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Navigating heavy industry digital transformation: key factors for successful implementation

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ABSTRACT

This article focuses on digital transformation in heavy industries and aims to identify the major factors contributing to its successful implementation. Based on reviews of case studies across various industries, the research highlights examples of digital transformation in practice, identifying common success factors and barriers specific to heavy industries. These factors include a series of challenges and considerations that organizations should navigate for favorable results. A rigorous analysis reveals, three key factors: operational challenges, planning, and organizational culture. The conclusions emphasize the importance of addressing these factors and recommend the use of competence centers as an organizational tool to remover overcome barriers to success. The article serves as a valuable resource for organizations preparing for digital transformation in heavy industries.

KEYWORDS: Digital transformation. Heavy industry. Success factors. Operational challenges. Organizational culture.

Transformação digital na indústria pesada: fatores chave para uma implementação bem-sucedida

RESUMO

Este artigo foca na transformação digital em indústrias pesadas e busca identificar os principais fatores de sucesso para sua implementação eficaz. Com base em revisões de estudos de caso de várias indústrias, ele fornece informações sobre implementações no mundo real, buscando identificar fatores de sucesso comuns e barreiras para uma transformação digital bem-sucedida em indústrias pesadas. Esses fatores incluem uma série de desafios e considerações que as organizações devem enfrentar para obter resultados favoráveis. No entanto, por meio de uma análise rigorosa, três fatores-chave se destacaram como particularmente significativos em nossa pesquisa: desafios operacionais, planejamento e cultura organizacional. As conclusões enfatizam

a importância de considerar esses fatores e recomendam o uso de Centros de Competência como uma ferramenta organizacional para abordá-los e superar barreiras ao sucesso. O artigo serve como um recurso valioso para organizações que se preparam para a transformação digital em indústrias pesadas.

PALAVRAS-CHAVE: Transformação digital. Indústria pesada. Fatores de sucesso. Desafios operacionais. Cultura organizacional.

Transformación digital en la industria pesada: factores clave para una implementación exitosa

RESUMEN

Este artículo se centra en la transformación digital en las industrias pesadas y tiene como objetivo identificar los principales factores de éxito para su implementación efectiva. Basado en la revisión de estudios de caso de diversas industrias, proporciona información sobre implementaciones en el mundo real, buscando identificar factores de éxito comunes y barreras para una transformación digital exitosa en las industrias pesadas. Estos factores incluyen una serie de desafíos y consideraciones que las organizaciones deben enfrentar para obtener resultados favorables. Sin embargo, a través de un análisis riguroso, tres factores clave surgieron como particularmente significativos en nuestra investigación: desafíos operativos, planificación y cultura organizacional. Las conclusiones enfatizan la importancia de considerar estos factores y recomiendan el uso de Centros de Competencia como una herramienta organizacional para abordarlos y superar las barreras para el éxito. El artículo sirve como un recurso valioso para organizaciones que se preparan para la transformación digital en industrias pesadas.

PALABRAS CLAVE: Transformación digital. Industria pesada. Factores de éxito. Desafíos operativos. Cultura organizacional.

INTRODUCTION

Digital transformation (DT) has become increasingly important for organizations as they seek to improve business processes and remain competitive in the rapidly changing market (Kutnjak; Pihiri; Furjan, 2019). DT involves the incorporation of digital technology throughout an organization, with a focus on people, business processes, and customer experience. It can lead to new business opportunities, innovations in product and/or service creation, and the acquisition of new knowledge. However, the adoption and success of DT initiatives can vary among industries due to different technologies and their levels of impact (Kutnjak; Pihiri; Furjan, 2019). Additionally, DT initiatives can face barriers such as organizational resistance (Hartl; Hess, 2017; Tumbas; Berente; Vom Brocke, 2017) and technical challenges (Schallmo; Williams; Boardman, 2017; Vogelsang *et al.*, 2019). The purpose of this paper is to identify key factors that can help organizations overcome these barriers and achieve success in DT. To do this, a literature review was conducted to examine previous research on DT and identify common themes and best practices. The review focused on case studies of digital transformation (DT) initiatives to identify common success factors, enablers, and barriers across different industries. Then the objectives of this paper are twofold. Firstly, to identify the most common barriers to DT success and how they vary among industries. Secondly, to identify key success factors for DT and how

they can be applied to overcome organizational barriers. By understanding these barriers and success factors, organizations can better prepare for DT and increase the chances of its success. The remainder of this paper is organized as follows. The literature review presents the findings of previous research on DT, including common barriers and success factors. The discussion and conclusion section summarizes the main findings of the paper and provides recommendations for organizations seeking to implement DT.

DEVELOPMENT – RESEARCH METHODOLOGY

The following methodology was applied to collect data for this review on digital transformation:

i. Searching for relevant key terms such as digital transformation, culture, organizational challenges, barriers, and success factors.

ii. Searching in leading databases including Elsevier, Springer, Emerald, Science Direct, Research Gate, and Google Scholar. Bibliographies of key articles were also checked to ensure that no relevant papers were missed.

iii. Selecting publications that matched the criteria by evaluating their titles and abstracts.

iv. Carefully reading, critiquing, and analyzing the selected papers. A total of 34 articles were used as references in this review. These articles covered a range of scientific, mostly peer-reviewed journals and represented diverse geographic regions. Most of the articles are focused on barriers and success factors in the context of digital transformation.

RESULTS

Our review indicates that the implementation of digital transformation initiatives in industries may face significant challenges (Hartl; Hess, 2017; Kutnjak; Pihiri; Furjan, 2019; Raj *et al.*, 2020). Three main factors have emerged as key when industries are aiming for a successful implementation of digital transformation initiatives: operational challenges, poor planning, and lack of proper organizational culture. These three categories were identified as a result of the findings from the reviewed literature, which explored barriers, success factors, implementation recommendations, and roadmaps for the digital transformation process.

In the literature on digital transformation, several terms have been identified as constraints to the implementation of DT in many industries, including automation (Fischer *et al.*, 2020), equipment integration (Kutnjak; Pihiri; Furjan, 2019), infrastructure (Vogelsang *et al.*, 2019), basic automation (Schallmo; Williams; Boardman, 2017), operational backbone (Sebastian *et al.*, 2017), and outdated system and equipment (Vogelsang *et al.*, 2019). These terms have been discussed individually in various studies. However, we, as authors, have categorized them as operational barriers to DT implementation, as they are all related to the challenges that companies face in updating their existing systems and processes to adopt new digital technologies.

The second category of barriers that emerged from our literature review was poor planning. This category includes expressions such as lack of effective strategy (Matt; Hess; Benlian, 2015), digitalized solutions (Sebastian *et al.*, 2017), alignment of strategy and objectives (Fischer *et al.*, 2020), growth strategies (Verhoef *et al.*, 2021), inadequate planning (Mahboub; Sadok, 2022), and failure to consider long-term impact (Zapata; Berrah; Tabourot, 2020), among others. Poor planning can lead to a lack of direction and clarity in the digital transformation journey, hindering progress and potentially wasting resources.

Finally, the third category from our findings is the lack of proper organizational culture, which emerged as the most common barrier to digital transformation in several industries. This category includes a variety of factors such as cognitive barriers (Jones; Hutcheson; Camba, 2021), missing skills (Hanelt *et al.*, 2021), lack of digital competency (Fischer *et al.*, 2020), organizational change (Verhoef *et al.*, 2021), lack of management skills (Eller *et al.*, 2020), fear of job loss (Vogelsang *et al.*, 2019), agile structure (Hartl; Hess, 2017), among others. Our literature review revealed that these factors often arise due to a lack of leadership commitment, inadequate communication, and insufficient employee engagement.

During our literature review, we identified several factors that were described as either barriers or enablers of digital transformation (DT) initiatives in various industries. However, for simplicity and clarity, we condensed all these factors under the category of barriers.

While some factors could be seen as enablers in certain contexts, they could also present challenges for other companies or industries. For example, infrastructure and equipment integration (Raj *et al.*, 2020; Schallmo; Williams; Boardman, 2017) could be seen as enablers in industries with modern equipment and robust infrastructure. However, in industries with outdated systems and equipment, they could present operational challenges and be categorized as barriers to DT implementation.

Similarly, factors such as organizational change (Hanelt *et al.*, 2021) and agile structure (Tumbas; Berente; Vom Brocke, 2017) could be seen as enablers for some companies that prioritize innovation and flexibility. However, for others, they could present cultural and cognitive barriers (Jones; Hutcheson; Camba, 2021), hindering progress in digital transformation initiatives.

Therefore, it is important to note that the factors we identified as barriers are not necessarily absolute and can vary depending on the context and industry. However, by condensing them under the category of barriers, we aimed to facilitate the understanding of the challenges faced by industries in implementing successful DT initiatives.

DISCUSSION

Digital transformation is a process of using digital technologies to fundamentally change how organizations operate and deliver value to customers (Mahboub; Sadok, 2022). The concept of digital transformation has been around for decades, but it has gained significant attention in recent years as the proliferation of digital technologies has accelerated (Siebel, 2021).

There is no single point in time when digital transformation began, as it has been a gradual process that has evolved. However, some key events and technological advances have played a significant role in shaping digital transformation (Siebel, 2021).

The widespread adoption of the internet in the 1990s is often considered a catalyst for digital transformation, leading to the development of a range of digital technologies and services such as social media, cloud computing, and e-commerce. The rise of the Internet of Things (IoT) has also been a significant contributor to digital transformation, allowing for the collection and analysis of large amounts of data to improve operations and inform decision-making (Siebel, 2021).

In general, digital transformation is an ongoing process that has been driven by a combination of technological advances and changing consumer behavior, and it will likely continue to evolve in the coming years as new technologies and innovations emerge (Rogers, 2017).

Digital transformation has the potential to revolutionize every aspect of an organization, from operations and customer experience to products and services (Verhoef *et al.*, 2021), business models (Sebastian *et al.*, 2017), and the workforce (Hartl; Hess, 2017). By implementing digital technologies, businesses can streamline workflows (Matt; Hess; Benlian, 2015), automate tasks (Schallmo; Williams; Boardman, 2017), and leverage real-time data analysis to enhance operational efficiency and productivity.

However, digital transformation also affects the workforce by changing the way work is organized and performed (Eller *et al.*, 2020; Jones; Hutcheson; Camba, 2021). Moreover, digital technologies can create new job roles, leading to job displacement and the need for reskilling and upskilling (Korbel *et al.*, 2019). Therefore, businesses must plan and manage workforce transformation effectively to ensure a smooth digital transformation process.

Thus, the impact of digital transformation on an organization can be significant, and it can require organizations to adapt and transform their operations (Schallmo; Williams; Boardman, 2017), planning (Sebastian *et al.*, 2017; Zaoui; Souissi, 2020), and culture (Hanelt *et al.*, 2021; Tumbas; Berente; Vom Brocke, 2017) to take full advantage of the opportunities that digital technologies offer.

Therefore, digital factories (Khanna *et al.*, 2020) can be seen as a response to ongoing digital transformation for the heavy industries, as it is a way for these organizations to adapt and turn their operations and processes to make the most of the opportunities that digital technologies offer.

Operations

Industry 4.0, also known as the Fourth Industrial Revolution, has emerged as a game-changing concept in recent years, thanks to the integration of advanced technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and Big Data into manufacturing processes (Noterdaeme *et al.*, 2018). While the metallurgy industry, like many other heavy industries, is not yet keeping up with the pace of Industry 4.0 adoption (Crispeels *et al.*, 2020), it is beginning to implement these technologies to enhance efficiency, reduce downtime, and optimize production processes (Ducro *et al.*, 2019). These innovations have the potential to revolutionize the industry, enabling greater precision, minimizing human intervention, and accelerating production processes. However, the implementation of Industry 4.0 in metallurgy confronts operational barriers that necessitate careful planning and management to harness its full potential (Korbel *et al.*, 2019).

In the metallurgy industry, the adoption of Industry 4.0 technologies can face several operation barriers (Noterdaeme *et al.*, 2018). One of the main issues is outdated infrastructure (Vogelsang *et al.*, 2019) and equipment that cannot support advanced technologies such as IoT, AI, and Big Data, requiring expensive and time-consuming updates or replacements (Crispeels *et al.*, 2020; Raj *et al.*, 2020). Additionally, the implementation of these complex technologies requires specialized knowledge and experience, and significant changes in existing processes and workflows (Crispeels *et al.*, 2020). The cost of investment is also a significant barrier, as many of these technologies are still new and require continuous maintenance and updating (Raj *et al.*, 2020). IoT applications can also present a barrier due to the significant investment required in sensors, networks, and data storage infrastructure, as well as challenges in integration with existing systems (Crispeels *et al.*, 2020; Vogelsang *et al.*, 2019). Compatibility with existing technologies and processes is another challenge (Kutnjak; Pihiri; Furjan, 2019), which can result in significant changes in workflows that are difficult to manage (Ducro *et al.*, 2019).

Lastly, the introduction of new technologies can impact production and result in possible failures that may negatively affect results and lead to a loss of investment (Korbel *et al.*, 2019).

Planning

Poorly executed planning can be a significant barrier to a successful digital transformation implementation in heavy industries as it may result in a lack of focus and direction for the implementation process (Ducro *et al.*, 2019; Stich *et al.*, 2020). Without a clear plan and objectives, it can be difficult to determine the resources and schedules needed for implementation, leading to delays and a surplus of costs (Korbel *et al.*, 2019). In addition, poor planning can lead to a lack of alignment between different areas of the company (Fischer *et al.*, 2020), such as production, engineering, and logistics, resulting in a lack of coordination and cooperation during the implementation process (Jones; Hutcheson; Camba, 2021; Zapata; Berrah; Tabourot, 2020).

Indeed, good planning is crucial for the successful implementation of digital transformation (DT) in heavy industries (Ducro *et al.*, 2019). To fully leverage the benefits of Industry 4.0 technologies, companies must address the barriers that hinder their adoption. Limited resources (Raj *et al.*, 2020), lack of a comprehensive strategy for technological adoption (Eller *et al.*, 2020; Fischer *et al.*, 2020), lack of understanding of integration and system architecture, and misalignment of strategy and objectives can all be addressed through careful planning (Jones; Hutcheson; Camba, 2021; Mahboub; Sadok, 2022).

Defining a clear vision and strategy for DT adoption is essential (Zaoui; Souissi, 2020). This strategy should consider the company's goals, its available resources, and the technological solutions available to achieve those goals (Matt; Hess; Benlian, 2015; Verhoef *et al.*, 2021). By aligning strategy and objectives, companies can ensure that they invest in the right technologies to achieve the desired outcomes (Mahboub; Sadok, 2022; Raj *et al.*, 2020; Zaoui; Souissi, 2020). Prioritizing digital levers, such as automation, advanced analytics, and artificial intelligence, can help to optimize processes, reduce costs, and improve efficiency (Ducro *et al.*, 2019).

In addition to strategy development, companies need to consider their operational backbone when implementing DT. This requires a thorough understanding of the integration and system architecture required to support the new Technologies (Raj *et al.*, 2020). Companies need to assess their current infrastructure and identify the necessary upgrades and modifications

to support the new systems (Ducro *et al.*, 2019). This may involve updating software, hardware, or networks to ensure that they are compatible with the new technologies.

A lack of a comprehensive strategy for technological adoption can lead to the adoption of incompatible technologies, resulting in a fragmented digital landscape that is difficult to manage (Mahboub; Sadok, 2022). By taking a holistic approach to DT adoption, companies can ensure that their systems are fully integrated and compatible with each other (Hartl; Hess, 2017; Tumbas; Berente; Vom Brocke, 2017). This will enable them to leverage the full potential of their DT investments.

Moreover, companies need to recognize the importance of collaboration between different departments and stakeholders (Hanelt *et al.*, 2021; Tumbas; Berente; Vom Brocke, 2017). DT adoption requires a company-wide effort that involves different teams and departments (Hanelt *et al.*, 2021; Tumbas; Berente; Vom Brocke, 2017). This means that all stakeholders need to be involved in the planning and implementation of DT initiatives. Collaboration can help to ensure that all aspects of the business are considered and that the technology investments are aligned with the company's overall strategy and objectives.

Therefore, successful DT implementation in heavy industries requires careful planning that takes into account the company's goals, available resources, and available Technologies (Branca *et al.*, 2020; Zaoui; Souissi, 2020). Defining a clear vision and strategy, prioritizing digital levers, understanding integration and system architecture, and aligning strategy and objectives are all crucial elements that must be considered (Ducro *et al.*, 2019). By embracing these elements and working collaboratively, companies can successfully adopt Industry 4.0 technologies and unlock their full potential.

Culture

The implementation of digital transformation in heavy industries can be challenging due to various barriers (Noterdaeme *et al.*, 2018). One such barrier is the lack of a proper digital culture (Jones; Hutcheson; Camba, 2021), which involves cognitive barriers (Jones; Hutcheson; Camba, 2021), communication challenges (Fischer *et al.*, 2020), and the need for new roles (Eller *et al.*, 2020). Heavy industries have traditionally been characterized by stability and predictability, but the introduction of digital technologies requires a flexible and adaptable mindset (Hartl; Hess, 2017). Addressing cultural barriers can be crucial for the success of digital transformation efforts in heavy industries (Ducro *et al.*, 2019; Korbel *et al.*, 2019).

A McKinsey analysis (Noterdaeme *et al.*, 2018) shows that a proper culture is essential to implementing digital transformation (DT) in heavy industries. The analysis highlighted that talent is one of the critical enablers once it bridges the gaps between different skill groups.

To restructure the organizational model and view technology as a tool to be discussed after a clear definition of the DT objectives in heavy industries, a culture that values collaboration between different sectors of the company and enables effective communication is required (Fischer *et al.*, 2020; Hanelt *et al.*, 2021; Hartl; Hess, 2017). Strong leadership is essential to promoting the necessary cultural change and investing in digital skills development for employees to handle technology and understand how to use it to solve specific problems (Eller *et al.*, 2020; Hartl; Hess, 2017; Vogelsang *et al.*, 2019). Additionally, clear processes should be established for technology selection and implementation, based on their suitability to the objective and

the value they can bring to the company (Hanelt *et al.*, 2021; Jones; Hutcheson; Camba, 2021; Verhoef *et al.*, 2021). Overall, restructuring the organizational model to view technology as a tool requires cultural changes, investment in digital skills, and clear technology selection and implementation processes (Hartl; Hess, 2017; Jones; Hutcheson; Camba, 2021; Vogelsang *et al.*, 2019; Tumbas; Berente; Vom Brocke, 2017).

Then, to successfully implement digital transformation in heavy industries, it is essential to assemble a team with the right mix of skills and expertise (Hanelt *et al.*, 2021; Hartl; Hess, 2017; Tumbas; Berente; Vom Brocke, 2017). This team should include individuals who have a deep understanding of the industry and the business, as well as those with expertise in digital technologies. Developing a clear vision and strategy is also crucial, which outlines the goals and objectives of the transformation (Zaoui; Souissi, 2020; Zapata; Berrah; Tabourot, 2020). This vision and strategy should be communicated clearly and consistently throughout the organization, including to employees at all levels, customers, and stakeholders (Ducro *et al.*, 2019; Korbel *et al.*, 2019). Change management processes should also be in place to support significant changes. Specific initiatives should be prioritized and implemented to achieve desired outcomes. Progress should be continuously monitored, and adjustments made as necessary. A culture of continuous learning and improvement should be fostered to ensure adaptability, resilience, and innovation (Sağbaş; Erdoğan, 2022). Finally, feedback from stakeholders should be continuously integrated to ensure the transformation meets their needs and the organization remains on track.

Scaling digital transformation in industries is a complex endeavor that involves assembling the right team and implementing change management strategies (Hartl; Hess, 2017). Key steps to scale digital transformation include developing a clear vision and strategy, communicating it throughout the organization, embedding change management processes, prioritizing and implementing specific initiatives, monitoring progress and making adjustments, building a culture of continuous learning and improvement, and continuously integrating feedback (Hanelt *et al.*, 2021; Jones; Hutcheson; Camba, 2021; Vogelsang *et al.*, 2019; Tumbas; Berente; Vom Brocke, 2017). Assembling the right team with a mix of skills and expertise, including a clear leader with a vision for the transformation and people who have a deep understanding of the industry and digital technologies, is crucial (Hartl; Hess, 2017). A culture of continuous learning and improvement should be built to ensure adaptability, resilience, and innovation (Sağbaş; Erdoğan, 2022; Verhoef *et al.*, 2021). Continuous integration of feedback from employees, customers, and other stakeholders is essential to meet their needs and ensure that the organization is on the right track (Ducro *et al.*, 2019).

COMPETENCE CENTERS

As previously explained, we have summarized the barriers and enablers found in the literature into three factors. This simplification is intended to facilitate understanding and focus on actions that enable the successful implementation of digital transformation in industries. In many instances, those factors, found in the literature, are cross-functional, meaning they involve two or more departments of the studied organizations (Hanelt *et al.*, 2021; Stich *et al.*, 2020; Tumbas; Berente; Vom Brocke, 2017). This implies that the identified barrier or enabler will be overcome or accelerated if the actions are simultaneously performed across the involved departments

(Ducro *et al.*, 2019; Jones; Hutcheson; Camba, 2021; Mahboub; Sadok, 2022). Therefore, centralized management of these actions will be more efficient and effective (Stich *et al.*, 2020; Verhoef *et al.*, 2021). Additional studies (Hartl; Hess, 2017; Kutnjak; Pihiri; Furjan, 2019) have shown that enterprise-wide transformation (Bonnet, 2022) is a critical step for overcoming failures in the implementation of Digital Transformation (DT). Then, our recommendation for companies is to establish Centers of Competence, which will be accountable for driving the digital transformation strategy across the organization.

Our understanding is that Centers of Competence (CoCs) could play a critical role in ensuring the successful implementation of digital transformation (DT) initiatives in industries. These autonomous and dedicated units within an organization would be responsible for directing the necessary actions to diffuse the digital technology process.

The CoCs would act as a central point of contact for all DT-related activities within the industries, providing guidance and support for the implementation of DT initiatives. They must have a comprehensive understanding of the organization's processes, operations, and culture, then, leverage such knowledge to develop a tailored plan and strategy for the successful implementation of DT projects.

They collaborate with employees across the organization, providing training and development opportunities to upskill them in digital technologies and processes. By doing so, they create a workforce that is equipped with the necessary knowledge and expertise to support the organization in the expected technological changes.

Another critical function of the CoCs is to develop a comprehensive plan and strategy for the implementation of DT projects. They work closely with the organization's management to understand and align their goals and objectives, and then develop a roadmap for the successful implementation of DT projects. They ensure that the necessary resources, budget, and time are allocated appropriately and that the projects are delivered within the specified timeframe and budget.

Centers of Competence (CoCs) for heavy industries could be the ideal model for organizations seeking to synergize their solutions for technology architecture (TA), information technology (IT), Industry 4.0 (I4.0), and processes. By establishing CoCs, organizations can bring together these domains and processes under a single umbrella, allowing for better integration and collaboration. With CoCs in place, organizations can ensure that their technology-related solutions align with their strategic goals, resulting in a more efficient and effective operation.

Finally, the CoCs promote a culture of innovation and change within the organization. They raise awareness of the benefits of DT and provide support and guidance to employees throughout the organization. By doing so, they create an environment that is open to change and innovation, and that is willing to embrace new digital technologies and processes.

In summary, the CoCs can be essential for the successful implementation of DT in industries. They provide a central point of contact for all DT-related activities, develop the technical skills and knowledge required for successful implementation, and develop a comprehensive plan and strategy for DT projects. Therefore, those centers must have the ability to create actionable plans for overcoming or accelerating the barriers and enablers found in the literature, which were summarized in the three factors described earlier in this paper.

CONCLUSION

Digital transformation is a complex and challenging process for industries, and organizations must overcome various obstacles to successfully implement it. The 34 articles' literature review has shown the critical role of digital transformation in modern industries and the challenges they face during their implementation. We grouped the relevant barriers and enablers found in our review into three main factors identified as crucial to the success of digital transformation initiatives: operational barriers, bad planning, and lack of proper culture.

Establishing Competence Centers (COC) can be an important action to help organizations overcome these challenges, providing technical knowledge, developing a comprehensive plan, and creating a culture of innovation and continuous learning. Competent leadership with accelerator and harmonizer skills is critical to ensuring that COC's objectives are aligned with the organization's objectives and objectives.

Overall, COCs can be a valuable tool to help organizations overcome challenges and achieve their digital transformation goals. With careful planning and execution, organizations can take advantage of COC to successfully implement DT and achieve their goals. Thus, COCs represent an opportunity to address operational, planning, and cultural factors that can act as barriers to implementing DT initiatives and helping organizations navigate the complexities of digital transformation.

These results and suggestions from our study have relevant management implications, as careful planning and execution of digital transformation initiatives can lead to significant benefits for organizations.

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DATA AVAILABILITY

This study is based on a bibliographic review, and no new dataset was generated. The data supporting the study's findings are available in the referenced sources within the article.