UNDERSTANDING AI ADOPTION AT ORGANIZATIONS: LITERATURE REVIEW OF TOE FRAMEWORK

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ABSTRACT

Purpose- In the contemporary business landscape, we are witnessing the rapid development of Artificial Intelligence (AI), which is fundamentally reshaping organizational practices. These developments mark what can be described as the **"Era of AI"**, a significant milestone in technological history. While AI offers benefits, it also presents critical challenges, particularly concerning its adoption and the adaptation processes within organizations. Despite the swift evolution of AI technologies, research on their practical applications in organizational settings remains scarce and underdeveloped. This gap highlights a promising area for further exploration.

In alignment with the literature, it can be argued that organizations with higher AI adoption rates tend to achieve better innovation outcomes, which suggests a need to revisit and potentially expand the Technology-Organization-Environment (TOE) paradigm. Originally developed to explain technological adoption/embracement, the TOE framework may not capture the complexities introduced by AI. This study aims to explore whether an expanded TOE paradigm is necessary to better address the contemporary dynamics of AI adoption.

Methodology- This research investigates the historical development and consolidation of AI within organizations, using the TOE paradigm as a foundational theoretical look. The study examines whether the existing TOE model sufficiently explains AI adoption or whether it requires augmentation to remain relevant in the age of generative AI.

Findings- Literature review findings indicate that the traditional TOE framework exhibits limitations when applied to AI adoption. To address these gaps, another study was found in the literature that proposes the inclusion of a human factor—transforming the TOE into a TOEH (Technology-Organization-Environment-Human) model. In our research we would like to integrate critical thinking (CT) skills under Human Factor, as organizations increasingly seek employees who can critically assess and effectively utilize outputs from generative AI (GenAI) tools. The ability to make intelligent and ethical decisions in the context of AI is now a vital competency.

Conclusion- The proposed TOEH framework offers a more well-rounded approach to discovering AI adoption within organizations. By incorporating the human element, particularly critical thinking skills, organizations can better prepare to embrace AI in an ethical, effective, and innovative manner.

Keywords: TOE, organizations, artificial intelligence, innovation, critical thinking
**JEL Codes:** G12, G14, C22

1. INTRODUCTION

In the contemporary business landscape, there is an increasing focus on the rapid advancements in Artificial Intelligence (AI). AI is redefining organizational practices in essence. While AI exhibits numerous advantages, it also gives rise to considerable challenges, especially with regard to its adoption within organisations. In spite of the rapid advancement of AI technologies, investigation on their implementation in organizational domains remains insufficient. Studies concerning the utilization of AI in organisations have been insufficient. The procedure of evaluating organisations is facilitated by the incorporation of TOE (Technological, Organizational and Environmental) elements. TOE paradigm is organization-based theory, yet it evolved day by day. This framework helps us to frame AI adoption in organisations. In addition, today's organisations need to be ready to adopt this technology first. We will be discussing AI readiness and adoption literature in the following parts.

2. LITERATURE REVIEW

The designation AI was primitively coined by McCarthy in the year of 1956 (Russel & Norvig, 2010; Taşçı & Çelebi, 2020) and the formal birth of AI was agreed unanimously to be the Dartmouth Conference in the same year (Cordeschi, 2007). AI is a kind of technology designed to ensure robots and act in a human-like manner (Sucu, 2019). The growing role of AI in digital transformation emphasizes the necessity for organizations to evaluate their AI readiness (Andersson, 2025). The readiness/preparedness of an organization makes AI adoption increases its potential for successful adoption (Jöhnk, WeiBert & Wyrtki, 2021). AI readiness/preparedness mentions to an institution's capacity to adopt/embrace AI technology. It enables to progress organization's value (Neumann et al. 2024; Ali & Khan, 2025). It is apparent that organisational readiness largely influences organisational embracement (Sun et al. 2018). A large number of enterprises are not properly ready to adopt AI (Tehrani et al. 2024). Research related with AI preparedness/readiness and AI embracement/adoption is in its early stages. That is, there is paucity of existing literature on the embracement of AI (Jöhnk, WeiBert & Wyrtki, 2021). The TOE model shown below Figure 1, signifies a component of this procedure-namely, the way in which the firm structure impacts the espousal and administration of innovations (Tornatzky, Fleischer & Alok, 1990).

Figure 1: The TOE Model
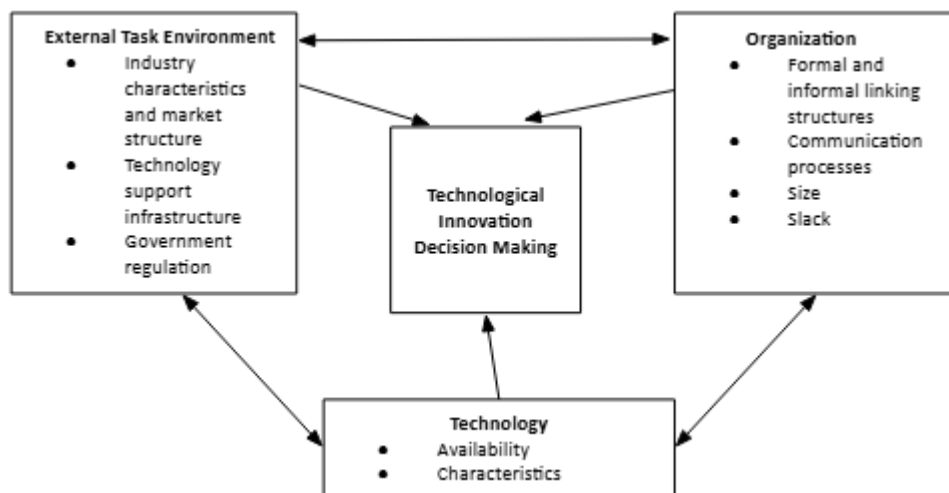
Although TOE explores technology deployment through the angles of technology, organization and environment, TOEH additionally incorporates human aspect. This human-centric emphasis is vital for evaluating an organisation's preparedness for AI adoption (Naheed, Pinto & Pirola, 2025) is shown below in Figure 2.

Figure 2: The TOEH Framework
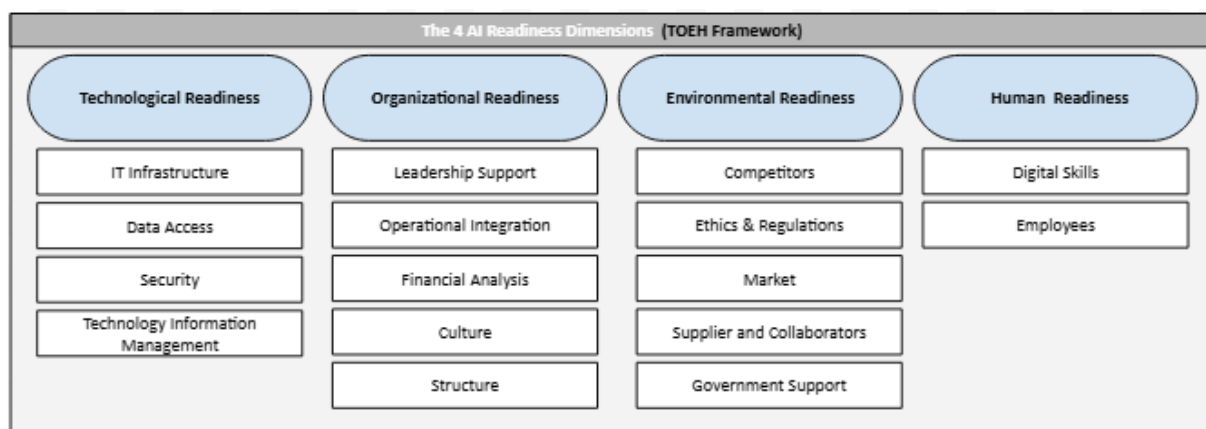
3. METHODOLOGY

The research question of this paper is "How can companies adopt to AI in today's businesses? The study examines whether the existing TOE model sufficiently explains AI adoption or whether it requires augmentation to remain relevant in the period of generative AI. That is, the literature review will be focused on clarifying references related to the article's hypotheses and variables such as independent, dependent

and mediator. Afterwards, comprehensive literature review findings assisted to prepare a proposed model. More detailed information regarding the literature is illustrated in Findings section of the paper Table 1. A Summary of the Literature Review.

4. FINDINGS

The literature review revealed inadequacies in the conventional TOE framework when applied to AI adoption. To resolve these gaps, further study was found in the literature mentioned earlier. This advocated for the reorganization of TOE into TOEH (Technology-Organization-Environment-Human) model. In our analysis, we want to blend critical thinking (CT) skills under the human factor, because organizations are ever-increasingly seeking employees who can skillfully evaluate and employ the outputs from GenAI (Generative AI) tools. The ability to make ethically-driven decisions in the paradigm of AI is now a vital competence. Technological, organizational, environmental and human readiness identified AI readiness. It means that organizations are ready for AI. They they may achieve a successful adoption of AI in their organizations. Figure 3 shown below illustrates how the authors utilize the TOEH Framework to analyze AI readiness and AI adoption. The literature review provided the foundation for this framework.

Table 1: A Summary of the Literature Review

Variables	Types of Variables	Hypotheses	Sources
IT Infrastructure	Independent Variable (X_1)	**H1:** IT Infrastructure positively relates to AI readiness.	Jöhnk, Weibert & Wyrtki, 2021; Alsheibani, Cheung & Messon, 2018; Ali & Khan, 2025; Bhattacherjee & Hikmet, 2008; Naheed, Pinto & Pirola, 2025; Felemban, Sohail & Ruikar, 2024.
Security	Independent Variable (X_2)	**H2:** Security positively relates to AI readiness.	Jöhnk, Weibert & Wyrtki, 2021; Coetzee, 2025; Naheed, Pinto & Pirola, 2025.
Data Access	Independent Variable (X_3)	**H3:** Data access positively relates to AI readiness.	Jöhnk, WeiBert & Wyrtki, 2021; Ali & Khan, 2025; Stenberg & Nilsson, 2020; Coetzee, 2025; Naheed, Pinto & Pirola, 2025.
Leadership Support	Independent Variable (X_4)	**H4:** Leadership support positively relates to AI readiness.	Jöhnk, Weibert & Wyrtki, 2021; Alsheibani, Cheung & Messom, 2018; Ali & Khan, 2025; Stenberg & Nilsson, 2010; Coetzee, 2025; Naheed, Pinto & Pirola, 2025; Baslom & Tong, 2019; Lokugeetal, 2019; Tursunbayeva & Gal, 2024.
Financial Analysis	Independent Variable (X_5)	**H5:** Financial analysis positively relates to AI readiness.	Jöhnk, Weibert & Wyrtki, 2021; Ali & Khan, 2025; Jun et al. 2021; Srisathan & Ketkaew, 2020; Naheed, Pinto & Pirola, 2025.
Culture	Independent Variable (X_6)	**H6:** Culture positively relates to AI readiness.	Jöhnk, Weibert & Wyrtki, 2021; Nortje & Grobbelaar, 2020; Naheed, Pinto & Pirola, 2025; Morandini et al. 2023.
Competitors	Independent Variable (X_7)	**H7:** Competitors positively relates to AI readiness.	Nortje & Grobbelaar, 2020; Naheed, Pinto & Pirola, 2025.
Ethics & Regulation	Independent Variable (X_8)	**H8:** Ethics & regulation positively relate to AI readiness.	Jöhnk, Weibert & Wyrtki, 2021; Coetzee, 2025; Naheed, Pinto & Pirola, 2025.
Government Support	Independent Variable (X_9)	**H9:** Government support positively relates to AI readiness.	Nortje & Grobbelaar, 2020; Naheed, Pinto & Pirola, 2025; Shonhe, Min & Phut ,2024; Felemban, Sohail & Ruikar, 2024.
Knowledge About AI	Independent Variable (X_{10})	**H10:** Knowledge about AI positively relates to AI readiness.	Jöhnk, Weibert & Wyrtki, 2021; Naheed, Pinto & Pirola, 2025; Jokinen, 2025; Tursunbayeva & Gal, 2024.
Willingness to Learn	Independent Variable (X_{11})	**H11:** Willingness to learn positively relates to AI readiness.	Naheed, Pinto & Pirola, 2025; Morandini et al. 2023; Jaiswal, Arun & Varma, 2023; AlRadini et al. 2022; Yurt & Kasarci, 2024.
Critical Thinking Skills	Independent Variable (X_{12})	**H12:** Critical thinking skills positively relate to AI readiness.	Pandey, Rathore & Dubey, 2025; Oloyede, 2025; Moppett, 2025; Baskara, 2025; Barreras, 2025.
AI Readiness	Mediator Variable (M)	**H13:** AI readiness positively relates to AI adoption.	Jöhnk, Weibert & Wyrtki, 2021; Naheed, Pinto & Pirola, 2025; Mabad et al. 2021; Jokinen, 2025; Felemban, Sohail & Ruikar, 2024; Sjöberg & Schill, 2023; Muhyi et al. 2024.
AI Adoption	Dependent Variable (Y)		Jöhnk, Weibert & Wyrtki, 2021; Naheed, Pinto & Pirola, 2025; Felemban, Sohail & Ruikar, 2024; Sjöberg & Schill, 2023

Figure 3: Understanding AI Readiness & AI Adoption By Using TOEH Framework

4.CONCLUSION

The TOEH framework expands upon existing models by offering a more elaborated path to discovering AI adoption/embracement in organizations. This is achieved by integrating the 'H' – the human factor, particularly critical thinking (CT) skills – which are essential for organizations to effectively embrace AI.

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