


**A CONCEPTUAL FRAMEWORK FOR STUDYING FACTORS THAT INFLUENCE
DIGITAL TECHNOLOGY ADOPTION AMONG MANUFACTURING SECTOR:
LEADERSHIP EFFECTIVENESS AS A MEDIATING VARIABLE**

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ARTICLE INFO	ABSTRACT
<p>Article history:</p> <p>Received 24 March 2023</p> <p>Accepted 23 June 2023</p>	<p>Purpose: The objective of this study was to explore the current literature on the adoption of digital technology and emphasized the importance of leadership effectiveness in the E&E Manufacturing sector context.</p> <p>Theoretical framework: To examine how organizations will respond to introducing new technologies in manufacturing firms, this study established two mainstream management theories, the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI), to develop a conceptual framework.</p> <p>Design/methodology/approach: this study extensively reviewed the literature to identify the important factors influencing digital technologies adoption in the E&E manufacturing sector.</p> <p>Findings: This study sought to develop a conceptual framework within the context of E&E manufacturing companies and to identify the factors that influence the adoption of digital technology. This research indicates that leadership style and psychological traits appear to play a significant role in an organization's openness to new technologies.</p> <p>Research, Practical & Social implications: The study's findings may contribute to the manufacturing management practices in performing a more significant strategic role toward Industry Revolution 4.0 requirements.</p> <p>Originality/value: Considering the digital transformation, the leadership field needs more sensitive research in institutional and cultural contexts, focusing on how leadership effectiveness may mediate digital technologies adoption among organizations.</p> <p>Doi: https://doi.org/10.26668/businessreview/2023.v8i7.2484</p>
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**UMA ESTRUTURA CONCEITUAL PARA ESTUDAR OS FATORES QUE INFLUENCIAM A
ADOÇÃO DA TECNOLOGIA DIGITAL NO SETOR DE MANUFATURA: EFICÁCIA DA
LIDERANÇA COMO VARIÁVEL MEDIADORA**

RESUMO

Objetivo: o objetivo deste estudo foi explorar a literatura atual sobre a adoção da tecnologia digital e enfatizar a importância da eficácia da liderança no contexto do setor de manufatura de E&E.

Estrutura teórica: Para examinar como as organizações responderão à introdução de novas tecnologias em empresas de manufatura, este estudo estabeleceu duas teorias de gestão principais, o Modelo de Aceitação de Tecnologia (TAM) e a Difusão de Inovação (DOI), para desenvolver uma estrutura conceitual.

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Projeto/metodologia/abordagem: este estudo analisou extensivamente a literatura para identificar os fatores importantes que influenciam a adoção de tecnologias digitais no setor de manufatura de E&E.

Resultados: Este estudo procurou desenvolver uma estrutura conceitual no contexto das empresas de manufatura de E&E e identificar os fatores que influenciam a adoção da tecnologia digital. Esta pesquisa indica que o estilo de liderança e as características psicológicas parecem desempenhar um papel significativo na abertura de uma organização às novas tecnologias.

Implicações sociais, práticas e de pesquisa: As descobertas do estudo podem contribuir para que as práticas de gestão da manufatura desempenhem uma função estratégica mais significativa em relação aos requisitos da Revolução Industrial 4.0.

Originalidade/valor: Considerando a transformação digital, o campo da liderança precisa de pesquisas mais sensíveis em contextos institucionais e culturais, com foco em como a eficácia da liderança pode mediar a adoção de tecnologias digitais entre as organizações.

Palavras-chave: Adoção de Tecnologia Digital, Eficácia da Liderança, Alfabetização Digital.

UN MARCO CONCEPTUAL PARA ESTUDIAR LOS FACTORES QUE INFLUYEN EN LA ADOPCIÓN DE LA TECNOLOGÍA DIGITAL EN EL SECTOR MANUFACTURERO: LA EFICACIA DEL LIDERAZGO COMO VARIABLE MEDIADORA

RESUMEN

Objetivo: El objetivo de este estudio era explorar la bibliografía actual sobre la adopción de tecnología digital y destacar la importancia de la eficacia del liderazgo en el contexto del sector manufacturero de E&E.

Marco teórico: Para examinar cómo responderán las organizaciones a la introducción de nuevas tecnologías en las empresas manufactureras, este estudio estableció dos teorías principales de gestión, el Modelo de Aceptación de la Tecnología (TAM) y la Difusión de la Innovación (DOI), para desarrollar un marco conceptual.

Diseño/metodología/enfoque: Este estudio revisó exhaustivamente la bibliografía para identificar los factores importantes que influyen en la adopción de tecnologías digitales en el sector manufacturero de E&E.

Resultados: Este estudio pretendía desarrollar un marco conceptual en el contexto de las empresas manufactureras de E&E e identificar los factores que influyen en la adopción de la tecnología digital. Esta investigación indica que el estilo de liderazgo y las características psicológicas parecen desempeñar un papel significativo en la apertura de una organización a las nuevas tecnologías.

Implicaciones sociales, prácticas y de investigación: Las conclusiones del estudio pueden contribuir a que las prácticas de gestión de la fabricación desempeñen un papel estratégico más significativo en relación con los requisitos de la Revolución Industrial 4.0.

Originalidad/valor: Teniendo en cuenta la transformación digital, el campo del liderazgo necesita una investigación más sensible en contextos institucionales y culturales, centrada en cómo la eficacia del liderazgo puede mediar en la adopción de tecnologías digitales entre las organizaciones.

Palabras clave: Adopción de Tecnología Digital, Eficacia del Liderazgo, Alfabetización Digital.

INTRODUCTION

Emerging technologies have reshaped the global manufacturing industry. In the contemporary industrial environment, electrical and electronic (E&E) manufacturers in particular will gain from shrewd operational alliances with vendors and government initiatives that encourage and support the adoption and use of advanced development strategies and technologies. As a result, the study attempts to highlight the introduction of digital technology and possible factors affecting the digitalization of the E&E manufacturing sector from the perspective of leadership effectiveness. From the theoretical point of view, this research used the Technological Acceptance Model (TAM), and Diffusion of Innovation (DOI) to contribute

to the contemporary understanding of new technology functions and implementation in the E&E Manufacturing field. The study stressed the importance of leadership in providing a structure to incorporate emerging technology's role in changing fundamental shifts in the organization.

BACKGROUND

The convergence of emerging technologies and manufacturing promises to reshape the global manufacturing landscape. Electrical and electronic (E&E) makers, on the other hand, cannot be expected to 'go it alone' in this environment. Rather than that, companies will profit from intelligent operational relationships with suppliers and government programs that promote and support their adoption and usage of advanced development tactics and technology. Additionally, in light of the continually changing global development atmosphere, manufacturing firms must constantly examine their current technologies and procedures in order to remain successful and competitive (Hannibal & Knight, 2018; Madaan, Kaur, Gowda, Gujrati, & Uygun, 2023). The purpose of this study is to shed light on the influence of digital technology adoption in the E&E manufacturing industry through the lens of leadership effectiveness. Digital transformation and usage of technology generate value for as many stakeholders as possible (e.g., employers, employees, and consumers) in order to develop and gain the capacity to react fast to changing conditions (Goerzig & Bauernhansl, 2018). Digital transformation is not just about technology or disruption; it also involves the interests, efficiency, and aptitude of employees to adapt to the required intelligent use of technology and knowledge.

While digital technology transformation is most prevalent in manufacturing, it also affects other organizations, such as governments and public and private sector agencies that leverage current new technologies to address social concerns such as pollution and elderly populations. Additionally, through a statewide campaign in some nations, the digital technology revolution attempts to impact all sectors of life (Park & Hong, 2019). Although researchers have conducted extensive research on the relationship between E&E manufacturing companies and digital technology adoption, there are no conclusive findings because there appears to be a 'black box' effect in the relationship between E&E manufacturing companies and digital technology adoption. Earlier research (Macedo, 2017; Carlson et al., 2017) discovered inconsistent findings regarding the many factors of employee acceptance of digital technologies. Meanwhile, academics are encouraged to examine the intervening factors that

could boost the adoption of digital technology in order to see inside the 'black-box' of background relationships (Graham et al., 2015; Berry, 2016). Given this, it is a big issue to ensure that digital technology stimulates and promotes good business processes. Effective leaders are required to play a critical role in guiding E&E manufacturing enterprises toward digital technology implementation. Much scholarly discussion has focused on leaders' readiness to integrate digital transformation into their organizations while also urging staff to embrace the move, which is frequently perceived as a threat to the status quo (Li, Liu & Liu, 2016). Additionally, prior outcomes have divided and scattered the contribution of leadership and digitalization, posing new challenges for leaders in terms of organizational operational and management perspectives on digital technology adoption (Vidgen et al., 2017).

LITERATURE REVIEW

The various functions of the company need to play are underlined by the several theories formed to justify the organization's actions in different situations. Using some of these ideas to explore how organizations react to digital technologies adoption, Findlay and Thompson (2017) observed that many of those studies tend to focus “exclusively on a single disciplinary domain, whether it be organizational behavior, HRM, leadership, strategic management, finance and so forth.” To examine how organizations will respond to introducing new technologies in manufacturing firms in E&E and how they have multiple positions, this study established two mainstream management theories, the Technology Acceptance Model (TAM) and Diffusion of Innovation (DOI), to accomplish its objectives. Technology clusters help to define the thresholds for acceptance of technology (Rogers, 2003). Innovations which spread concurrently are often interdependent and should be regarded as such in adoption studies (Rogers, 2003). The initial adoption of technologies decreases confusion and improves the opportunity to leverage a digital medium (Rice & Katz, 2003). New research in information technologies appears to look at a technology in particular where users do not use related developments in functionality (Sawhney & Nambisan, 2007). From the practical standpoint, new technology or content solution, particularly one deemed a desirable substitute, will replace its comparable functionality (Chorna, Semenets-Orlova, Shyshliuk, Pugachov, & Pugachov, 2023). Technology clusters influence assumed technical characteristics (Leung & Wei, 1998) and technology usage motives (Gaul & Ziefle, 2009).

Relationship Between Perceived Usefulness and Digital Technology Adoption

Davis (1993) defined perceived usefulness as "a foreseeable user's subjective likelihood of boosting employees' job performance in an organizational environment through the usage of a particular application system." This concept demonstrates usability as the primary predictor of usefulness and purpose (Pynoo et al., 2012), as well as the degree to which an individual believes that the use of certain digital technology can increase their work efficiency (Davis, 1993). The importance of technology's perceived utility has long been recognized (Guriting & Ndubisi, 2006; Ajjan et al., 2008; Park et al., 2009). According to the writers, the arbitrary possibility that technology will alter the way a person does a task is positive. Gerrard and Cunningham (2003) stated that the alleged utility is entirely dependent on financial services such as bank checks, loan applications, utility bill payments, money transfers, and mutual fund information. There is much evidence that perceived usefulness affects intentions to adopt emerging technologies (Martins et al. 2014; Macedo, 2017; Chipeva et al., 2018). Thus, Navimipour and Soltani (2016) hypothesized that a crucial element affecting adaptation is the perceived utility of new technology. As a result, the more advantageous the new technology is perceived to be, the more likely it will be adopted by an organization. Using these data, the current study seeks to examine the direct relationship between perceived usefulness and digital technology adoption. Therefore:

P1: There is a significant relationship between perceived usefulness and digital technology adoption.

Relationship Between Perceived Ease of Use and Digital Technology Adoption

Calisir (2004) stated that the ease with which an innovation can be comprehended or employed could be construed as ease of use. According to Molinillo and Japutra (2017), employees view ease of use as a prerequisite for new technology adoption. Wingo et al. (2017) identified a similar relationship between perceived ease of use and employees' capacity to swiftly understand developing technology. He also observed that elements influencing an increase in digital activities include perceived ease of use, which combines simplicity with simple Internet connectivity, the availability of secure, high-quality electronic equipment, and the requirement for organizational resources. Extensive studies over the previous decade demonstrate the important impact of perceived ease of use on the intention to use, either directly or indirectly (Yu et al., 2017; Stone et al., 2015; Baird & Raghu, 2015; Moreno et al., 2015). Rogers discovered in 1962 that technical failure causes employees to modify novel activities

for ease of use. Son et al. (2015) recently demonstrated empirically that two important aspects of practical interfaces, namely perceived user-friendliness and perceived usability, have a major impact on the decision to introduce current technology. As a result of this study's proposal to investigate the direct relationship between perceived ease of use and acceptance of emerging technology, the second proposition is constructed:

P2: There is a significant relationship between perceived ease of use and digital technology adoption.

Relationship Between Perceived Cost-Effectiveness and Digital Technology Adoption

Dale and Plunkett (2017) defined cost-effectiveness as the degree to which someone believes it would cost more to use a particular gadget. Engaging in large-scale digital technology initiatives or establishing information technology infrastructure in the hardware and software realms is crucial to cost-cutting methods. In earlier phases of new technology adoption, while determining business investment strategies, the potential for perceived value for money for developing breakthroughs is gradually weighed (Osiro & Sevilla, 2015). While the company continues to run, manufacturing and life continue to evolve as a result of rising technologies; automation, artificial intelligence, and technical advancement are no longer universally viewed as a driver of success (Joda & Brägger, 2015). In comparison, as the number of automated or artificial intelligence-infused processes increases, human-centered processes continue to lag in terms of performance, optimization and perceived cost-effectiveness (Konstantakopoulos et al., 2019). Since the turn of the century, technological advancement has followed an upward trajectory, while worker morale has remained largely stable. The issue is complicated by a lack of user experience and projected cost efficiency in introducing new technology (Hickman & Silva, 2018). To establish cost efficiency, the business should do a cost-benefit analysis, comparing the costs of implementing innovative technologies, procedures, or policies to the advantages achieved (Navimipour & Soltani, 2016). Typically, a cost-benefit analysis considers the monetary expenses and future profits associated with new technology adoption. Cost-benefit evaluations, on the other hand, might be viewed as potential dangers for introducing new technology that may endanger personnel or result in non-monetary gain. Thus, the argument is designed to examine the direct relationship between perceived cost-effectiveness and the adoption of new technology, so contributing to the formulation of the third proposition:

P3: There is a significant relationship between perceived cost-effectiveness and digital technology adoption.

Relationship Between Perceived Effectiveness of Communication and Digital Technology Adoption

Dale and Plunkett (2017) defined cost-effectiveness as the degree to which someone believes it would cost more to use a particular gadget. Engaging in large-scale digital technology initiatives or establishing information technology infrastructure in the hardware and software realms is crucial to cost-cutting methods. In earlier phases of new technology adoption, while determining business investment strategies, the potential for perceived value for money for developing breakthroughs is gradually weighed (Osiro & Sevilla, 2015). Getting people to adopt a new technology perspective from the top down is critical for any organization, and it is the most difficult element. To begin, it is bureaucratic because it is ingrained in its culture (Moreno et al., 2015). Employees are notoriously resistant to change, as any business owner is well aware. Additionally, while the revolution of digital technology has already prioritized customer service, staff engagement must remain a priority (Hu & Kapucu, 2016; Sreenath, Parashuram, & Devlanaik, 2022). Second, people must value and operate in an environment that fosters and incorporates technological innovation. Third, communicate the company's values and how new technology adoption benefits employees (Kaya & Bozbura, 2023). According to Robinson et al. (2015), the value of workers is obvious and fosters an environment conducive to the seamless adoption of new technologies, since employees benefit from a transparent company. This type of ideal value alignment boosts competitiveness, stimulates innovation, and introduces new technology, most notably in areas undergoing an organizational upheaval.

On the other side, if employees believe they can support their company's mission statement, they develop an interest in their work and desire to do more. Employees who invest in their professions and job are also more likely to overcome self-imposed barriers to advancement (Huda et al., 2017). Thus, the purpose of this study is to examine the direct relationship between perceived effective communication and the performance of new technology, thereby contributing to the formulation of the fourth proposition:

P4: There is a significant relationship between the effectiveness of communication and digital technology adoption.

Relationship Between Digital Literacy and Digital Technology Adoption

Employees with digital literacy are capable of efficiently identifying, comprehending, and utilizing digital technology and facilities for the identification, navigation, control, incorporation, appraisal, comprehension, and synthesis of digital tools, as well as learning new skills, establishing media expression, and communicating with others in real-world contexts to facilitate positive social action (in which skill use contributes to innovation and creativity). Employees can contact and communicate with family and friends on a daily basis through digital networking, despite today's hectic schedules (Hu & Kapucu, 2016). Employees' digital learning is critical as a source of expertise for digital culture involvement. Lee and Wilkerson (2018) defined technical literacy as the ability to access and comprehend data in the digital age, emphasizing the importance of information technology as a "vital life skill." Technologically skilled individuals should retain sophisticated digital capabilities, the ability to define computer interfaces and computer network skills. Employees may participate in online forums and social media sites as part of their behavior rules.

The abilities required to succeed in a future global economy are going to change dramatically. There is a sea change occurring in business and educational culture, and governments throughout the world have begun to integrate digital education into school curricula (Colbert, Yee, and George) (2016). As a result, the current research proposes to examine the direct relationship between employees' digital literacy and their use of digital technology, resulting in the formulation of the fifth proposition:

P5: There is a significant relationship between perceived digital literacy and digital technology adoption

Relationship Between Leadership Effectiveness and Digital Technology Adoption

Researchers have just lately begun to investigate the theoretical implications of leadership effectiveness, which must affect workers as a result of increasing technologies (Colfax et al., 2009). Although scholars have explored the use of technology for leadership purposes, such as connection, for over a decade, a comprehensive paradigm for technology use in administration has not been formed (Avolio et al., 2001; Potosky & Lomax, 2014). Neufeld et al. (2010) discovered that employees' belief in successful interaction implies a chasm in their expectations of leaders' efficacy. Understanding communication network efficiency has an effect on the decision to incorporate new technologies into the leadership model. In reality, leaders and employees must work together to ensure the success of growing technologies within

an organization (Srivastava & Dhar, 2016). Additionally, requiring people to adopt a specific type of digital technology does not contribute to effective leadership if the digital technology is resistant (Robbins & Madrigal, 2019). Prior research has discovered that when leaders and staff do not collaborate, administration effectiveness varies significantly (Chamkiotis & Panteli, 2011). The contrast is that evolving platforms and additional considerations are required for both leaders and people to effectively embrace digital technology (Gazizadeh et al., 2012).

Additionally, the leader facilitates technical exchanges with employees due to the lack of face-to-face connection (Kohnke, 2017). Thus, the leadership effectiveness approach to leadership provides the solution to this challenge, as it encourages leaders to use technology to guide and inspire people to use emerging tools to help the business strengthen. As a result of this study's proposal to evaluate the direct association between leadership effectiveness and the use of digital technology, the sixth proposition is generated:

P6: There is a significant relationship between leadership effectiveness and digital technology adoption.

The Mediating Role of Leadership Effectiveness

Pikkarainen et al. (2004) discovered that when evaluating the usage of current technology, an information system's assumed utility was the most important factor. The adoption of new technologies was slightly higher than the expected correlation between the simplicity of use and digital technology adoption (Davis, 1989; Gutierrez et al., 2015). Despite this, it has been demonstrated that leaders have a substantial impact on how employees see new technology as advantageous and how they use it (Lymperopoulos & Chaniotakis, 2005; Zhang, Zhang, Sun, Lytras, Ordonez de Pablos, & He, 2018). Attitude represents potential employees' readiness to understand and can thus be positively associated with values and leadership effectiveness. By virtue of supposed value, scholars have discovered that the leader's activities indirectly impact the acceptability of emerging technologies (Baturay, et al., 2017; Teo et al., 2016). However, Lai and Yang (2009) argue that in a performance-based e-business framework, personnel is often strengthened to deliver success and incentives, rather than leadership quality. This suggests that the expected utility of positively influencing employees' attitudes about the introduction of new technology has an influence on their mindset, not on the effectiveness of leadership. It is necessary to confirm the effect of perceived usefulness on leadership effectiveness. It has been suggested that incentives and value interpretation are the key motivating factors in the sector's adoption of developing technology (Lederer et al., 2000;

Rojas-Ménde, 2000). This study seeks to investigate the seventh proposition, namely the mediating influence of leadership effectiveness on perceived usefulness and digital technology adoption, using these assertions.

P7: Leadership effectiveness mediates the relationship between Perceived Usefulness and digital technology adoption.

Often, it is assumed that perceived simplicity of use has a substantial impact on employee sentiments. The TAM separates two critical processes (auto performance and instrumentality) by which anticipated ease of use influences the actions and attitudes that contribute to practical use. The more straightforward the technology is to operate with, the more meaningful the employees' sense of usefulness (Bandura, 1982) and personal autonomy (Lepper, 1985; Lelkes, Sood, & Iyengar, 2017) in terms of their ability to execute the sequences of activities required for technology to function. However, leadership quality is a relatively recent development and is little investigated, despite growing awareness of leadership efficacy through the use of a digital technology paradigm. Corporate leaders may be at a competitive disadvantage if they do not receive training on how to harness developing technology to influence people (Hickman & Silva, 2018). However, a lack of a theoretical paradigm for emerging technology leadership performance might influence how digital technologies are implemented in a company (Bentley, 2017). Thus, the purpose of this study is to examine the mediating effect of leadership efficiency on perceived ease of use and digital technology adoption, thereby leading to the creation of eight propositions:

P8: Leadership effectiveness mediates the relationship between Perceived Ease of Use and digital technology adoption.

According to Van Laar, Van Deursen, Van Dijk, & De Haan (2017), some problems surrounding the application of emerging technologies are cost-effectiveness versus leadership. As expected, developing technology may be a significant expense for many firms, and the effectiveness of leadership in digital technologies is critical in determining an organization's success (Gutierrez et al., 2015). The corporation must decide whether the capital budget, given the extra value, or the money would be better spent elsewhere, is worth the investment in these emerging digital technologies (Keynes, 2018). This is also the primary reason for caution when it comes to developing technology.

On the other side, optimism about emerging advancements is the major factor that motivates a business to adopt technology (Jahanmir & Cavadas, 2018). According to several studies, leadership performance and actions are integrated into a single system (Alsajjan &

Dennis, 2010; Xu, Loi, & Ngo, 2016; Tareq, Khazaei & Khazaei, 2017). However, the attitude is influenced by a variety of antecedent characteristics, including technical skill, cognitive capacity, and confidence in the necessity for the technology. Additionally, leadership in digital technology is always developing in reaction to historical variables, such as gaining more understanding of how digital networks operate or discovering new digital technology applications (Bhattacharjee & Premkumar, 2004; Flores & Ekstedt, 2016). As a result, the more effective new technology is integrated into an organization, the more likely it will be used in a perceived cost-effective manner. Thus, this study aims to investigate the mediating effect of leadership effectiveness on perceived cost-efficiency and acceptability of digital technology, which resulted in the development of the ninth proposition:

P9: Leadership effectiveness mediates the relationship between perceived cost-effectiveness and digital technology adoption

The adoption of new technology occurs at the same rate as grapevines in an organization. However, as new technology is introduced, it is critical for all organizational members to communicate, understand and participate on the vision, priorities, and road map for this transformation (Moreno et al., 2015). Leaders must first consider the big picture and the variables influencing the organization's growing technology adoption and transition—then consider the methods and expertise necessary to push others in this direction (Levin, 2016). While communications are necessary for all types of leaders, a paradigm shift compels leaders to work more efficiently with all the employees (Kwiatkowski, 2017). The emphasis is on executives who develop policy strategies for implementing emerging technology and on those who assist their firms in integrating digital technologies and changing crucial business processes. With these facts and claims, this study advises evaluating the mediating effect of leadership effectiveness on perceived communication effectiveness and new digital technology adoption. This resulted in the ninth proposition:

P10: Leadership effectiveness mediates the relationship between perceived communication effectiveness and digital technology adoption.

Individuals who use technology and so transform their behavior are considered innovators (Bennett, 2010). Technological advancements alter how leaders and employees learn (Prior, Mazanov, Meacheam, Heaslip, & Hanson, 2016). The installation of technology has an effect on the leadership comprehension and acceptance of technology, altering the form and classification of adoption employed in education. As new technologies, digital literacy, and digital knowledge literacy developed, the format of information distribution transformed

(Selwyn & Facer, 2014). Digital literacy is a digital technology approach to learning activities that make use of ubiquitous and real-time technology (e.g., a management learning framework, curation software, web browsers, and Google Cloud Docs) to promote information sharing and digital literacy. This type of infrastructure makes use of web-enabled computers and incorporates cutting-edge technology (Brown et al., 2015; Velev, 2014; Khazaei, Wei, & Sulaiman, 2022). The ability to employ innovations for information analysis, assessment, development, and collaboration necessitates the acquisition of non-cognitive and technical abilities (Digital Literacy Taskforce, 2013). Digital literacy is distinct from computer skills in that it necessitates technical autonomy and leadership in order to comprehend the content offered by technologies and generate an instructive consequence (Adam-Turner, 2017; Belshaw, 2014). Since then, the emphasis has shifted to those leaders who design a strategy for introducing and promoting emerging technology and digital technologies in their sectors, thereby altering fundamental business processes. With these facts and justifications in hand, the eleventh proposition is advanced to test and strengthen the mediating effect of leadership effectiveness on perceived digital literacy and digital technology adoption:

P11: Leadership effectiveness mediates the relationship between perceived digital literacy and digital technology adoption.

METHOD

This study extensively reviewed the relevant literature to identify the important factors influencing digital technologies adoption in the E&E manufacturing sector.

DISCUSSION

This work aims to increase awareness of digital technology adoption and leadership effectiveness. The technology adoption topic has been extensively researched worldwide but examining the role of leadership is still in its early stages, especially in the manufacturing sector. This research proposal may assist researchers in properly outlining measures in planning, developing, and implementing the digital technology adoption in supporting the Industry 4.0 transformation in the manufacturing sector since digitalization has become more imperative over the last few years. This can be attained through efforts to reform digital technology adoption and its changes to create knowledge-based societies and enhance manufacturing sectors' digitalization. This will increase productivity and decrease human labor reliance and eventually move competitiveness forward.

Moreover, from the theoretical point of view, this research used the Technological Acceptance Model (TAM), and Diffusion of Innovation (DOI) to contribute to the contemporary understanding of new technology functions and implementation in the E&E Manufacturing field. The importance of leadership was needed to provide a structure to incorporate emerging technology's role in changing fundamental shifts in the digital age. Moreover, the convergence of these viewpoints is supposed to provide a foundation for emerging technology management, not only by automating and digitizing conventional production management functions but also by redesigning those functions based on modern digital market thought, based on people and performance.

Finally, from the practical contribution standpoint, manufacturing needs to address the current workforce challenges and maximize opportunities. Leaders need to reorient their practices towards attracting, developing, and retaining digital-savvy talents, developing a culture that embraces innovation, agility, productivity, and accountability to transform the way the manufacturing sector operates in the new digital environment.

CONCLUSION

This study aimed to develop a conceptual framework in the context of E&E manufacturing companies and described the factors that affect digital technology adoption. It proposes a conceptual foundation for examining factors that influence the use of digital technology in E&E manufacturing firms. This study suggests that leadership style and psychological characteristics appear to play a significant role in an organization's receptivity to new technologies. Thus, this study contributed to closing the literature gap by examining the relationship between E&E manufacturing and digital technology adoption through the lens of leadership effectiveness and gaining a better understanding of the important factors that might impact the adoption of digital technology. This study contributes to the theory and practice. Providing an overview of digital technology adoption in the manufacturing industry by summarizing the study results to demonstrate evidence on a meta-level and identify areas in which additional research is required, which is an essential step in developing theoretical frameworks and conceptual models. However, only portraying the literature might limit the thoroughness of the study. Therefore the results of this study can be useful for future studies to analyze the factors in the proposed framework to study digital technology adoption, specifically in the manufacturing industry.

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