

# A Conceptual Study of TOE and Organisational performance

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**Abstract:** The COVID-19 pandemic has changed everything and created a big challenge for all the enterprises including the SME's. The use of technology becomes crucial for the survival of the business activities because the mode of payment and receiving mostly shifted towards the digital method. However, the SME's sector still facing the challenge of technology adoption particularly in the native areas. The basic motive of this research is to examine previous studies to find the role of technology, organisation and environment (TOE) in organisational performance. This study analysed various theories of technological innovation while focusing the theory of TOE. The main factors studied in this research are the Technological, environmental and organisational variables. This research study will follow the qualitative research method. In this research study we have followed the systematic "Meta-narrative" of literature review method introduced by Kuhn. To study and find the relevant article we have used the key words of SMEs, TOE, technology and adoption. Moreover, the study period covered in this research was from 2011 to 2023. This study highlights the important aspect of TOE and its application in SMEs. Moreover, this research contributes in the theoretical understanding of SMEs success factors while critically studying the theory of TOE.

**Key words:** SMEs, TOE, Technology & Digitalisation

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## 1. Introduction

A study of the World Bank (2022) acknowledged the importance role of Small and Medium Enterprises (SMEs) in all over the world, particularly in the developing and emerging countries. SMEs has a dual role in the economic development, on the one side it creates business opportunities and in the other side it creates new jobs openings. Moreover, it has a vital role in fostering domestic economies and emerged as the main contributor of local businesses. According to Cahyono et al., (2022) the SMEs sector contribution in the national economy is approximately 37% of the total gross domestic product (GDP). As suggested by Muhammad et al., (2021), the local SMEs can further accelerate and advance their business while applying the new technological advancement like online business, mobile payment and industry 4.0 technology. However, "Technological-Organisational Environmental" (TOE) research identified that adoption of Industry 4.0 suggest SMEs must be better prepared and need to consider the practical challenge of the implications. This advance readiness is necessary to move the economy to the next structural cycle of the economy (Prasanna, 2019).

Research on the relationship between Technological-Organisational Environmental (TOE) influences the adoption of Industry 4.0, which has increased in developing expertise and continuously pushed businesses to upgrade to new technology in recent years (Nguyen & Luu, 2020). Another study primarily focused the SMEs sector, revealed that most of the technological adaptation decisions are centralised and mainly in the hand of the business owners (Jayashree et al., 2020). According to Trotta & Garengo, (2018) the benefits of technological adoption is recognised everywhere however, there is still lack of industry 4.0 technological implementation due to insufficient theoretical understanding. Currently SMEs are having to face many challenges and barriers when they try to adopt the advanced technological innovations. Hence, the SMEs sector faced some specific challenge as compared to the big industries (Muhamad et al., 2021).

The adaptation of Technological-Organisational Environmental (TOE) framework continuously becoming a challenge for small enterprises particularly in suburbs and rural areas in Malaysia Tien et al., 2020). Small and Medium-sized Enterprises (SMEs) in Malaysia still need to develop competitive advantages based on the adequate and intensive use of information systems (IS) which are essential sources of innovation and success in today's market (Erind, 2015). The success of the SMEs heavily dependent on the smart and timely adoption of new technologies in their business activities. During the covid-19 every organisation realised the true need and importance of technological usage. SMEs must adopt the infusion of automation and digital practices embedded in Industry 4.0 to remain competitive and innovative in the market. Benefits of SMEs adopting TOE are increased productivity, increased efficiency of internal business operations, and more easily and cheap connection to external contacts (Thaha et al., 2022). Various researchers also listed benefits such as

increased complexity, compatibility, information technology capabilities, and technological competencies, business competitiveness, vertical integration with other related businesses, stakeholders, and institutions, improved networking with other parties, and support from the government and environmental dynamics (Sugandini et al., 2020). The Technology Organisation Environment (TOE) is a general framework that identifies various factors that influence organisational technology adoption (Chong & Olesen, 2017).

Previous research was mainly carried out in the domain of quantitative research; however, this research studied the important aspect of qualitative research as suggested by (Trotta & Garengo, 2018). Moreover, Salimon et al, (2023) further suggested to conducted a qualitative and mix-method research on the SMEs performance with respect to TOE. Hence, this research conducted a comprehensive review of the relevant literature on the TOE and SMEs performance in viewing the rural setting of Malaysia.

## **2. Literature review**

Electronic business, or e-business, has the power to completely restructure organisations, their organisational structure and their business processes (Zhu et al., 2006). The connections with clients, suppliers, and other business partners are also impacted by e-business (Ulas, 2019 & Ifinedo, 2011). According to Simpson and Doherty (2004) and Turban et al. (2004), e-business is the integration of communication (internet) technology, management practices and business processes. According to Ulas, (2019), web technologies help businesses in better understand the needs of their customers (marketing capability), personalise their goods and services (improving customer satisfaction), adopt product-market solutions (responding quickly to changes in the exogenous environmental elements), and accept customer orders (improv delivery speed, enhances global approach, declines cost and provide and improved satisfaction of the customers).

Sindakis & Aggarwal, (2022) also examined the drivers and barriers to e-business adoption in small businesses, discovered that adoption is influenced by the unique characteristics of each business setting as well as the social backdrop. They also emphasised to develop a complete framework to support the adoption of e-business. This comprehensive framework assured to understand the underlying factors of e-business success strategies. A model created by Bertschek and Fryges (2002), examined the elements that influence a company's decision to use B2B e-commerce in Germany. The findings of the study suggested that business size plays an influential role while adopting B2B e-commerce strategy. Therefore, it would seem that a large firm accepts e-business more readily, largely due to the managerial staff's professional knowledge and skill.

Similarly, Aceto et al., (2019) also conducted a similar research in the SMEs business of Italy and identified the information and communication technology (ICT) adoption. The findings of the study confirmed that technological adoption in SMEs vary from business to business and the environment of the organisation. Like the supportive and technological cultural of the organisation further enhance the use of E-business activities. Harindranath et al. (2008) also tried to find the reason of limited adoption of digital and mobile technology in the SMEs sector of United Kingdom. Their findings revealed that the British managers feel fear due to the possibility of restricted usage and obsolescence of an IT system that would also necessitate frequent updates.

Additionally, the Covid-19 pandemic further uncovered the importance and need of digital transformation in all over the world including Malaysia. After post-Covid there is, in particular, a lack of understanding of how capabilities, skills, and knowledge may be developed internally or acquired from outside sources. While policymakers are currently seeking to promote SMEs' digital transformation as the key focus point for SME growth in 2022 and beyond (June, 2022), little is known about the efficacy of individual measures. Asean SME Transformation Study 2022 by UOB has identify although there is renewed ambition towards business recovery, a significant proportion of SMEs (45%) in the region remain concerned about the need to transform their business models, particularly in the areas of digitalisation and sustainability (Malik et al., 2022). This is especially true for SMEs that may struggle to priorities tech upgrades among their other budgetary considerations.

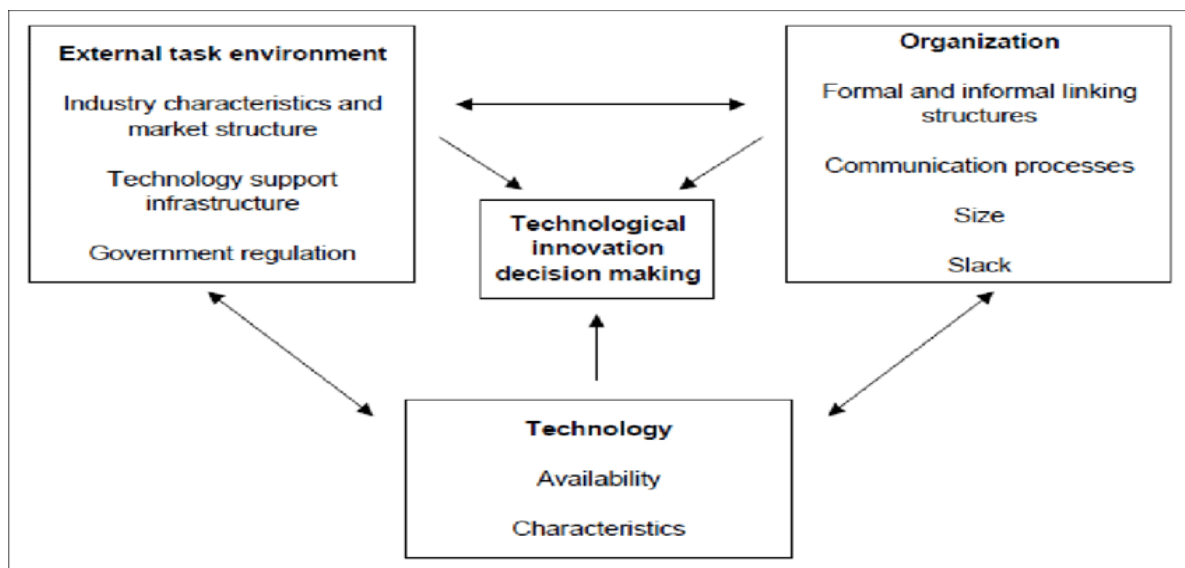
Several analysts compare the effects of digitisation to the industrial revolution. According to TM, scalability and flexibility of the cloud reduce complexities and prohibitive costs around info-tech infrastructure, enabling SMEs to transform how they work without over-committing financially (TM One, 2021). Covid-19 has spurred necessary digital transformations that had previously been slow in many sectors. Digital News Asia reported the study conducted by SAP identify having managed significant challenges over the past two years, SMEs across Asia Pacific and Japan are looking beyond a focus on resilience (Digital News Asia, 2022). demonstrate how existing businesses must rethink entire industries to cope with the influence of technology improvements. Meier et al. (2022) study also affirm on how existing businesses must rethink entire industries to cope with the

influence of technology improvements.

## 2.1 Technology, organisation and environmental (TOE)

Tornatzky and Fleischer (1990) introduced the TOE framework to study the technological innovation and implementation through technological, organisational and environmental context as shown in the figure 1 below. The technological context describes that how technology availability is important for the firm perceived benefits. Similarly, the organisational context focuses on the firm types, size, scope, managerial level and other concern issues. The environmental context talks about the external climate in which the firm operates like the Govt. agencies, industrial obligations and business competitors (Mahakittikun et al., 2020).

As documented by Oliveira and Martins (2011), TOE framework provided strong empirical and theoretical foundation which is proved by previous research scholars to predict and explain the technological adaptation at firm level. Moreover, Kuan and Chau (2001) also confirmed the suitability of TOE framework for assessing the technological innovation.



**Figure: 1 TOE framework developed by Tornatzky & Fleischer (1990)**

Similarly, the TOE framework is applied in elucidating the application, utilisation and execution of innovations. For example Zhu et al., (2004) found a connection between TOE elements and organisation performance. These factors included the technological readiness, financial resources, global scope, and regulatory environment, identified as significant contributors. Later on Zhu and Kraemer (2005) combined TOE with the theory of resource based view to investigate the collective effect on e-business. They observed that regulatory support plays an important role in developing countries. Additionally, Picoto et al. (2014) studied the collective effect of TOE, diffusion of innovation theory resource-based theory to examine the prevailing vales connected with mobile business and found that the TOE factors has a predictive power in the adaptation of mobile business.

Additionally, a comprehensive review of the relevant literature also performed to vouch the trend of the adoption of TOE in the SMEs sector. The systematic review of the literature was followed the method of “Meta-narrative” introduced by (Kuhn, 1970) and suggested (Xiao & Watson, 2019). Meta-narrative review represents a novel analytical and synthetic approach tailored for subjects that have been approached and studied from diverse epistemic communities, each with its unique perspectives. The method was pioneered by Greenhalgh et al. (2005) and draws inspiration from Kuhn's concept of scientific paradigm competition (Kuhn, 1970). Metanarrative review centers on tracing the development of specific social concerns and research traditions pertaining to a particular issue over time. By examining this evolution, it aims to understand how the unfolding of these concerns and traditions influences the formulation of research questions and the adoption of methodologies to address them. All the reviewed research papers were published in the leading research journal. To identify and study the relevant paper the key words, such as SMEs, TOE, technology and adoption were used. All the research papers were published in the leading research journals and international conference proceeding. The main source of theses research articles was the google scholar and ProQuest online data base. The articles which were selected and analysed are presented in the following table in year wise order.

**Table 1: Review of SMEs technological adoption studies**

Author and Year	Type of study	IS/IT adoption	Focus area of the study	Google citation
Hanafiah et al., 2023	Qualitative	E-commerce adoption	"Does E-commerce adoption create SME performance: A Literature Review".	02
Alraja et al., 2022	Quantitative	TOE & RBU	"Technological Innovation, Sustainable Green Practices and SMEs Sustainable Performance".	49
Ramdani et al., 2021	Qualitative	Digital innovation	"Digital innovation in SMEs: a systematic review, synthesis and research agenda".	67
Ali et al., 2020.	Quantitative	IT adoption and usage	"Examining the factors affecting SME performance: the mediating role of social media adoption".	15
Lutfi et al., 2020	Quantitative	Social media adoption	"The impact of AIS usage on AIS effectiveness among Jordanian SMEs: A multi-group analysis of the role of firm size".	42
Sandu & Gide, 2018	Quantitative	adoption of Cloud based service	"TOE factors that influence the adoption of Cloud based service SMEs in India".	26
Mahmod et al., 2018	Qualitative	Enterprise Risk Management	"A Conceptual Framework of ERM Practices among SMEs IN Malaysia".	11
Soto et al., 2016	Quantitative	e-business & organisational innovation	"E-business, organisational innovation and firm performance in manufacturing SMEs".	382
Chatzoglou & Chatzoudes 2016	Quantitative	e-business adoption	"Factors affecting e-business adoption in SMEs: an empirical research".	182
Amini & Bakri 2015	Quantitative	Cloud computing	"Cloud Computing Adoption by SMEs in the Malaysia: A Multi-Perspective Framework based on DOI Theory and TOE Framework".	93
(Alshamaila, 2013	Qualitative	Cloud computing adoption	"Contribute to a growing body of research on cloud computing, by studying the small to medium -sized enterprise (SME) adoption process".	984
Chao & Chandra, 2012	Quantitative	IT adoption and strategic alignment	"Impact of owner's knowledge of IT on business, IT strategic alignment and use in the small firm context. Resource-based view as a theoretical foundation".	124
(Haug et. al. 2011	Qualitative	IT readiness/IT adoption	"IT readiness in small and medium-sized enterprises. <i>Industrial Management &amp; Data Systems</i> ".	110

The above literature review shows that most of the research studies were conducted in the domain of the quantitative research. Similarly, majority of the research studies focused on the framework of the TOE and "Diffusion of Innovation" DOI for the technological adoption in SMEs. The relative importance of each model is undeniable; however, the holistic application produces more superior understanding and application. According to Oliveira and Martins, (2011) the TOE model provides a comprehensive theoretical understanding and has the potential of solid application in SMEs. The research of Hanafiah et al., (2023) disclosed the importance of the theory of diffusion of innovation. This theory provides the fundamental approach to study the primary factors of technological diffusion. It further confirmed that the adoption of technological innovation depends mainly on the innovative behaviour and nature of the organisation. Similarly, the study of Alraja et al., (2022) investigated the challenged technological adoption faced during the covid-19 pandemic. The finding of the research revealed that a holistic approach is needed to compact these types of mass pandemic. Like the integration of the TOE and resource-based view. By applying these integrations, the SMEs businesses can be able to proactively grab the future pandemic challenge. Previous research study of Lutfi et al., (2020) also suggested for an integrated model TOE and RBV to address the technological changes for the SMEs.

However, few studies also recommended the cloud computing for the SMEs to scale-up their business activities. According to Amini & Bakri, (2015) cloud computing become more practicable, as it can be used with low budget and less human resources. Although, there is some security concerns which need to be considered. The application of information technologies gives competitive advantages and enable them to compete with the larger firm. Moreover, the study of Alshamaila, (2013) identified various factors which affect cloud computing application such as, compatibility, scope & nature of the business, comparative advantage, employee's capabilities, stakeholder support and organisational culture. All of the given factors collectively influence the adoption of cloud computing in the SMEs business sector.

### 3. Conclusion

Before adopting new technologies and methods, it's crucial to comprehend the dimensions and characteristics of organisational adoption of technological innovation as it is a necessary element in understanding the process. Researchers and practitioners with an interest in this subject can benefit from the insights offered by the TOE framework developed by Tornatzky and Fleischer (1990) which explains three key parameters which influence the organisational adoption; Technology, Organisation and Environment. The enterprise's technological, organisational, and environmental settings all have an impact on how quickly IS advances are adopted. A variety of inventions and circumstances have been examined using the TOE framework by the researchers. The majority of research in the area of small- and medium-sized business adoption of IS innovations is focused on the adoption of technologies like ERP, E-commerce, and E-business, as well as on determining how prepared SMEs are for IT. However, over the study period (2011 to 2023), we came across a growing body of research that concentrated on how SME's adopted new technologies like cloud computing, social networking and other Web 2.0 tools that are gaining popularity.

Various elements that affect how SMEs adopt technological innovation might be found throughout the literature review and illustrated through summary table 1. The expected relative advantage, IS knowledge, top management support, innovativeness and organisational readiness are some of the topics that are frequently mentioned in research articles analysed during literature. In SMEs, mostly CEO makes majority of critical decisions due to the lack of managerial human resource. In addition to "characteristics of the technological innovation," "characteristics of the organisation," and "characteristics of the environment," Thong (1999) emphasises the significance of "characteristics of the organisational decision makers" (including the CEO's IS knowledge and CEO's innovativeness) as a fourth element of context.

In conclusion, our study highlights the missing research on SME adoption of the new Web 2.0 technologies and how well their patterns of adoption do fit in the already established frameworks of technological innovation adaptation, such as the TOE framework, as a research gap for the time period taken in consideration for literature review. Continuous empirical research work and framework validation are required during these dynamic technological advancements. The study's findings may have repercussions for the SME managers, research community and information and communication technology providers in terms of illustrating the state of the field's research and developing better frameworks and strategies for the adoption of new IS among Small and Medium Enterprises.

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