID-19 pandemic has compelled companies to adapt quickly, leading many to gradually appreciate the benefits of digital transformation in their governance processes.

In the maritime industry, gaps in digital literacy significantly hinder the successful implementation of Digital Human Resource Management (DHRM) systems. For instance, HR personnel may struggle with digital recruitment tools like applicant tracking systems (ATS), leading to inefficient candidate screening and longer time frames to fill positions. This not only affects the quality of hires but also the overall productivity of the organization. To address this issue, targeted training sessions can be established to enhance proficiency with these tools, ensuring that HR staff can effectively utilize the systems available to them. Similarly, the use of digital performance management systems can be undermined by employees' difficulties in navigating the software. Incomplete or inaccurate evaluations can result from this lack of understanding, ultimately hindering employee development. To combat this, organizations can implement hands-on workshops and provide tailored user guides that empower employees to use these tools effectively.

Moreover, employee engagement with digital platforms can be negatively impacted by varying levels of comfort with technology, particularly among older generations or those less tech-savvy. This disconnect in communication can lead to reduced morale and engagement. By establishing mentorship programs that pair tech-savvy employees with their peers, companies can foster a supportive learning environment. Additionally, creating user-friendly platforms with clear instructions can further enhance participation. The challenges extend to digital training and development, where employees may miss out on essential learning opportunities due to a lack of skills to engage with e-learning modules. Offering blended learning options that combine online and face-to-face training can accommodate different learning preferences and ensure all employees can develop the necessary competencies.

Resistance to adopting new technologies often stems from this digital literacy gap, as employees may feel skeptical or fearful of the changes. Involving them in the selection and implementation of new DHRM tools can foster a sense of ownership and acceptance. Highlighting the tangible benefits of DHRM—such as improved work-life balance and streamlined processes—can also encourage buy-in from staff. Lastly, underutilization of data analytics can prevent organizations from leveraging insights for strategic decision-making, as HR professionals may struggle to analyze and interpret the data generated. Providing training on data analytics specific to HR metrics or collaborating with data experts can bridge this gap and enhance decision-making capabilities.

In conclusion, addressing the digital literacy gap within maritime companies is crucial for the successful adoption of DHRM systems. By investing in targeted training programs, fostering a culture of continuous learning, and involving employees in the change process, organizations can enhance their workforce's digital competencies. This strategic approach not only facilitates the effective implementation of DHRM but also drives digital innovation and improves overall human resource management practices in the maritime sector.

Table 1: Summary of DHRM Adoption in Maritime Enterprises

Area	Current Status	Challenges	Recommendations
Digital Recruitment	Primarily online, but hybrid approach common.	Lack of digital literacy among local population.	Enhance digital literacy training, invest in user-friendly platforms.
Digital Performance Management	Simple tools used, but more sophisticated systems emerging.	Focus on basic assessments, lack of attention to employee welfare.	Implement integrated performance management systems, prioritize employee well-being.
Digital Training and Development	Limited use of digital platforms.	Lack of specialized training programs.	Invest in digital training programs, utilize LMS.
Digital Communication	Informal channels dominate, formal methods underutilized.	Need for more open and transparent communication.	Implement formal communication channels, ensure clear communication.
Employee Data Management	Data collection initiated, but limited analysis.	Lack of comprehensive tools for data management and analysis.	Invest in data management tools, utilize data for decision-making.
Digital Employee Engagement	No significant resistance, but engagement varies.	Challenges for less tech-savvy employees.	Implement tools for employee interaction, address inclusivity concerns.
Adoption of New Technology	Limited adoption due to resource constraints.	Managerial support and organizational readiness crucial.	Cultivate a culture of innovation, provide necessary training.

3.3 Opportunies and Benefits in the Adoption of DHRM in Maritime Enterprises

[10] found that adopting DHRM helps companies meet employee expectations, align with industry digital transformation, stay competitive, and respond to government innovations. It also provides the agility needed in the VUCA era. DHRM boosts productivity by automating processes, improves employee engagement through personalized services, and drives innovation. However, companies must prioritize digital ethics, ensuring data privacy and responsible use of technology to maintain trust and security in the digital workplace.

The findings of [11] indicate that the adoption of DHRM significantly enhances the performance of small and medium-sized enterprises (SMEs). Additionally, digital innovation plays a crucial role in boosting SME performance, with its impact being both positive and significant. Moreover, the study reveals a strong and positive correlation between DHRM and digital innovation, suggesting that the implementation of digital HR practices contributes to driving innovation within these enterprises, further enhancing overall business performance.

Opportunities and benefits in the adoption of DHRM in maritime enterprises are taken from information collected from literature, observations and interviews . here, several opportunities for DHRM in the maritime enterprises can be summarized as follows:

- **Enhanced Efficiency and Effectiveness:** DHRM offers significant potential to improve the efficiency and effectiveness of HR management. By streamlining processes and making them more fluent across departments, companies can monitor and analyze team performance objectively, resulting in better overall productivity.
- **Objective Performance Tracking:** With DHRM systems in place, individual and team performance can be tracked and analyzed more objectively. This leads to data-

driven insights, helping to identify areas for improvement and ensuring that employee contributions are accurately measured.

- **Increased Productivity:** Departments such as media, marketing, and finance have shown increased productivity after adopting DHRM technologies. DHRM allows employees to explore new ways of working and become more innovative, improving output and engagement.
- **Improved Recruitment and Selection Processes:** DHRM can support more comprehensive data collection and analysis in recruitment, helping companies make more informed decisions about new hires. It enables the collection of detailed information about candidates, allowing for better matching of roles and skills.
- **Meeting Internal Customer Expectations:** The digital transformation of HR processes can meet the evolving expectations of internal stakeholders (employees and management), who demand more seamless and digitalized services. This enhances overall satisfaction and engagement within the organization.
- **Support for the VUCA (Volatile, Uncertain, Complex, Ambiguous) Era:** DHRM enables organizations to better adapt to the rapidly changing and unpredictable environment. With agile HR processes and real-time data analysis, companies can respond more quickly to market changes and internal demands.
- **Fostering Digital Innovation:** By implementing DHRM, companies can encourage and support digital innovation across departments. This includes exploring new digital tools, platforms, and ways of working that align with the company's strategic goals and improve efficiency.
- **Competitive Advantage:** In an industry as competitive as maritime, DHRM provides an opportunity to gain an edge by improving HR functions, which in turn can improve overall business performance. Digitalized HR processes help companies stay ahead of the curve in talent management and employee engagement.
- **Alignment with Government Digital Initiatives:** With government encouragement for digital innovation, adopting DHRM helps maritime companies align with broader industry trends and regulatory support for digital transformation.
- **Digital Workplace Transformation:** DHRM facilitates the transition to a digital workplace by offering digital employee services and HR processes. This transition supports remote work, better communication, and greater access to information for all employees.

These opportunities demonstrate that the implementation of DHRM can significantly benefit maritime companies by improving efficiency, productivity, and the overall management of human resources.

3.4 Challenges in the adoption of DHRM in Maritime Enterprises

Based on the collected information regarding the challenges of implementing DHRM in the maritime industry, several key themes can be summarized as follows:

1. **Limited Human Resources:** Many maritime companies, especially those that are still growing, face constraints in terms of the availability of human resources needed to implement and regularly monitor DHRM systems. Existing staff are often optimized for other tasks, making it difficult to assign additional responsibilities for DHRM management.
2. **Dependence on Centralized Decisions:** Some maritime companies in Kepri are required to follow directives or policies from central headquarters, which may not fully align with the specific needs of local branches or operational sites. This dependence can slow down the effective adoption of DHRM, which would otherwise be more tailored to local requirements.

3. **Technological Infrastructure Limitations:** A major challenge is the development and implementation of the technological infrastructure necessary to support DHRM, including both hardware and software systems. Building the appropriate infrastructure requires significant time and investment to ensure it meets the needs of the organization. Limitations in technological infrastructure significantly hinder HR processes in the maritime industry, particularly in recruitment, training, and employee engagement. In recruitment, inadequate tools and a weak online presence can lead to inefficient candidate screening and a limited talent pool, causing longer hiring cycles and potential losses to competitors. For training, the absence of digital learning platforms and resources prevents the development of engaging and tailored training programs, leaving employees ill-equipped to adapt to new technologies. Moreover, ineffective communication channels can result in missed feedback opportunities, reducing employee morale and engagement. Without efficient recognition systems, employees may feel undervalued, further diminishing their motivation. To address these challenges, maritime companies must invest in enhancing their technological capabilities to streamline HR processes, foster continuous learning, and improve overall employee engagement.
4. **Focus on Seagoing Workforce Development:** Existing studies tend to focus more on training and skills development for maritime employees working at sea. Meanwhile, less attention is given to the HR management practices onshore that could help facilitate the transition to a more digitalized maritime business environment[12].
5. **Talent Management and Recruitment:** Managing talent and recruitment processes is often a challenge, particularly for larger companies with centralized HR structures. This can create a disconnect in decision-making for local talent and staff, making it difficult to tailor recruitment programs to specific regional operational needs.

In addition to enrich findings from interviews, [13] research highlights key challenges in the implementation and adoption DHRM within the maritime industry, emphasizing the significance of adaptive learning environments. The research on adaptive learning technologies in maritime education is closely related to the challenges faced by digital HRM. Both systems prioritize personalization—adaptive learning focuses on creating individualized educational paths for students, much like digital HRM customizes training and development for employees. Both rely heavily on data management and analytics to monitor performance and make content adjustments. Furthermore, adaptive learning promotes student motivation and engagement through increased autonomy, paralleling how digital HRM seeks to boost employee satisfaction and productivity through tailored training programs. Additionally, adaptive learning fosters a collaborative and communal maritime atmosphere, which aligns with HRM's objective to build a cooperative organizational culture using digital tools. Both fields face similar obstacles, including technological integration, infrastructure preparedness, and workforce training. The insights gained from implementing adaptive learning can provide valuable strategies to overcome the challenges of adopting digital HRM, especially in the areas of personalization, skill development, and cultivating a positive workplace culture.

Moreover, [12] identifies several significant challenges in maritime human resource management (HRM). Firstly, there is a crucial need for ongoing training and education to ensure the maritime workforce can adapt to the technological advancements and skills required in an increasingly digitalized industry. Secondly, automation poses a risk of displacing traditional jobs, making it imperative to focus on reskilling and upskilling workers for new roles. Thirdly, while much research has been dedicated to seagoing personnel, there

is a notable gap in understanding how digitalization affects shore-based employees. Another challenge is the integration of HRM practices across sea and shore-based employees as the industry moves toward greater digitalization. Lastly, the lack of a clear regulatory framework for Maritime Autonomous Surface Ships (MASS) technologies complicates policy-making and safety management within the sector.

4 Conclusion

In summary, the adoption of DHRM in the maritime industry of the Kepri demonstrates both potential and challenges. While companies are beginning to adopt digital tools for recruitment, performance management, and employee engagement, there remains a significant gap in the comprehensive utilization of these technologies across all divisions. The insights gathered from interviews and observations reveal that while certain sectors have embraced digital solutions, others still rely on traditional methods. This highlights the need for a more structured approach to DHRM, emphasizing the importance of training and capacity building for employees to fully leverage the available digital tools.

Furthermore, the role of top management is crucial in fostering an environment conducive to the adoption of new technologies. Their support can help bridge the technological divide and encourage a culture of innovation within organizations. The willingness to adapt, particularly in light of the challenges posed by the COVID-19 pandemic, indicates a promising shift toward greater digital integration in maritime enterprises. As the industry evolves, it is essential for companies to not only explore advanced technologies like artificial intelligence but also to prioritize the development of inclusive practices that ensure all employees can thrive in a digitally driven workplace.

Incorporating feedback from employees on their experiences with DHRM reveals the critical need for comprehensive training in digital technology use, emphasizing their role not just as an object of adopting DHRM. Many employees express a desire for more structured training programs that focus on enhancing their digital skills, enabling them to effectively engage with DHRM systems. This need is particularly pronounced in maritime companies where the rapid integration of digital tools can feel overwhelming without proper support. Employees often highlight the gaps in their understanding of new technologies, which can hinder their ability to utilize DHRM platforms fully. By investing in tailored training initiatives that empower employees with the necessary digital competencies, organizations can foster a culture of continuous learning and adaptability. Such training not only helps employees navigate DHRM systems with confidence but also promotes a sense of ownership over their professional growth. This proactive approach to individual development is essential for maximizing the benefits of DHRM adoption, as engaged and well-trained employees are better equipped to contribute to the organization's success in the evolving digital landscape.

To deal with the challenges in adoption DHRM in the maritime enterprises, the following are recommendations for actions and policies that can be implemented :

- **Increase HR Capacity.** Maritime companies should hire or upskill HR professionals who specialize in DHRM. This will ensure there is enough expertise to manage and monitor digital HR systems. Smaller companies can collaborate with educational institutions or industry associations to access specialized knowledge and support.
- **Localize HR Decisions.** To reduce dependence on centralized headquarters, companies should allow local branches more flexibility in making HR decisions. This will enable them to tailor DHRM systems to meet specific regional needs. Additionally, creating regular feedback channels between headquarters and branches can help ensure alignment with local requirements.
- **Upgrade Technological Infrastructure Incrementally**[6]. Instead of attempting a full-scale digital transformation at once, companies can start by implementing

essential DHRM components such as cloud-based platforms. These systems are scalable, secure, and accessible from remote locations, making them ideal for maritime operations. Public-private partnerships can also help secure funding and expertise for infrastructure upgrades.

- **Balance Seagoing and Shore-Based Employee Development.** Companies should offer integrated training programs for both seagoing and shore-based employees, focusing on the digital skills needed across the entire workforce. Partnering with educational institutions to develop certification programs for digital skills can ensure uniformity in training and skill development.
- **Enhance Talent Management and Recruitment**[14]. Establish regional talent hubs that focus on recruiting from local labor markets. These hubs can collaborate with universities to create tailored talent pipelines. Additionally, using AI-powered recruitment systems can speed up hiring decisions and match candidates to roles more effectively.
- **Personalize Training and Development** [13] . Implement adaptive learning technologies that customize training based on individual employee needs. This approach, similar to personalized education, will boost productivity and engagement. Use DHRM data analytics to create personalized development plans for each employee, ensuring continuous growth.
- **Collaborate on Regulatory and Safety Concerns.** Work closely with regulatory bodies to co-develop frameworks for adopting technologies like Maritime Autonomous Surface Ships (MASS). By staying proactive with regulations, companies can ensure smoother digital transitions. Regular compliance training will also help employees stay updated on evolving safety standards.
- **Improve Employee Engagement and Digital Culture.** Foster a digital-first workplace culture by using user-friendly HR platforms that encourage employee participation. Offering digital tools like wellness platforms and real-time communication channels can boost engagement, satisfaction, and overall productivity.

Future research on DHRM in the maritime industry could will be interesting to explore the integration of Artificial Intelligence (AI) in Human Resource Management particularly in the context of DHRM. AI is increasingly becoming a pivotal part of operations across various industries, offering a wide range of possibilities for enhancing HR functions. By incorporating AI, organizations can streamline recruitment processes, improve talent management through predictive analytics, personalize employee training, and optimize performance evaluations. Investigating the role of AI in DHRM could provide valuable insights into how AI-driven tools can not only increase operational efficiency but also foster a more dynamic, data-driven approach to managing human resources. This avenue of research would be crucial in advancing the digital transformation of HR practices and maximizing their impact on overall business performance.

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