INTEGRATION OF FIT AND VIABILITY IN CLOUD ENTERPRISE RESOURCE PLANNING ADOPTION AMONG MICRO SMALL AND MEDIUM ENTERPRISES IN EGYPT

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by

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LIST OF SYMBOLS

rho_c	Composite reliability
R^2	Coefficient of determination
Q^2	Predictive relevance
f^2	Effect size

LIST OF ABBREVIATIONS

MSMEs	Micro, Small, and Medium Enterprises
ERP	Enterprise Resource Planning
CC	Cloud Computing
CERP	Cloud Enterprise Resource Planning
CBE	Central Bank of Egypt
IT	Information Technology
IS	Information System
ICT	Information and Communication Technology
CAGR	Compound Annual Growth Rate
DOI	Diffusion of Innovation Theory
TOE	Technology Organization Environment
FVM	Fit Viability Model
NIST	National Institute of Standards and Technology
SPSS	Statistical Package for the Social Sciences
PLS-SEM	Partial Least Squares Structural Equation Modelling
CB-SEM	Covariance Based Structural Equation Modelling
CMB	Common Method Bias
AVE	Average Variance Extracted
HTMT	Heterotrait–Monotrait Ratio
VIF	Variance Inflation Factor

LIST OF APPENDICES

INTEGRASI KESESUAIAN DAN KEBOLEHHIDUPAN DALAM PENERIMAGUNAAN SISTEM PERANCANGAN SUMBER PERUSAHAAN AWAN DALAM PERUSAHAAN MIKRO KECIL DAN SEDERHANA DI MESIR

ABSTRAK

Sistem Perancangan Sumber Perusahaan Awan (CERP) ialah perkhidmatan atas permintaan yang menawarkan peluang besar untuk Perusahaan Mikro, Kecil, dan Sederhana (PKS). Model "bayar ikut guna", skalabiliti, dan fleksibiliti awan telah menghapuskan banyak halangan yang berkaitan dengan sistem ERP tradisional, yang berpotensi menyumbang kepada pertumbuhan ekonomi PKS. Walau bagaimanapun, PKS di negara membangun, terutamanya di Afrika dan Timur Tengah, lambat menerima CERP walaupun mereka menghadapi kesukaran untuk beroperasi dengan cekap. Berdasarkan kajian awal dan tinjauan literatur yang luas, model konseptual telah dibangunkan dengan mengambil kira Teori Penyebaran Inovasi (DOI), Teknologi, Organisasi, Persekitaran (TOE), dan Model Kesesuaian Daya Maju (FVM) untuk menyiasat faktor-faktor yang mempengaruhi penerimaan CERP di kalangan PKS di Mesir. Model ini telah disahkan secara empirik melalui tinjauan terhadap 236 responden daripada PKS Mesir. Penemuan ini mendedahkan pandangan baharu tentang penerimaan CERP. Hasil kajian menunjukkan bahawa kesesuaian dan daya maju mempengaruhi secara positif penerimaan CERP. Keserasian, kebolehlihatan, kesediaan teknologi, sokongan pengurusan atasan, dan tekanan persaingan didapati sebagai penentu utama penerimaan CERP melalui kesan pengantaraan kesesuaian dan daya maju. Membangunkan model konseptual yang menggabungkan DOI, TOE, dan FVM adalah pendekatan baharu yang menyumbang kepada pengetahuan sedia ada. Model

yang disahkan ini memberikan pandangan pelbagai aspek yang boleh membantu CEO, pengurus, ahli akademik, dan penyedia perkhidmatan untuk lebih memahami faktor-faktor yang mempengaruhi penerimaan CERP di kalangan PKS di Mesir, dan seterusnya, mempercepatkan kadar penerimaan.

INTEGRATION OF FIT AND VIABILITY IN CLOUD ENTERPRISE RESOURCE PLANNING ADOPTION AMONG MICRO SMALL AND MEDIUM ENTERPRISES IN EGYPT

ABSTRACT

Cloud Enterprise Resource Planning Systems (CERP) are hosted on-demand services that offer significant opportunities for Micro, Small, and Medium Enterprises (MSMEs). The "pay-per-use" model, scalability, and flexibility of the cloud have removed many of the barriers associated with traditional ERP systems, potentially contributing to the economic growth of MSMEs. However, MSMEs in developing countries, particularly in Africa and the Middle East, have been slow to adopt CERP although they are facing difficulties to operate efficiently. Based on a preliminary study and extensive literature review, a conceptual model was developed drawing on the Diffusion of Innovation (DOI), Technology, Organization, Environment (TOE), and Fit Viability Model (FVM) to investigate the factors influencing CERP adoption among MSMEs in Egypt. This model was empirically validated through a survey of 236 respondents from Egyptian MSMEs. The findings revealed new insights about CERP adoption. The results showed that fit and viability positively influence CERP adoption. Compatibility, observability, technological readiness, top management support, and competitive pressure were found to be major determinants of CERP adoption through the mediating effects of fit and viability. Developing a conceptual model integrating DOI, TOE, and FVM is a novel approach contributing to existing body of knowledge. The validated model provides a multifaceted view that can help CEOs, managers, academics, and service providers to better understand the factors influencing CERP adoption among MSMEs in Egypt, and in turn, accelerate the adoption rate.

CHAPTER 1

INTRODUCTION

1.1 Research Background

Micro, Small and Medium-sized enterprises (MSMEs) are considered the backbone of any economy. Particularly in developing countries, MSMEs are considered major drivers of socio-economic development by means of contributing to the gross domestic product (GDP) and lowering unemployment rates. Therefore, MSMEs play a significant role in enhancing the economic success of developing countries, including Egypt (Elnaggar & Elsayed, 2023; Kumar, Samalia, & Verma, 2017). MSMEs in Egypt are considered key drivers to economic growth and sustainability. Consequently, the Egyptian government has been recently focusing on MSMEs sector in order to boost the economy and achieve its development goals (Zaazou & Salman Abdou, 2022).

The number of employees, the volume of yearly turnover, and/or the amount of investment have been the benchmark for categorizing MSMEs. However, there does not exist an accepted universal definition of MSMEs. Their definitions vary across countries and sometimes across different institutions of the same country. It may also vary across different industries in some countries (Ongori & Migiro, 2010; Sastararuji, Hoonsopon, Pitchayadol, & Chiwamit, 2021). Table 1.1 presents different definitions for SMEs across different countries.

Table 1.1 Definition of SMEs in other countries

Country	SMEs Definition	
European statistics and the US Small Business Administration, and the Organization for Economic Co-operation and Development OECD (2004)	Organizations that have less than 500 employees (Conte and Karr 2001)	
Britain	Enterprises with annual turnover not exceeding £2 million and with less than 200 employees (Ongori & Migiro, 2010).	
Australian Bureau of Statistics	A micro firm has 0-4 employees, a small firm has 0-19 employees, while a medium-sized firm has 20-199 employees (Enagi & Van Belle, 2019; Salim, Sedera, Sawang, Alarifi, & Atapattu, 2015)	
Malaysia	Manufacturing Sector	Enterprises with sales turnover less than RM50 million, or less than 200 full-time staff
	Service Sector and other industries	Enterprises with sales turnovers less than RM20 million or full-time staff not more than 75 (Razzaq, Asmai, Talib, Ibrahim, & Mohammed, 2020)

Egypt is among the countries where different institutions provide different categorizations of MSMEs. The present study adopted the most used definition of MSMEs according to the Central Bank of Egypt (CBE), which defines MSMEs as shown in Table 1.2 (Metawa, Elhoseny, & Mutawea, 2021). MSMEs strongly dominate Egypt's private sector, constituting approximately 98% of the Egyptian market, and contributing to around 75% of the labour force and to almost 43% of Egypt's GDP. Therefore, SMEs are significantly important in Egypt's socioeconomic development, hence, their survival and growth are crucial to the welfare of the whole economy (Hustad, Olsen, Jørgensen, & Sørheller, 2019).

Table 1.2 Definition of MSMEs as defined by CBE

	Existing Companies		Newly Established Companies	
Size	Annual revenue (EGP Mn)	Number of employees	Capital (EGP Mn)	Number of employees
Micro	<1	Up to 10	<0.5	Up to 10
Small	1-50	Up to 50	Industrial companies 0.5-5	Up to 50

			Nonindustrial companies 0.5-3	
Medium	50-200	Up to 200	Industrial companies 5-15 Nonindustrial companies 3-5	Up to 200

Nonetheless, MSMEs in developing countries, including Egypt, often incurs a range of structural weaknesses that limit their potential for expansion. These include, but are not limited to, the lack of managerial skills, limited financial resources, rigorous competition, and low profit margins (Metawa et al., 2021). Consequently, as reported by the World Bank (2021), 40% of SMEs in developing countries need $5.2 trillion yearly, which is equal to 1.4 times the current level of global SMEs lending. That is due to several factors, most importantly; the improper strategic planning, inability to cope with change, and the existence of a clear knowledge gap at the SMEs sector (Grigorescu & Ion, 2022). Therefore, it is not surprising that the MSMEs sector has seemingly weak exporting capabilities (Ayadi & Sessa, 2017).

In Egypt, the situation got even worst after the effect of the so-called ‘Arab Spring’ that hit the region in 2011, as Egypt was among the countries that was most significantly affected. The Egyptian economy was devastated in addition to the sudden return of Egyptians from Libya, Syria, and Gulf countries, which led to an increase in the unemployment rate from 8.9% in 2010 to 12.8% in 2015. As MSMEs are normally more labour than capital intensive, they can play an important role in such economies that have large unemployed youth population; like Egypt (Hassan & Hart, 2016).

Accordingly, the Egyptian government has begun to focus its initiatives on MSMEs’ growth to deal with the political instability and the economic crises that followed the 2011 uprisings. For instance, the second pillar of the Egyptian Ministry of Trade and Industry (MTI 2016-2020) development strategy emphasized on supporting

MSMEs to help accelerate industrial production, reduce unemployment rate, and boost exports. Fortunately, this strategy succeeded in decreasing the unemployment rate from 12.8% in 2015 to 7.4% in 2021 (as published by the world bank statistics). Similarly, in regard of these initiatives, in 2016 the CBE allocated LE200bn to national banks for allowing them to lend to MSMEs at 5-7% interest rates, depending on the size of the business, to be re-paid over five to seven years, in a state-led attempt to support the commerce and industry sectors. Moreover, the CBE obliged commercial banks to increase their lending to MSMEs to be 20% of their total loan portfolios by 2019 (Hassan & Hart, 2016; Ayadi & Sessa, 2017).

Moreover, despite the evolution that has been clearly realized in the Egyptian MSMEs sector over the past years, with consistent support from the Egyptian government and policy makers, MSMEs in Egypt often face impediments to growth, especially in the current unfavourable business environments (Metawa et al., 2021). The global outbreak caused by Covid-19 pandemic, followed by the global economic crises caused by the Russian War had negatively affected MSMEs in most parts of the world including Egypt. Most MSMEs found it difficult to maintain their survival and sustainability in such a turbulent environment (Zaazou & Salman Abdou, 2022). In this regard, there still exist continuous attempts to help MSMEs to enhance their operations.

According to researchers and practitioners, digital transformation is highly recommended as an important strategic tool to aid MSMEs in facing their challenges and improving their performance (Acee-Eke & Ogonu, 2020; Mabrouk, 2020). Furthermore, studies have shown that the dramatic business changes led to a globally widespread use of Information and Communication Technology (ICT) among various sizes of enterprises, including MSMEs (AL-Shboul, 2019). The effective and efficient utilization of ICT can help MSMEs to save costs through streamlining their business

processes, gaining improved and faster communication with their clients, and enhancing product distribution by increasing utilization of online channels (Kumar et al., 2017).

However, low budget, limited skills and knowledge, and lack of qualified staff lower the potential of MSMEs to fully exploit ICT benefits. In addition, the complex nature of emerging ICT and its unpredictable changes have continually put pressure on MSMEs. Although ICT has unlocked diverse opportunities for businesses, it has become challenging for MSMEs as it opens them up to uncertainties and risks (Usman, Ahmad, & Zakaria, 2016). Using a survey, Deloitte reported that 80% of SMEs do not fully utilize digitalization due to limited awareness of the benefits (Sastararuji et al., 2021). Consequently, MSMEs are usually less likely to adopt emerging technologies than larger enterprises. In OECD countries, the rate of e-commerce and CC adoption among SMEs is nearly half that of large enterprises (Senyo, Addae, & Boateng, 2018). In addition, the International Finance Corporation (IFC, 2020) research reported that SMEs' usage of technology during Covid-19 was 10 times lower in developing countries compared to developed ones (Sastararuji et al., 2021).

Furthermore, most MSMEs often experience drawbacks in performance due to inefficient utilization of ICT. For instance, some MSMEs might be using legacy software systems that do not comply with their hardware infrastructure, human capabilities, or business processes. In such case, continuing to use the system is not useful for the organization and might negatively affect its productivity. Consequently, these MSMEs lack the operational efficiency needed to compete effectively, as well as the information or insight needed to make the right business decisions. For MSMEs to be able to resolve the inefficient operation of its business, they need an enterprise-wide software, like Enterprise Resource Planning (ERP) systems (Saini, Khanna, & Peddoju, 2014; Qian, Baharudin, & Kanaan-Jebna, 2016).

ERP is one of the most common information systems for enterprises that has been in existence since the 1990's. The popularity of this solution is attributed to its ability to integrate all functional units; including data and business processes, within and outside the organization boundaries (Abdelmoniem, 2016). Implementing an ERP system leads to reduced costs, improved efficiency, better communication, optimum inventory management, and enhanced quality of end products or services (Awa & Ojiabo, 2016). In addition, the technical and operational integration of business functions results in harmonized information stream and material flow of goods or services (Beheshti, 2006). Hence, ERP has been a state-of-the-art information system that remains one of the most important research topics in the IS field (Huang & Yasuda, 2016).

The utilization of ERP systems provides organizations with strategic benefits, including improved service quality, enhanced customer service, and more effective communication with business partners. These benefits further lead to a competitive advantage in the market. However, research has shown that large enterprises are the primary adopters of ERP systems (M. S. M. Soliman, Karia, Moeinzadeh, Islam, & Mahmud, 2019). The adoption and success factors of implementing ERP in large enterprises have been a topic of interest in academia (Felderer & Piazolo, 2016). Nevertheless, some scholars have argued that the agility of small and medium-sized enterprises and their need to remain competitive drive them to adopt ERP systems as well (Awa & Ojiabo, 2016). The potential benefits of ERP have attracted the attention of an increasing number of MSMEs (AL-Shboul, 2019; Alsharari, Al-Shboul, & Alteneiji, 2020; Azhar, Quah, & Goh, 2022).

Nonetheless, implementing an ERP system is not just a computer project, but rather an expensive and risky investment, which affects the organization's primary and

support processes (Alsharari et al., 2020; Hailu & Rahman, 2012). An ERP project requires substantial amounts of resources and time and encounters several managerial difficulties. Consequently, many ERP implementations often fail (Chauhan & Jaiswal, 2015). In some organizations, the inefficient implementation of ERP turned out to be disastrous to the extent that they announced bankruptcy (Al-Ghofaili & Al-Mashari, 2014). ERP also incurs high customizing costs, as well as re-customizing costs whenever business processes are changed. Thus, the enhancement of business processes that shall increase the firm's competitiveness, rather becomes more costly than before (Saini et al., 2014).

In addition, the purchase cost is not the only cost incurred in an ERP implementation project. Other expenses include the maintenance, support, consultations, and administration of the system. Hence, the ERP implementation process often exceeds the budgeted costs and takes longer than scheduled (Chandrakumar & Parthasarathy, 2014; Haddara, Fagerstrøm, & Mæland, 2015; Haddara & Päivärinta, 2011). While large enterprises can bear these challenges, MSMEs are rather characterized by scarcity in financial and human resources, lack of suitable IT infrastructure, limited IS knowledge, and lack of IT skills and competencies, which make ERP adoption a difficult and critical endeavour (Deltour, 2012; Haddara & Elragal, 2013; Schniederjans & Yadav, 2013). ERP adoption is deemed challenging and, in most cases, unaffordable for MSMEs, particularly in developing countries (Abdelghaffar & Abdel Azim, 2010; AL-Shboul, 2019; Haji Salum & Abd Rozan, 2016; Razzaq et al., 2020).

Therefore, MSMEs would prefer external IT support for their business that would offer the system at lower costs and with limited IT skills required (Saini et al., 2014). Through the past years, many communication technologies and infrastructural

changes have evolved and been introduced to ERP systems, yet it was still hard for most MSMEs to implement them successfully. However, a more convenient ERP solution was raised through the Cloud Computing (CC) technology, which is currently one of the emerging trends in ICT for businesses (Al-Ghofaili & Al-Mashari, 2014; Kumar et al., 2017; Salim et al., 2015).

CC provides a great opportunity for organizations that aim to use ICT without the need of huge initial investment and without the fear of getting locked up with an obsolete technology (Buyya, Yeo, Venugopal, Broberg, & Brandic, 2009). Cost reduction, scalability, and shareability are the main benefits realized by organizations adopting CC (Al Hadwer, Tavana, Gillis, & Rezania, 2021). As a result, the CC market has been accelerating over the past few years and its global market size is expected to grow from $371.4 billion in 2020 to $832.1 billion by 2025 at a compound annual growth rate (CAGR) of 17.5% (EPC Group, a Microsoft Partner).

Implementing cloud-based services helps MSMEs to save major costs, maximize flexibility and agility in internal and external operations, and reduce production costs. In fact, MSMEs are considered the most suitable entities for adopting CC (Rezaei et al., 2016; Kumar et al., 2017). Several studies indicated that MSMEs generally benefit a lot from adopting cloud-based services for their IT strategy as compared to adopting traditional IT systems (Widyastuti & Irwansyah, 2018). Studies also recommended that outsourcing main business functions to CC at affordable costs shall help MSMEs in developing countries to improve their digitalization and better recover from Covid-19 consequences (Sastararuji et al., 2021).

1.2 Research Focus

With the advance of CC technology, ERP vendors addressed the challenges faced by MSMEs in using traditional ERP systems and accordingly developed cloud-based ERP systems (CERP) that are provided at lower costs with better elasticity (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011). In CERP systems, the business logic of the ERP is decomposed into web services accessed when needed. Through user interfaces, the services are composed and delivered from the data centres to the organization. By utilizing the needed web services only, the costs are minimized, and the functionalities are scaled to the organization's actual needs. Thus, CERP presents an affordable alternative to traditional ERP systems (Sultan, 2011).

MSMEs are not obliged to own the ERP system with its required IT infrastructure and physical resources. They rather make payments for the utilized services only upon their demand, which makes CERP highly advantageous for them (AL-Shboul, 2019). The "pay per use" nature of cloud suits MSMEs' limited financial resources and enable them to focus on enhancing their competitiveness and developing new practices towards their businesses. Also, the ease of maintenance and the minimum technical expertise required fit the lack of IT skilled and trained personnel in MSMEs (Saini et al., 2014).

The flexibility, cost efficiency, scalability, adaptability, and affordability of CERP represent a revolutionary approach in ERP deployments that helps MSMEs to improve their operations and organizational performance (AlBar & Hoque, 2019; Øverdal, Haddara, & Langseth, 2023). Accordingly, CERP systems are advocated as the key strategic technology for future development, and its market has been accelerating in the past few years (Demi & Haddara, 2018). Hence, it has become one

of the famous phenomena in the business environment and among researchers alike (Bhatti, 2017; Burchin, Darwish, & Erkayman, 2017; Haji Salum & Abd Rozan, 2016).

Additionally, the global crises caused by Covid-19 pandemic raised the need for increased remote work possibilities which further accelerated the adoption of various cloud-based services and digital infrastructures worldwide, including CERP (Ahn & Ahn, 2021; Qutaishat, Abushakra, Anaya, & Al-Omari, 2023). Moreover, an exploratory study was conducted to analyse and predict the tendency of organizations to migrate their traditional ERP to the cloud, or hybrid models. The researchers proposed that hybrid and CERP are expected to be the dominant models adopted by 2025, whereas the traditional ERP model will be a minority (Ruivo, Rodrigues, & Oliveira, 2015). This conveys with the recent global forecasts which show that CERP market will be worth $101.1 billion by the year 2025 and expected to grow at a CAGR of 11.9% from 2020 to 2027 (published by Finances Online, a website that provides software statistics and reviews for businesses).

1.3 Research Problem

Compared to developed countries, developing countries often possess poorer infrastructure, less effective workforce (sometimes due to lower education levels), unstable economic status, and other socio-cultural issues that hinder technology adoption, including ERP systems (Hooks, Davis, Agrawal, & Li, 2022; Salim et al., 2015). According to Kaunda and Kennedy (2013), developing countries are far less than developed countries in many areas of ERP systems implementation (AlBar & Hoque, 2019; Mpanga & Elbanna, 2019). The success rate of ERP implementations in most developing countries is often low. In Egypt, around 50% of ERP implementations are considered failures in terms of time and cost over-dues and unmet project deliverables

(M. Soliman & Karia, 2017). Therefore, it is more difficult for MSMEs to utilize ERP systems for improving their organizational performance.

Nonetheless, the CC technology has been viewed by academics and practitioners as a platform that shall bridge the digital gap between developing and developed countries (Senyo et al., 2018). Thus, encouraging CERP adoption in developing countries will help MSMEs to enhance their competitiveness and, in turn, flourish their economies (AL-Shboul, 2019; Razzaq, Asmai, Talib, Ibrahim, & Mohammed, 2020). However, reaserchers argue that using the latest technology advancements to leapfrog to the developed country status is not always easy and accessible due to the different obtacles existing in developing countries (Asiaei & Nor, 2019).

This seems to be the case regarding CERP adoption. Despite the above-mentioned benefits of CERP, its applicability in improving MSMEs' organizational performance, and the acceleration of its market in the past few years, developed countries are the prominent adopters, whereas developing countries lag behind (Ahmed, Oliver, & Rahim, 2020; Demi & Haddara, 2018; Øverdal et al., 2023; Qutaishat et al., 2023). Existing studies assert that CERP adoption in developing countries is lower than expected (Christiansen, Haddara, & Langseth, 2021; Jayeola, Sidek, Rahman, Bali Mahomed, & Jimin, 2020; Loukis, Janssen, & Mintchev, 2019; ongsuksai, Mathrani, & Weerasinghe, 2023). Particularly, in developing Middle Eastern countries, such as Egypt, slow CERP adoption rates are observed among MSMEs (AL-Shboul, 2019; AlBar & Hoque, 2019; Lutfi, 2021; Qutaishat et al., 2023; Razzaq et al., 2021, 2020; Skafi, Yunis, & Zekri, 2020; Zamzeer, 2019).

Besides, few studies conducted in the African context highlighted the existence of an obvious lack of knowledge and awareness about CERP that is most probably

affecting MSMEs' attitude towards adoption. In addition, a qualitative preliminary investigation conducted among a sample of Egyptian MSMEs shed more lights on that problem. The results clearly indicated a low rate of adoption and limited awareness regarding CERP. Besides, it was clearly shown that most MSMEs are facing difficulties in streamlining their business operations leading to inefficient productivity. Many participants also highlighted that they need to manage their resources more efficiently for faster production or services provision. Nonetheless, although many participants were highly interested towards CERP adoption, they still felt reluctant to adopt it. The preliminary investigation and prior studies have apparently shown that there exists an ambiguous sense of how MSMEs can make use of cloud services, particularly CERP, and how they can obtain a competitive advantage from adoption (AL-Shboul, 2019; Alsharari et al., 2020; Luo, Zhang, Li, Bose, & Chung, 2018).

Recent studies conducted in other developing countries attempted to address this problem. However, research is still inadequate and thus a holistic assessment of the factors affecting CERP adoption is needed to identify the reasons behind the lower rate of adoption in the developing world and act accordingly to accelerate the adoption in these countries (AL-Shboul, 2019; AlBar & Hoque, 2019; Asiaei & Nor, 2019; Awan et al., 2021; Cheng, 2019; V. Gupta & Bhatia, 2017; Lutfi, 2021; Qutaishat et al., 2023; Razzaq et al., 2021, 2020; Valdebenito & Quelopana, 2019).

Most importantly, the majority of participants in the preliminary investigation of the current research revealed that regardless of the benefits of CERP, they cannot decide whether it is good enough for their businesses or whether their organizations are ready to adopt it and/or capable of gaining value from its adoption at their current situation. That said, the fit of CERP to different business operations and the readiness

of the organization to adopt CERP were the main questionable factors that appeared to be hindering or causing the hesitancy of the interviewed sample to adopt CERP.

Prior studies reported similar factors that are influencing CERP adoption like compatibility, relative advantage, top management support, IT infrastructure and skills, competitive pressure, and regulatory environment. However, none of those studies investigated CERP adoption from the perspective of the fit of CERP and the organizational readiness which might help in exploring the reasons behind the lower rates of adoption in the developing countries. Besides, despite the lower rate of adoption, there exists potential adopters that shall not be ignored. Hence an investigation of the factors influencing their decisions is needed to help encourage them to embrace CERP adoption. Therefore, this study was motivated by adding new perspectives to fully understand CERP adoption among MSMEs in developing countries, particularly in Egypt to help accelerate the rate of adoption. Accordingly, this study answers the following research questions.

1.4 Research Questions

Q1: What are the common factors influencing the adoption of CERP among MSMEs in the developing countries?

Q2: What is the level of awareness and the status of CERP adoption in MSMEs in Egypt?

Q3: What are the determinant factors that influence the adoption of CERP in MSMEs in Egypt?

1.5 Research Objectives

In regard of the above research questions, this research addressed the following objectives:

1. To explore previous work done in MSMEs discipline with a view to identify the common factors that influence CERP adoption in developing countries context.
2. To conduct a preliminary study to identify the level of CERP awareness and knowledge among MSMEs in Egypt and discover the factors that might be affecting the rate of adoption.
3. To develop and empirically validate a theoretical model that identifies the exact factors influencing CERP adoption among MSMEs in Egypt.

1.6 Research Motivation

Previous studies claimed that the evolutionary technology of CC contributes to the socio-economic development of developing countries to advance to a developed country status (El-Gazzar, 2015). Moreover, CC provides developing economies with access to IT infrastructure, data centres, and applications like those in developed countries, but at lower costs. However, several studies argued that developing countries often lag in recent technologies' adoption and are not among the first to utilize emerging technologies. As CC is no exception; its low adoption makes practitioners, service providers, and researchers feel challenged to foster it, especially that different contextual economic and environmental obstacles might make CC adoption more complex in developing countries (Al Hadwer et al., 2021; Asiaei & Nor, 2019).

Furthermore, it is commonly claimed that SMEs usually reap more benefits from CERP. Several studies highlighted the suitability of CERP for smaller enterprises, and some even argued that they are a viable solution for SMEs only (Arnesen, 2013; Haddara, Gøthesen, & Langseth, 2021; Bjorn Johansson, Alajbegovic, Alexopoulo, &

Desalermos, 2015). Therefore, due to the widespread presence of MSMEs in Arab developing countries, researchers began directing the focus of their studies to these developing countries to investigate the determinants of CERP adoption. These studies further implied that more empirical research is still needed in the Middle Eastern economies to help MSMEs better exploit the potential benefits of CERP systems.

Recalling that the Egyptian private sector is primarily dominated by MSMEs, it is worth exploring the opportunities and potential benefits that can help Egyptian MSMEs to flourish and thus enhance the overall economy. Moreover, a preliminary study was conducted to get an initial view of CERP status and perception among a sample of Egyptian MSMEs. The results demonstrated that despite the limited awareness and low rate of adoption, there exists a positive attitude towards the potential benefits of CERP. This further reinforced the motive for investigating the factors that can help accelerate CERP adoption in Egypt.

1.7 Research Scope

CERP has been acknowledged by organizations in developed countries as a strategic tool that helps small and medium enterprises to enhance their productivity and maintain their competitiveness. Nonetheless, CERP adoption rates in developing Middle Eastern countries are below expectations. MSMEs constitutes the largest percent of the Egyptian private sector, but unfortunately, they often face impediments to growth and the majority of them lack the operational efficiency. In that regard, helping MSMEs to improve their operational performance is crucial for the improvement of the whole economy. Therefore, this research aimed to study the factors contributing to the lower rates of CERP adoption among Egyptian MSMEs to help accelerate it adoption and in turn help MSMEs to enhance their operational efficiency.

1.8 Research Significance

The present research focuses on CERP adoption among MSMEs in Egypt. Previous studies declared that CC generally, and CERP specifically, are not extensively adopted in developing countries as it is in developed countries (Qutaishat et al., 2023; Sharma, Gupta, Acharya, & Jain, 2023; Skafi et al., 2020). A comprehensive list of factors can affect MSMEs' decision to adopt CERP. Although some of those factors are discovered by prior studies, research in the context of developing countries, particularly in Africa and the Middle East is yet inadequate. In Egypt, a limited body of literature found exploring the adoption of CC. Until recently, there is no single published study examined the adoption of CERP in MSMEs in Egypt. The present research aimed to examine the holistic influential factors affecting CERP adoption among Egyptian MSMEs and hence explore the reasons behind the low rate of adoption.

In addition, as CERP is still an emerging research area, the underlying factors discovered might be lacking explanatory insight or causal relationships (Ahmed et al., 2020). Hence, exploring different context specific factors can add value to CERP emerging knowledge area. This was accomplished by the present research. Through a preliminary qualitative investigation, a fundamental understanding of the studied phenomenon and an enriched insights of specific influential factors in the Egyptian context were developed prior to the quantitative investigation. Thus, rather than directly applying existing theories to study CERP adoption, the factors hypothesized in this study were chosen based on the relevance of the factors identified from the qualitative preliminary investigation to those revealed by prior similar studies (see Table 2.3).

In that regard, this research also answers the calls of scholars who recommended the examination of more country-specific factors to identify the differences caused by

different cultures when investigating CERP adoption (Yasiukovich & Haddara, 2020). Besides, this research contributes to knowledge being one of the first studies to explain CERP adoption in MSMEs in Egypt. It also contributes to filling the literature gap existing in the developing countries, particularly the Middle East.

Most importantly, the novelty of this research lies in adding new perspectives in studying CERP adoption that were ignored by prior studies. Hence, it provides a significant theoretical contribution to existing literature through utilizing the Fit Viability Model (FVM) in investigating CERP adoption. It thus enriches existing knowledge and opens future research directions by introducing the fit and viability dimensions as influential factors of CERP adoption in MSMEs. Besides, the validated model in this research provides a comprehensive understanding of CERP adoption in Egypt through integrating Diffusion of Innovation (DOI), Technology Organization Environment (TOE), and FVM. Therefore, the findings of this research not only contribute to the understanding of CERP adoption in Egypt but also to other countries having similar socio-economic profile.

Moreover, this research provides practical implications as the validated model can help MSMEs' CEOs and top managers to understand CERP adoption process and plan accordingly. By introducing the new perspectives of fit and viability, this model provides guidelines for decision makers in MSMEs to efficiently assess the status of their organizations and the fit of CERP solutions for better CERP adoption. It also serves CERP vendors in Egypt where they can use the findings to understand MSMEs' attitudes towards CERP adoption and the factors influencing them. Consequently, they can direct their efforts to meet MSMEs' needs and hence accelerate the rate of CERP adoption in Egypt. The Egyptian government can also make use of this research findings to help MSMEs to enhance their readiness to adopt CERP, and thus improve their

performance that further leads to flourishing the economy. This research also helps in dispensing knowledge and awareness about CERP among MSMEs in Egypt. All theoretical and practical implications of this research are fully discussed in Chapter 6.

1.9 Definitions of Key Terms

Enterprise Resource Planning System (ERP) is a software solution that incorporates all business functions and data into a single system that is shared within the different departments in an organization (Mpanga & Elbanna, 2019).

Cloud Computing (CC) is defined by the National Institute of Standards and Technology (NIST) as a computing model that provides easy, convenient, and on-demand access to a shared set of configurable computing resources i.e., servers, storage, applications, and services, that can be rapidly provisioned and released , via the internet, with minimum management effort or interaction with the service provider (Mrhaouarh, Okar, Namir, & Chafiq, 2018). CC is a convenient alternative to the on-premises deployment of applications and systems (V. Gupta & Bhatia, 2017).

Software as a Service (SaaS) refers to a CC model that enables users to use software and applications that are provided by a third party as a service over the internet. The users can rent the software based on "pay-per-use" method (Kim, Jang, & Yang, 2017).

Cloud Enterprise Resource Planning (CERP) is an ERP system hosted and managed by the service provider and accessed by the users over the internet. CERP addresses the inflexibility of traditional ERP systems that are implemented on premises through enabling the organizations to choose the deployment option that best fits their specific needs and utilize the modules upon their demand. In that way, CERP serves as a flexible, scalable, and cost-effective alternative for small and medium enterprises

which can help them to expand and enhance their productivity (Jain & Sharma, 2017; Ruivo et al., 2015).

Diffusion of Innovation Theory an organizational level adoption theory that states that an organization's intention to adopt a certain innovation is affected by the characteristics of the innovation itself (Rogers E, 1995).

Technology Organization Environment are the institutional contexts identified by Tornatzky and Fleischer, (1990) that influence the adoption of technological innovations in organizations.

Fit in technology adoption refers to the degree to which the technology's characteristics meet the task characteristics performed by the user. This determines the positive impact of adopting that technology (Goodhue & Thompson, 1995).

Viability refers to the extent to which an organization is ready to adopt a new technology (Tjan, 2001).

Compatibility is defined as *"the degree to which an innovation fits with the existing values, practices, and needs of the potential adopter"* (Rogers E, 1995).

Observability refers to *"the degree to which the benefits obtained from an innovation adoption are visible to others"* (Rogers E, 1995).

Technological readiness refers to the technological characteristics possessed by the organization for enabling the adoption of an innovation. It comprises both the technological platform or infrastructure and the specialized human resources (Oliveira, Thomas, & Espadanal, 2014).

Top management support refers to the extent to which the top management are enthusiastic about a new technological innovation and provide the sufficient support and adequate resources for its adoption (Yang, Sun, Zhang, & Wang, 2015).

Economic feasibility refers to the cost-benefit analysis of adopting an innovation and the extent to which the innovation can positively impact transaction costs (Tjan, 2001).

Service provider support refers to the efforts of the service provider (the supplier offering CERP) to manage the system, provide after-sale services, maintain the service quality, and communicate effectively with the user (adopting organization) (Seethamraju, 2015).

Competitive pressure refers to *"the degree of pressure felt by an organization from competitors within the industry to adopt a certain innovation"* (Oliveira & Martins, 2011).

1.10 Organization of the Thesis

This research is structured as follows:

Chapter 2: Reviews existing literature on CERP adoption and the underlying theories used. It then describes the theoretical model and the hypotheses developed for this research.

Chapter 3: Presents the results of the preliminary study conducted to capture an initial insight of the current CERP status among MSMEs in Egypt.

Chapter 4: Describes the research methodology; including the research philosophy, research design, the population and unit of analysis, the data collection procedures, research instrument, and finally explains the statistical analysis applied for the research using SPSS25 and SmartPLS 4.

Chapter 5: Presents the data analysis results. It starts with the descriptive analysis presenting the respondents demographics, followed by the results of data evaluation tests, including missing data, outliers, data normality, and CMB. Finally, the results of

the inner and outer model evaluation are presented along with the results of the tested hypotheses.

Chapter 6: Presents the interpretation and discussion of the research findings in accordance with previous studies. Following, the conclusion of the study is provided followed by the implications of the study, the limitations, and future research directions.

CHAPTER 2

PRELIMINARY STUDY

2.1 Introduction

This chapter explains the qualitative investigation conducted prior to developing the research model. It starts by elaborating the reason for conducting the preliminary study, followed by its design and data collection procedures. Finally, a discussion of the results is provided upon which inferences were drawn to help in developing the research model as discussed in the next chapter.

2.2 The Need for Conducting a Preliminary Study

An extensive literature review showed that despite prior studies' attempts in studying the factors influencing CERP adoption in developing countries, yet existing research is still inadequate to comprehensively identify the factors causing the lower rates of adoption in the developing world. Besides, there hardly exist any studies that examined the determinant factors influencing CERP adoption among MSMEs in Egypt. In addition, prior studies, although conducted in different countries, they focused on similar factors. Thus, more country-specific contexts are needed in CERP adoption research and also more holistic assessment is required using different perspectives to help identify what is hindering SMEs in developing countries to adopt CERP systems (Al Hadwer et al., 2021; Picek, Mijac, & Androcec, 2017; Yasiukovich & Haddara, 2020).

This existing research gap raised the need to initially conduct a preliminary study to grasp a broader view of the research area and identify the present status of Egyptian MSMEs' awareness regarding CERP and their tendency to adopt it. In

addition, although prior studies have declared tremendous benefits for using CERP in MSMEs, many organizations remain hesitant in taking the adoption decision. One of the reasons; as argued by researchers, is that most decision makers in MSMEs have doubts and confusion regarding the characteristics of a CERP system. The lack of adequate and comprehensive information hinders decision makers from realizing the benefits that could be gained from adopting a CERP system (Alsharari et al., 2020; Scholtz & Atukwase, 2016).

Similarly, some studies added that the lack of knowledge results in MSMEs having false perceptions regarding CERP systems. For example, many MSMEs consider CERP as a complex and technologically advanced solution that is hard for them to implement (S. Gupta, Misra, Singh, Kumar, & Kumar, 2017). Moreover, several studies implied that MSMEs do not fully understand the benefits of cloud services. Besides that, there is a common confusion regarding what type and size of organizations are the most suitable to adopt CERP. For example, a survey based in the UK with 505 SMEs reported that 31% of the respondents have limited understanding of the potential implications of using cloud services in their organizations. Additionally, it surprisingly found that 22% believed that even the cloud option of an enterprise system is suitable for large enterprises only (Bjorn Johansson et al., 2015).

Furthermore, those issues of limited awareness and knowledge, and false perceptions, are more widely found in developing countries, particularly Africa and the Middle East (Adam & Musah, 2015; Hasheela et al., 2016; Zamzeer, 2019). Therefore, this preliminary study was needed to identify the extent to which MSMEs in Egypt understand the potentials of CERP and, to be able to get an initial insight of the factors influencing the adoption rates against the factors found by previous studies. Hence, matching this preliminary data to previous findings and adding new factors that were

not previously discovered, guided the development of a conceptual model that constitutes the factors influencing CERP adoption in the Egyptian context.

2.3 Preliminary Study Design

This preliminary study was conducted in a 6-month period from April to October in 2019. The qualitative research approach was applied where information was gathered through semi-structured interviews; one interview per company. Interviews have been known as the preferred method used to generate facts, opinions, and insights of a certain topic (Yin R, 1984). They also provide a way for the researcher to capture a rich image of the participants' views and perceptions based on their understanding and using their own words. Hence, they help the researcher to highlight significant factors concerning the topic (Oates, 2006; Yin, 2013).

Individual perceptions of CEOs and/or managers are usually used to comprehend, link, and validate an organizational level phenomenon (Seethamraju, 2015). Thus, as this study aims to explore CERP adoption at the organizational level, interviews were conducted with the CEOs, and only 2 of them were conducted with the IT manager. According to the nature of the small and medium-sized business, the CEO is usually the owner of the company.

The convenience sampling technique was utilized for this preliminary study where information was collected from participants who are conveniently available and willing to participate. Convenience sampling is commonly used in such cases where quick and inexpensive gathering of preliminary information is needed for the research (Sekaran & Bougie, 2016). The sample of companies interviewed were picked from a list of MSMEs available online while others were peer-introduced, through the