Volume: 10 Issues: 76 [September, 2025] pp. 712 -719
Journal of Islamic, Social, Economics and Development (JISED)
eISSN: 0128-1755
Journal website: www.academicinspired.com/jised
DOI: 10.55573/JISED.107654

EXAMINING THE APPLICATION OF THE TECHNOLOGY ACCEPTANCE MODEL (TAM) IN INDUSTRY 5.0 ADOPTION: AN EARLY OUTLOOK

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Article history
Received date : 11-7-2025
Revised date : 12-7-2025
Accepted date : 7-9-2025
Published date : 25-9-2025

To cite this document:
Ahmad, N. A. F., Muhamad, M. Q. B., Abdullah Thani, A. K., Rosely, N., Ismail, A. N. N., & Nik Mohd Zainordin, N. M. S. (2025). Examining the application of the Technology Acceptance Model (TAM) in Industry 5.0 adoption: An early outlook. *Journal of Islamic, Social, Economics and Development (JISED),* 10 (76), 712 – 719.

Abstract: *Business has grown rapidly in recent decades due to globalization and advancements in technology, especially in information technology (IT). Humanity is on the brink of a major technological shift that will transform how people live, work, and communicate—something never seen before. Manufacturing companies are currently transitioning into what is known as Industry 4.0. However, a new phase called Industry 5.0 is emerging, where humans and machines are working closely to create customized products and services that meet customer needs. As Industry 5.0 continues to expand, more research is needed in this field. Understanding how organizations perceive the usefulness and ease of using new technology is crucial for technology adoption. This study explores Industry 5.0 by focusing on how organizations decide to implement it, using the Technology Acceptance Model (TAM). The TAM model has been widely used in previous studies to analyze factors influencing the adoption of new technology. The insights from this research are valuable across multiple fields.*

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Keywords: *Industry 5.0, Industry 4.0, TAM Model, Technology Adoption, Personalization*

Introduction

Industry 5.0 is a new way of manufacturing that focuses on meeting each customer's specific needs. While Industry 4.0 allowed companies to customize products for many people, it was not enough because today's customers want highly personalized products on a large scale. To meet this demand, Industry 5.0 is moving from mass customization to mass personalization (Dalal et al., 2023). It helps industries create more specialized products using advanced technology. This change is driven by new technological developments and the growing need for sustainable practices, which have become a key goal for businesses.

Industry 5.0 has a major impact on businesses and society. Businesses must adapt to new technologies and processes that emphasize human interaction and collaboration. This involves changing traditional business structures, encouraging innovation culture, and managing digital knowledge excellently (Ting, 2023; De Felice and Petrillo, 2024). To remain competitive, businesses must actively engage with employee and customer feedback to enhance products and services while investing in workforce training programs to develop essential digital competencies.

Historically, the first Industrial Revolution introduced machines powered by water and steam. The second Industrial Revolution involved electricity and mass production, while the third has brought the rise of information and communication technology (ICT). Then came Industry 4.0, which focused on automation and smart technology, leading to the current era of Industry 5.0 (Daimari et al, 2024). The figure below illustrates the phases of industrial revolutions.

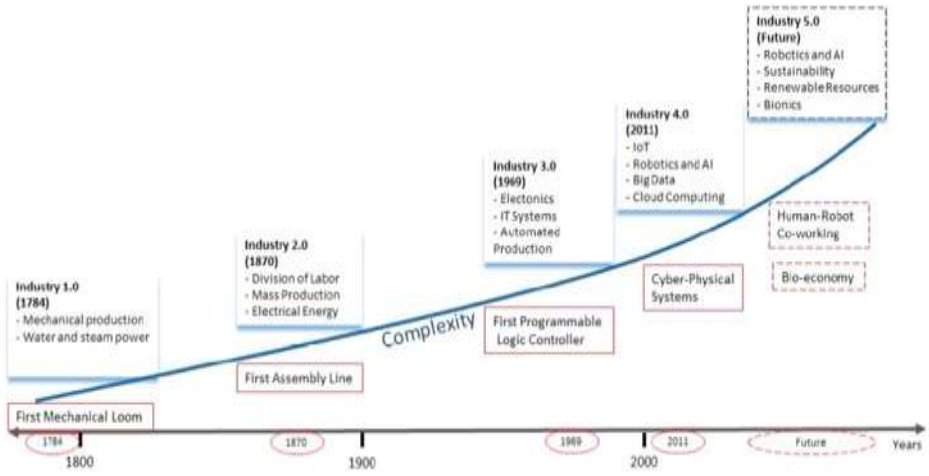

Figure 1: Phases of the Industrial Revolutions
Source: (Demir et.al, 2017)

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Research Objectives

(i) To analyze organizations' intentions to adopt new technology of Industry 5.0 by using the technology acceptance model (TAM).
(ii) To study perceived usefulness influences towards the organizations' intention of adopting Industry 5.0 technology.
(iii) To study perceived ease of use influences towards the organizations' intention of adopting Industry 5.0 technology.

Literature Review

Industry 5.0

Industry 4.0 and Industry 5.0 differ significantly. Although Industry 5.0 is based on the advancements of Industry 4.0, they are two different concepts. Industry 4.0 focuses on automation and robotics, whereas Industry 5.0 emphasizes collaboration between humans and smart machines. According to Tunji-Olayeni et al. (2024), Industry 5.0 integrates human and environmental factors into industrial production while using digital technologies to improve efficiency, productivity, and increase profits. In other words, Industry 5.0 moves beyond automation by incorporating human intelligence and sustainable practices into manufacturing.

Building on past revolutions, this new concept not only improves technology but also focuses on making life better, protecting the environment, and considering ethical issues. Industry 5.0 uses artificial intelligence (AI), the Internet of Things (IoT), and other modern technologies to create solutions that are smart, effective, responsible, and eco-friendly (Rame et al., 2024). To stay competitive, businesses need to accept change, take risks, work together, and stay flexible in the digital world. Many researchers have studied Industry 5.0, looking at its technological aspects, impact on the economy, and potential for new ideas (Haddad et al. 2022; Hu, Wei, & Chang, 2022; J. Z. Wang et al., 2023 & Wen et al., 2023).

Although Industry 4.0 has transformed businesses through automation and smart technologies, the emergence of Industry 5.0 promises a new paradigm where human–machine collaboration drives mass personalization and sustainable production. Yet, the literature does not always agree. For example, while Haddad et al. (2022) and Hu et al. (2022) emphasize the technological and economic benefits that Industry 5.0 could bring, Madsen and Berg (2021) caution that its visibility is still overshadowed by the dominance of Industry 4.0 research. This contrast shows that, although Industry 5.0 is often described as the "next revolution," its real-world adoption and scholarly attention are still uncertain. This makes it important to move beyond broad descriptions and begin testing, through empirical studies, what actually drives organizations to adopt it.

Despite its potential, the adoption of Industry 5.0 remains uncertain, particularly in developing economies such as Malaysia, where organizations are still consolidating Industry 4.0 practices. Most of the existing research on Industry 5.0 is conceptual in nature, focusing on frameworks, theoretical debates, and futuristic visions (Madsen et al., 2023 & Rame et al., 2024).
However, there is limited empirical testing to understand how organizations actually perceive and adopt Industry 5.0 technologies in practice. Moreover, while the Technology Acceptance Model (TAM) has been extensively applied in studying the adoption of technologies in different contexts (Davis, 1989; Chuttur, 2009; Holden & Karsh, 2010; Lai, 2017), there is a

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lack of studies applying TAM at the organizational level in relation to Industry 5.0 adoption. Addressing this gap is critical because organizational decision-making differs from individual adoption, involving structural, cultural, and strategic considerations.

Thus, this study attempts to fill this gap by applying the TAM framework to examine organizational intentions to adopt Industry 5.0, focusing on perceived usefulness and perceived ease of use as determinants of adoption in Malaysia's service sector.

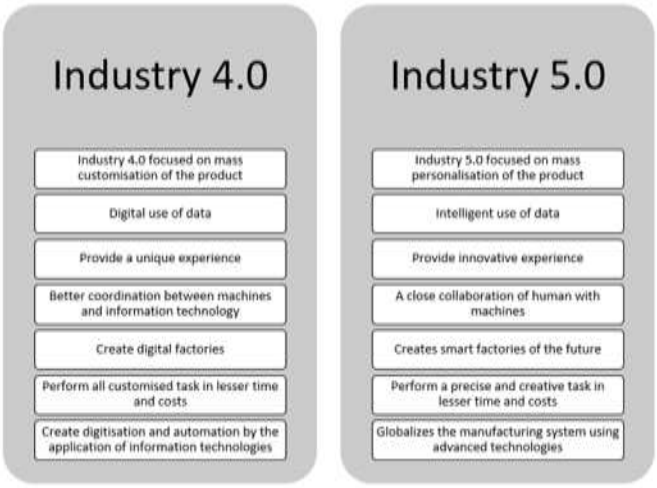

Figure 2: Major Difference between Industry 4.0 and Industry 5.0
Source: (Javaid & Haleem, 2020)

Technology Acceptance Model (TAM)

The original Technology Acceptance Model (TAM) was developed by Davis in 1989 to identify factors that influence the adoption of new technologies in organizations and understand why users accept or reject them. The model suggests that when people encounter new technology, various factors affect their decision on how and when to use it. Over time, TAM has been modified and expanded to provide deeper theoretical and practical insights (Kruger & Steyn, 2024). These modifications have made TAM valuable for predicting technology adoption in both individual and organizational settings, with studies supporting its effectiveness. TAM is one of the most widely used theories for understanding technology acceptance (Chuttur, 2009; Holden & Karsh, 2010; Lai, 2017). It is based on two key factors: perceived usefulness and perceived ease of use, which influence a person's actual use or intention to adopt a technology (Mlekus et al., 2020).

Perceived usefulness

Perceived usefulness is how much a person thinks a certain technology will help them do their job better (Davis, 1989). According to Kim et al. (2021), perceived usefulness directly affects people's willingness to use new technology. Individuals decide whether to use a technology based on how much they believe it will help them perform their tasks more effectively. This suggests that users' perceptions of a technology influence their attitudes toward adopting it, whether positively or negatively. Previous research on the TAM model has also shown a strong link between perceived ease of use and a person's intention to adopt technology. Based on these findings, this study proposes the following hypothesis:

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H1: Perceived usefulness positively influences organizations intention of adopting Industry 5.0 technology.

Perceived ease of use

Perceived ease of use refers to how easy and convenient a person thinks it is to use a technology (Yu et al., 2024). Davis (1989) explains that people are more likely to accept a technology if it is simple to use. While perceived usefulness directly influences a person's intention to adopt a technology, perceived ease of use plays an indirect role by shaping their attitude toward it. Research has consistently shown that perceived ease of use positively impacts users' adoption of technology and behaviour (Lanlan, Ahmi & Popoola, 2019). Based on this understanding, this study hypothesizes the following:

H2: Perceived ease of use positively influences organizations intention of adopting Industry 5.0 technology.

This study adopts the following research model:

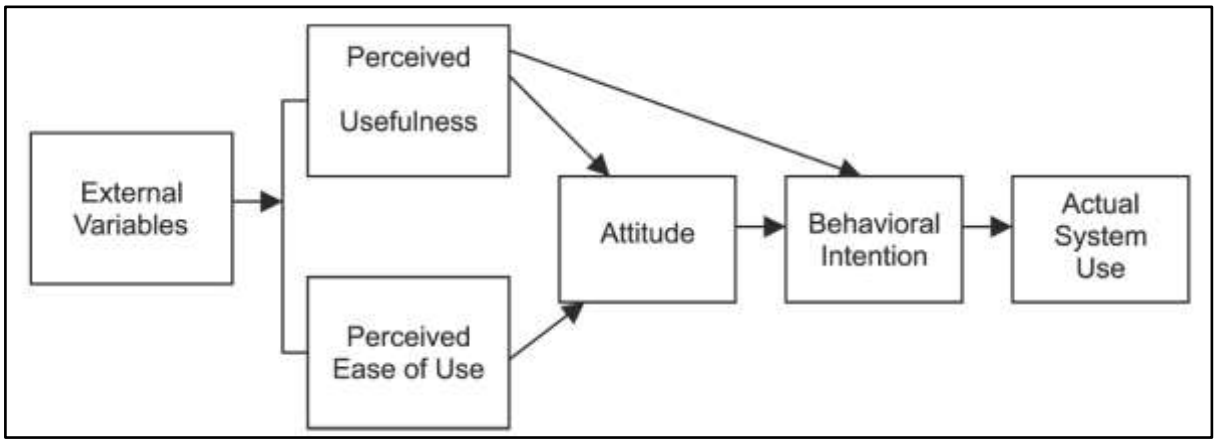

Figure 3: Technology Acceptance Model (TAM)
Source: (Davis, 1989)

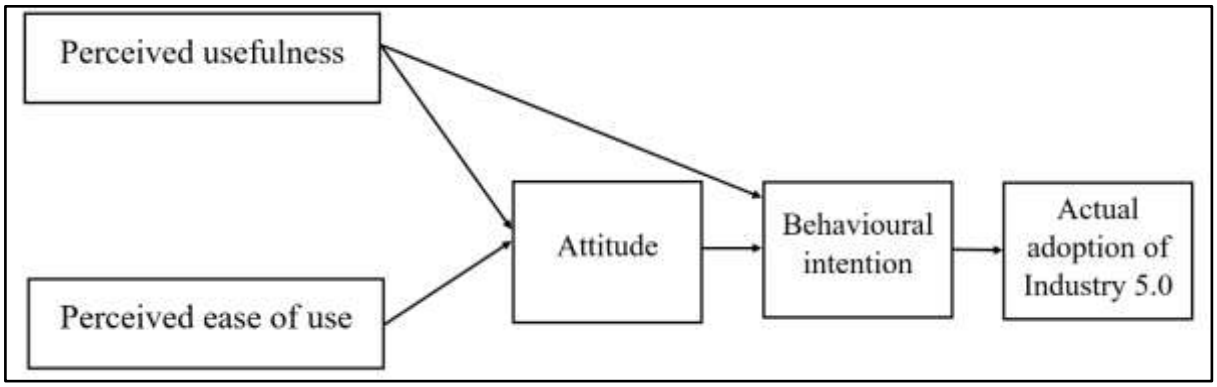

Figure 4: Conceptual model of the research adapted from Davis (1989)

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Methodology

This study focuses on registered service companies in Malaysia as its target population. This sector was selected because, according to the Department of Statistics Malaysia (2024), the services industry contributed the most to the country's GDP, accounting for 59.2% in 2023. A total of 350 questionnaires will be circulated through online surveys. The measurement items for the study's variables are derived from previous research and adapted to suit this study's context. Each construct will be measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree, as widely recommended in organizational and management research. The analysis will be conducted in several stages, beginning with an assessment of the demographic profile using frequency, mean, and standard deviation. Selecting the appropriate analytical tool is crucial for building an effective model. Therefore, this study will utilize partial least squares structural equation modeling (PLS-SEM) to analyze the data, using causal-predictive model assessment, variable validation, and hypothesis testing (Hair et al. 2021).

Future Research

Due to the limited sample size and scope of this study, it provides a solid foundation for future large-scale research. Future studies can expand on the proposed model and test it with a larger sample to validate the findings on a global level. Additionally, conducting longitudinal or ethnographic research during the ongoing development of Industry 5.0 would offer valuable insights into its adoption over time. These suggested studies will help refine future hypotheses.

Continuous validation of the current framework is essential to keep pace with technological advancements. As technology adoption evolves, the TAM model will remain a valuable tool for researchers to gain deeper insights. Future research can explore additional influencing factors while considering the appropriate research context. Given the limited studies on Industry 5.0, further research should incorporate various adoption theories to support the growth of different disciplines.

Conclusion

As far as the authors know, this study is one of the first to use the TAM model to explore why people want to adopt technology Industry 5.0, which marks as an important addition to the research in this area. Industry 5.0 provides organizations with practical advantages, such as customizing products and services to meet customer needs, enhancing supply chain efficiency, delivering personalized services at a lower cost, and improving digital solutions for better service quality. This study is primarily conceptual, which aims to analyze organizations' readiness to adopt Industry 5.0 technologies by using the TAM model as its guiding framework.

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