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Contextual Factors and Strategic Consequences of Cloud Enterprise Resource Planning (ERP) Adoption in Malaysian Manufacturing SMEs: A Conceptual Framework

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Abstract:

Purpose: *The purpose of this study is to holistically investigate the interrelationships between key contextual factors of cloud ERP adoption and the strategic consequences of such adoption.*
Design/Methodology/Approach: *The key contextual factors whose influences are explored on cloud ERP adoption are Feature task-match, (FTM); Top Management Support on Change Management (TMSCM) and Government Financial Support (GFS) while the strategic consequences of cloud ERP adoption investigated are competitive advantage (CA) and organisational performance. A conceptual framework grounded in Technology-Organisation-Environment (TOE) model, Task technology-fit (TTF) model and Resource-Based View (RBV) theory is developed for empirical validation that will involve a projected sample of 382 respondents of SMEs in Malaysia using PLS-SEM as main statistical analysis tool.*
Practical Implications: *Practically, this study will guide SMEs' managers on cloud ERP selection that fits their firms' tasks, how to effectively deal with resistance to change occasioned by technology adoption and how effective GFS has been influencing cloud ERP adoption. In addition, SMEs managers stand to gain insight into how cloud ERP adoption can simultaneously and/or indirectly lead to competitive advantage and organisational performance as strategic benefits.*
Originality/Value: *Investigation of a new variant key contextual factors critical for successful cloud ERP adoption and their subsequent impact on CA and organisational performance simultaneously and indirectly.*

Keywords: *Contextual, cloud ERP, adoption, Malaysia, SMEs, strategic consequences.*

JEL Code: *L25, L60, M21.*

Paper Type: *Research study.*

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1. Introduction

The present rapid economic development poses a threat to firms and in order to survive the ravaging competition triggered by this swift economic progression, they must adopt emerging innovation (Arteta and Giachetti, 2004; Roberts and Grover, 2012). Among the popular emerging innovative technologies that are reshaping the business world is cloud computing (CC). CC is a technology which facilitates the outsourcing of information technology (IT) by obtaining computing resources on the internet through pay-per-use model (Martson, Bandyopadhyay, Zhang, and Ghalasi, 2011; Yigitbasioglu, 2015). CC is made up of three main services, namely; Software as a Service (SaaS), which enables user to access software applications, Infrastructure as a Service (IaaS), which provides networks, operating systems, virtual machine, servers and storage, and Platform as a Service (PaaS), which permits users to experiment and deploy software. CC has four deployment models; private (solely for one organisation), public (shared by many organisations), community (exclusively for firms that have shared interests and hybrid cloud (combination of two or more models) (Bruque-Cámara, Moyano-Fuentes, and Maqueira-Marín, 2016; Mell and Grance, 2011; Vu, Hartley, and Kankanhalli, 2020). According to Gartner (2018), by 2022, over $1.3 trillion of global IT expenditure will be fully or partially influenced by cloud implementation. In Malaysia, IDC predicts that by 2023, cloud-based services market will have an accumulated yearly growth rate of 23.8% (Reseller Malaysia, 2018).

SMEs prevalently leverage on CC as it is less-expensive than setting up local servers and it empowers local firms to connect and compete globally (Hasnan, 2019). CC can improve SMEs' competitiveness by expediting business operations, saving money on computing cost, optimally accelerating time to market and consequently improving the bottom line of businesses (Amini and Bakri, 2015; Abolfazi *et al.*, 2015). Business applications offered on CC include supply chain management (SCM), customer relationship management (CRM), enterprise resource planning (ERP) and more. These applications are usually offered as software-as-a-service (SaaS). As a result, many SMEs can afford to subscribe because it is cheap, scalable and pay per use (Marston *et al.*, 2011; Son, Lee, Lee, and Chang, 2014; Yu, Li, Li, Zhao, and Zhao, 2018). Out of these CC business applications, cloud ERP is of interest to this study since it enables organisations to gain from a powerful integration of information and processes across diverse functions of business (OECD, 2019). Cloud ERP is an organisational-wide Information System (IS) packages that comprise of a broad collection of software modules designed to harmonize the vital logistics in business processes across several functional units and department of organisations through one data storage (Rezaei, Karimi, and Hosseini, 2016).

The global cloud ERP market is predicted to reach $40.5 by 2025, increasing between 2019 and 2025 at a CAGR of 13.6% (Liu, 2020). The cloud-based ERP systems are germane for all SMEs because they allow them to conduct data transactions along the value chain and help simplify information between finance, inventory, planning, manufacturing, human resources, marketing, engineering, distribution, materials and

sales and all other units within the organisation and among other organisations (Al-Shboul, 2018; Khamis and Mohd, 2016).

SMEs all over the world play a significant role in the economies of their host countries. In Malaysia, SMEs comprise of 98.5% of all business population and in 2018, they contributed 38.3%, 17.3% and 66.2% to the overall GDP, total exports and employment respectively (Teng, 2020). For global competitiveness and economic sustainability, Malaysian government has taken some measures to assist SMEs in forms of policies and incentives towards CC adoption. For instance, the digital transformation of the economy through endeavours such as education and awareness campaigns and the Malaysia Multimedia Super Corridor (MSC) Malaysia Cloud Computing Enablement Initiative (Mehrotra, 2017). Similarly, through the Multimedia Development Corporation (MDeC), Malaysia government offers SMEs a six-month subscription fee refund or up to RM1,500 of the total amount of subscription for any type of Saas such as cloud ERP from any of the Malaysia MSC status companies (Hassan, 2017: Hassan, Mohd Nasir, Khairudin, and Adon, 2017).

Despite government's effort, evidence shows that cloud-based applications are on the low side. For example, according to the digitalisation Survey of SMEs in 2018 by SME Corp. Malaysia and Huawei Technologies (M) Sdn. Bhd, only 44% SMEs in Malaysia have adopted CC, out of which 35% use other business applications and 10.5% use cloud ERP (Lee, 2018; Noordin, 2019; SME Corporation and Huawei Technologies, 2018). Malaysian SMEs' lag in cloud adoption begs the question. Prior studies largely concentrated on some factors influencing CC/cloud ERP adoption with inadequate consideration given to vital contextual factors influencing CC/cloud ERP adoption (Asiaei, Zairah, and Rahim, 2019; Fook Ming, Kim On, Rayner, Tse Guan, and Patricia, 2018; Qian, Bahrudin, and Kanaan-Jebna, 2016).

Additionally, prior studies show tendency not to investigate the strategic consequences of adopting CC when examining its antecedents. This research seeks to holistically study this phenomenon by comprehensively investigating the interconnection between vital contextual factors (feature-task match, FTM, top management support on change management, TMSCM and government financial support, GFS) of cloud ERP adoption and the strategic consequences; competitive advantage (CA) and firm performance resulting from such adoption. Prominently, this study seeks to develop a conceptual model that will serve as a guideline for successful cloud ERP adoption and strategic consequences of such adoption by SMEs.

The paper's structure is as follows. The next section gives the theoretical background of the study. Then the literature review of contextual factors and strategic consequences are discussed in the third section. Research framework and hypotheses development and research methodology are presented in sections 4 and 5. The discussion and conclusion section ends the paper.

2. Theoretical Background

In contrast to predominant focus on adoption as found in the literature, this study integrates both vital contextual factors and strategic consequences of cloud ERP adoption. The contextual factors influencing cloud ERP adoption is grounded in the TOE model (Tornatzky and Fleischer, 1990) and the technology context of the TOE is anchored by the Task-technology fit (TTF) theory of Goodhue and Thompson (1995). The strategic consequences of cloud ERP adoption is underpinned by the Resource-based view (RBV) theory (Barney, 1991). The next section discusses the theoretical foundation of this study.

2.1 The TOE Framework

According to Tornatzky and Fleisher (1990), TOE consists of three forms of an organisation's contexts that influence how technological innovations are implemented; they are the technological, organisational and environmental contexts. The technological context illustrates both the accessible technologies and the latest ones in the organisation. The descriptive elements of a firm such as size, scope and the quantity of excess resources available within are the organisational context. The external surrounding in which a firm operates — competitors, its industry, and connection to government refers to environmental context. TOE provides a good foundation when examining appropriate adoption factors and innovation utilisation because of its high empirical validation (Wang, Wang, and Yang, 2010; Zhu and Kraemer, 2005). The organisational, environmental and technological factors inclusion in TOE makes it have an edge above other adoption models in investigating adoption, usage and creation of value of new technology (Hossain and Quaddus, 2011; Oliveira and Martins, 2010; Zhu and Kraemer, 2005).

2.2 The Task-Technology Fit (TTF) Theory

TTF theory, proposed by Goodhue and Thompson (1995), posits that how well the requirements of a job match the features of a new technology determines technology acceptance. Essentially, Goodhue and Thompson (1995) and D'Ambra and Wilson (2013) argue that TTF is a factor that clarifies the degree to which IT can improve workers task, that is to say, the higher the harmony between technology and tasks, the higher the employees' performance. TTF highlights the interconnections between an individual, task and technology. Tasks are generally defined as the actions performed by persons in processing inputs into outputs. A task characteristics comprise those that might make a user to depend greatly on certain components of an IT. Technologies are regarded as instruments used by people to execute their given tasks. In the perspective of IT studies, technology includes computer systems (software, hardware, and data) and back-up services for user (such as training) made available to help users in their tasks. Individual characteristics (such as instruction, computer skills and drive) could dictate how effective the person will put the technology to use. Diverse tasks require diverse technological applicabilities. The wider the gap between the task

requirements and the applicability of a technology, the lesser TTF (Goodhue and Thompson, 1995) and vice-versa.

2.3 Combining TOE and TTF

Wang *et al.* (2010) and Gangwar, Date and Ramaswamy (2015) argue that TOE framework has unclear major constructs and is too generic, hence it needs to be reinforced by integrating with the theories that have plain constructs. In addition, Awa, Baridam and Nwibere (2015), Henderson, Sheetz and Trickle (2012) and Premkumar (2003) advocated that to determine the fundamental relationships and discover the precise factors that exist among the three contexts of TOE, it should be integrated with other theories of technology acceptance that suggest task and individual contexts so that predictive power of the resulting model can be improved. In this regard, the TOE framework is somewhat quiet on how technology's functionality match the task needs of the end-users (Awa, Ojiabo, and Orokor, 2017; Balaid, Abd Rozan, and Abdullah, 2014) making TTF an appropriate complementary theory. Thus, as a supporting theory to the TOE framework, the feature-task match (FTM), coined from the TTF is used to represent the technology factor of the TOE.

After taking into consideration prior CC studies' neglect of integrating TTF with TOE as shown in Table 1and section 3.1.1, the limited efforts of investigating a critical factor, top management support on change management, see Table 1 and section 3.1.2 and the fuzzy investigation of government support without clearly differentiating government non-financial support from government financial support, see Table 1 and section 3.1.3, the technology factor- Feature-task match (FTM), organisation factor, Top management support on change management (TMSCM) and environment factor- Government financial support (GFS) are selected as key contextual factors for cloud ERP adoption.

Table 1. *Literature on cloud computing adoption based on TOE model*

Authors/year/industry/country	**Technology context factors**	**Organisation context factors**	**Environment context factors**
Gutierrez, Boukrami and Lumsden (2015). CC adoption. Large and small enterprises (Multi-industry). UK	Relative advantage, *complexity and compatibility	Top management support, firm size and *technology readiness.	*Competitive pressure and *trading partner pressure.
Oliveira, Thomas and Espadanal (2014). CC adoption. Large and small enterprises (manufacturing and services). Portugal.	*Technology readiness, *relative advantage, *complexity and compatibility.	*Top management support and *firm size	Competitive pressure and regulatory support.
Karkonasasi et al. (2016). CC adoption. SMEs. Malaysia.	*Cost saving, *security and privacy and reliability.	*Top management support.	*Competitive pressure and *trading partner pressure.

Asiaei et al. (2019). CC adoption. SMEs. Malaysia.	*Data security, *technology readiness and cost saving.	*Top management support and *innovativeness.	*Competitive pressure and regulatory support.
Qian et al. (2016). Cloud ERP adoption. SMEs. Malaysia.	Security and privacy, cost effectiveness and internet reliability.	*Top management support.	Competitive pressure.
Fook Ming et al. (2018). CC adoption. SMEs. Malaysia.	*Cost saving, *technology readiness and relative advantage.	*Top management support.	Competitive pressure and external support.
AL-Shboul (2018). Cloud ERP adoption. SMEs. International	*Technology readiness, security concerns and *technical barriers.	*Top management support, *enterprise readiness, *enterprise size and enterprise status.	*Competitive pressure, government support and infrastructure/telecommunication.
Hsu and Lin (2016). Cloud services adoption. Large and small enterprises (Multi-industry). Taiwan.	*Relative advantage, ease of use, compatibility, trialability, *observability and *security.	Firm size, global scope, *financial costs and *satisfaction with existing IS.	*Competition intensity and regulatory environment.
Khayer,Talukder, Bao and Hossain (2020). CC adoption. SMEs. Bangladesh.	Relative advantage, service quality and perceived risk.	Top management support and facilitating conditions.	Cloud providers' influence and server location.
Amini and Bakri (2015). CC adoption. SMEs. Malaysia.	*Relative advantage, *compatibility, *security concerns, *cost savings and *technology readiness.	*Top management support	*Competitive pressure and *regulatory support

Note: ** Significant factors.*
Source: *Compiled by authors.*

2.4 Resource-Based View (RBV) Theory

The RBV takes a holistic view on why firms thrive or are unsuccessful in the market arena (Dicksen, 1996). Based on the RBV theory, an organisation can be referred to as a mix of physical, human and organisational resources (Amit and Schoemaker, 1993; Barney, 1991). The RBV theory contrives an idea or gives an explanation of tangible and intangible resources as well as capabilities which have impactful influence on organisation performance (Kamasak, 2017). The tangible and intangible resources that are valuable, rare, inimitable and non substitutable (VRIN) (Barney, 1991) facilitate firms to grow and maintain competitive advantages, to make use of these resources and competitive advantages for better-quality results (Madhani, 2010; Grant, 1991; Wernerfelt, 1984). Based on RBV theory (Barney, 2001), competitive advantage could be gained by a firm through resources and capabilities combination (Gupta, Qian, Bhushan, and Luo, 2018). The tactical combination of resources and

capabilities espouses uniqueness of strategy, difficult to copy by other firms. Organisational competitive advantage has been examined through RBV lens and RBV has been used by many researchers investigating firm performance (Azam, 2015).

Cloud ERP is such a strategic instrument for helping firms to achieve competitive advantages by combining all business processes, honing the available resources, improving accessibility, facilitating market reach, and enhancing productivity and efficiency (Gupta, Kumar, Singh, Foropon, and Chandra, 2018; Nikookar, Yahya Safavi, Hakim, and Homayoun, 2010; Zamzeer *et al.,* 2019). RBV theory provides a theoretical base for linking CC adoption with firm performance (Gangwar, 2017; Garrison, Wakefield, and Kim, 2015; Gupta, Kumar *et al.,* 2018) and competitive advantage. Thus, in this study, cloud ERP serves as IT resources and cloud ERP adoption conceptualised as usage and strategic alignment represents the firm's capabilities. The combination of these two encapsulates the VRIN qualities (Barney, 1991) and allows firms to gain strategic benefits of CA and better organisational performance.

3. Literature Review on Key Contextual Factors and Strategic Consequences of Cloud ERP Adoption

As earlier explained, three unique factors of the TOE framework, FTM, TMSCM and GFS are selected as the contextual factors of cloud ERP Adoption based on prior studies' neglect of these crucial factors and Competitive advantage (CA) and organisational performance are the strategic consequences of cloud ERP adoption focused in this study, since studies have confirmed that they are the two dominant strategic benefits firms seek in IT adoption (Bruque-Camara *et al.,* 2016; Chang, Hsu, Huang, and Chen, 2019; Lucia-Palacios *et al.,* 2014; Shehat and Montash, 2019). These constructs are reviewed in the next section.

3.1 Contextual Factors of Cloud ERP Adoption

3.1.1 Feature-Task Match (FTM)

FTM is the reasonable perspective of how a novel technology's capacity can support the effective and efficient performance of a task. TTF (Goodhue and Thompson, 1995) is among the theories of IS with behavioural technique that explains tasks compatibility with IS technologies (Ratna, Astuti, Utami, Rahardjo, and Arifin, 2018). Based on TTF theory, digital technologies such as cloud ERP are more likely to yield a positive effect when the functionalities they deliver can match the tasks organisational users must undertake (Goodhue and Thompson, 1995). In this study, FTM is synonymously referred to TTF. Ghani, Di, Khidzir, Guan and Ismail (2017) integrated FTM and TBP to investigate the intention of textile cyberpreneurs to implement m-retail application based in the cloud in Malaysia. They found FTM as the most influential factor on textile cyberpreneurs' behavioural intention to use cloud-based m-retail application.

Furthermore, Cheng (2019a) in the cloud ERP context in Taiwan found FTM to have significant effects on, perceived usefulness, users satisfaction and confirmation which in turn led to cloud ERP usage continued intention. FTM, expectation-confirmation model (ECM) and DeLone and Mc Lean information system success (D&M) models were applied. Abugabah, Sanzogni and Alfarraj (2015) investigated ERP's impact on users' performance in six universities in Australia. FTM was combined with TAM and D&M's models. FTM significantly contributed to users' performance success of ERP measured by efficiency, effectiveness and service quality. On the other hand, Cheng (2019b) found FTM to have significant influence on users' satisfaction, confirmation and perceived usefulness with the cloud e-learning system in a Taiwanese university based on the theoretical foundation of FTM and ECM. Despite the importance of FTM to complement TOE, the literature review revealed that studies which strengthens the TOE framework with FTM in the cloud-based services adoption are scant.

3.1.2 Top Management Support on Change Management (TMSCM)

Top management support is as a result of the fact that the conviction and willingness of top management to endorse adequate financial resources, technological competencies and human resources is vital for facilitating successful CC adoption (Hassan *et al.,* 2017). Top management will be motivated to ensure that all kinds of resources needed to adopt CC successfully or expand its usage are provided when they are aware of its benefits (Oliveira *et al.,* 2014; Pathan *et al.,* 2017). Similar to on-premise ERP solutions, the adoption of cloud-based ERPs leads to organisational changes (Elragal and El Komos, 2012). Though cloud ERP can be quickly implemented, it still requires significant time for organisational adaptations, where staff must amend some of their routines in order to handle data in a different way (SØrheller, HØvik, Hustad, and Vassilakopoulou, 2018). Organisational resistance has been a factor that SMEs battle with when moving from conventional means of conducting the business to cloud-based ERP solution (Gupta and Misra, 2016). Thus, a call for proper change management by top management to curtail resistance. Past studies on CC/cloud ERP have been able to confirm the influence of TMS on CC adoption (AL-Shboul, 2018; Asiaei *et al.,* 2019; Fook Ming *et al.,* 2018; Karkonasasi *et al.,* 2016; Oliveira *et al.,* 2014; Qian *et al.,* 2016).

However, none of these studies used instruments that completely reflect TMS complexity and multi-dimensionality such as structural arangements, communication, expertise, power or authority, resources provision, change management and more (Ahmed and Azmi bin Mohamed, 2017; Boonstra, 2013; Dong, Neufeld, and Higgins, 2009). For example, Qian *et al.* (2016) used five items of "top management deems cloud ERP is essential in the operations of company", "the decision of top management is vital for company to adopt cloud ERP", "top management plans to adopt cloud ERP", "top management will support cloud ERP adoption", and "top management support is important to provide resources for comapany to adopt cloud ERP". Oliveira *et al.* (2014) used three items "the company's management supports the implementation of cloud computing", "the company's top management provides strong leadership and engages in the process when it comes to information systems"

and "the company's management is willing to take risks (financial and organisational) involved in the adoption of cloud computing". Qian *et al.* (2016) literally measured the attitude of top management towards cloud ERP adoption and Oliveira *et al.* (2014) measured TMS as top management behaviourial action of "support" as a general concept, "strong leadership" and attitude of top management "willingness". These items partially measure TMS and may be misleading as they insinuate all the existing types of TMS and moreover they are devoid of TMS on change management, a vital role for successful IT adoption.

Change is a compulsory situation in adopting CC and resistance to change has been reported as a barrier to adopting and using CC (Gangwar, 2017; Hsu and Lin, 2016; Yeboah-Boateng and Essandoh, 2014). However, TMS on change management has been neglected altogether in the literature. According to a 2014 report "Best Practices in Change Management" by a world renowned change management research group Prosci, there was a finding that an IT project is 600% more likely to be successful when an excellent change management is put in place by organisational leaders (Wipfli LLP, 2014). In actual fact, the discussion of change hardly exists without implicitly making reference to leadership (Bass, 2008), yet, close relationships between change and leadership have not been systematically explored (Oreg and Berson, 2019). This study therefore seeks to investigate the TMS role of managing change during CC adoption.

3.1.3 Government Financial Support (GFS)

Government support (GS) could be direct investments, financial incentives, specific suggestions to firm's business activities and business-friendly programs and policies (Wang, Xue, Liang, Wang, and Ge, 2019) that can influence IT adoption such as cloud ERP. Thus, a firm's behaviour and competitiveness could be greatly affected by various degrees of support from government (Cai, Jun, and Yang, 2010). Basically, GS is conceptualised as financial and non-financial supports (Kim, Oh, Park, and Joo, 2018). An observation from prior studies in the CC domain in Table 1 shows that the generic GS concept was employed. A more critical scrutiny of the measurement items revealed that some authors only focused on non-financial support without the financial support. For example Oliveira *et al.* (2014) conceptualised GS from the non-financial view, using 2 instrument items of "legal protection in using CC" and "the sufficiency of present laws and regualtions to protect CC usage". Sandu and Gide (2018) employed five items which are "regulation of data protection policies for CC", "sufficiency of current laws and regualtions for CC usage", "sufficiency of current laws and regualtions for CC user's interest", "support of business laws for CC" and "provision of incentives for CC usage" where only the last item indifferently highlights GFS which can still be disputed as not GFS because incentives could be non-financial.

It is argued that the indiscriminatory investigation of the GS concept maybe responsible for the conflicting results reported in the literature. For example Oliveira *et al.* (2014) and Asiaei *et al.* (2019) reported insignificant results while Amini and

Bakri (2015) reported a significant result. Specifying the actual roles of government and measuring it completely can help resolve the conflicting results and conspicuously reveal the type being reported in the literature. Although, Malaysian government has supported SMEs from both financial and non-financial aspects, this study chooses government financial support because Malaysian government has provided huge financial support for CC adoption by SMEs and the effect is yet to be categorically explored. For instance, through the Multimedia Development Corporation (MDeC) Malaysia, government of Malaysia offered a six-month refund on the subscription or RM1,500 and below of the total subscription for any type of SaaS such as cloud ERP from one of the Malaysia Multimedia Super Corridor (MSC) grade firms (Hassan, 2017; Hassan *et al.,* 2017). An annual incentives of 250 USD was also introduced by the CC adoption programme initiated by the Malaysian government to incentivize local SMEs to embrace SaaS business cloud applications such as enterprise resource management (ERP), customer relationship management (CRM), content management systems (CMS) etc., rendered by local SaaS vendors (Rosen *et al.*, 2015). Hence, this study conceptualises GS in terms of financial support to verify whether it has influence on cloud ERP adoption. Moreover, SMEs are mostly cash-strapped (Marston *et al.,* 2011; Seethamraju, 2013; 2015) and would be more willing to adopt CC when financial incentive is provided.

3.2 Strategic Consequences of Cloud ERP Adoption

3.2.1 Competitive Advantage (CA)

Scholars and practitioners have shown great interest in understanding how CA could be created through different ways such as IT implementation, human resources capabilities, diversification, mergers and acquisition and so on (Breznik, 2012; Lee, 2015). Big and small organisations in developed and developing economies can speedily become strong competitors while using IT to create CA and become market leaders (Mustafa, 2015). Their determination to use IT as a means of gaining CA is motivated by their need to deliver cheap and quality products and services, heterogeneous products and services, capability to focus on a specific market segment, facilitate strategic planning and improve on the innovative practices of the organisation (Agwu and Murray, 2015; Chiu and Yang, 2019; Keller and Von der Gracht, 2014).

Some studies have examined how different types of IT can be a source of CA. Shehata and Montash (2019) developed and empirically examined an holistic model that attempted to discover the factors that determine CA of executing e-business in the third world countries (Middle East and North Africa). The result indicated that ICT driven customer relationships and environmental forces (e-business constructs) were positively significant to CA and e-business barriers mediated the relationships. Soliman and karia (2017) conceptually studied how successful ERP adoption in higher learning institution in Egypt could help them gain CA. Although, the study was not empirically validated, the authors established that ERP successful adoption by higher institutions in Egypt could make them gain CA because of the cheap standard

educational services and also ERP system enabled effective resources use. Bilgihan and Wang, (2016) used semi-interview technique to gather data from CTO/CIOs and vice presidents of hotels, CEOs of technology vendors of hospitality and academics whose area is hospitality technology research in the US. The findings show that CA gained as a result of IT is achievable when hotels logically combine all existing technologies in the organisation in a way that generates synergy. A study found that cloud absorptive capacity and cloud usage positively and significantly influenced CA in diverse company sizes and industries internationally using online survey (Chang *et al.*, 2019).

3.2.2 Organisational Performance

Organisational performance and its improvement are considered the central part of corporate strategic management and so most of the efforts of researchers in this field are directed to this aspect (Tseng and Lee, 2014; Masa'deh , Tarhini, Al-Dmour, and Obeidat, 2015). Empirically, evidence abound on the link between IT and firm performance. Lucia-Palacios, Bordonaba-Juste, Polo-Redondo and Grünhagen.(2014) reported a significant effect of implementing e-business (internal integration and external diffusion) on organisational performance (market share, profitability and sales volume) in US and Spanish firms. Furthermore, Gangwar (2017) examined the CC usage and organisational performance relationship in large and small manufacturing firms in India. The TOE framework and RBV were integrated and the results revealed that all the TOE factors were critical antecedents of CC usage. CC usage in turn was positively significant with organisational performance with firm size moderating actual usage and performance. Sallehudin, Razak and Ismail (2017) examined implementation of CC on the performance of agencies from the Malaysian public sector. The study revealed that technological and organisational factors and human characteristics had a significant effect on CC implementation and CC implementation impacted significantly and positively on operational effectiveness. Similarly, a Malaysian study found that performance expectancy, firm size, absorptive capacity of CC had a positively significant influence on innovativeness which in turn positively influenced performance of manufacturing firms (Ooi, Lee, Tan, Hew, and Hew, 2018).

Bruque-Cámara *et al.* (2016) analysed the effect of community CC on supply chain integration (informational and physical integration). The combined effect of community CC and supply chain integration on firms' operational results were also analysed. The results indicated that community CC exerted a positive and significant effect both on the supply chain integration and on operational performance in Spain. Based on prior studies on the consequences of IT/CC, most of the past research approached it in a fragmented manner especially CA and firm performance phenomenon. Meanwhile, the foremost proposition is that CA is a prelude to superior performance (Barney, 2001; Grant, 1991; Sigalas and Economou, 2013), and in all of the leading strategic management theories, a firm will achieve CA first before superior performance (Sigalas and Papadakis, 2018). To illustrate, RBV theory for example, suggests that tangible and intangible resources that are valuable, rare, inimitable and

non substitutable (VRIN) (Barney, 1991) facilitate firms to grow and maintain competitive advantages (Essel, Adams, and Amankwah, 2019; Mohamad Radzi, Mohd Nor, and Mohezar Ali, 2017), and make use of these resources and CA for better firm performance (Madhani, 2010; Grant, 1991; Wernerfelt, 1984). Thus, a firm that attains a CA is most likely to exhibit a superior performance. In that light, the association between firm performance and competitive advantage is symbiotic (Breznik, 2012) and this study investigates both jointly and indirectly.

4. Conceptual Framework and Hypotheses

In this section, the relationship between the proposed key factors (FTM, TMSCM and GFS), cloud ERP adoption, CA and organisational performance are reviewed from the existing literature to support the proposed relationships in the conceptual framework (Figure 1). Basically, this framework has two parts which link the antecedents (FTM, TMSCM, GSF) of cloud ERP adoption with the strategic consequences (CA and organisational performance). In the first part (left-hand side), FTM, TMSCM and GSF serve as determining constructs of cloud ERP adoption. GSF also serves as a moderator construct between FTM, TMSCM and cloud ERP adoption. In the second part (right-hand side), cloud ERP adoption serves a determining construct of CA and firm performance. The CA also serves as a mediator construct between cloud ERP adoption and organisational performance.

Feature-task match refers to matching the qualities of the technology to the work requirements, that is to say, the capability of technology to support a successful task completion (Teo and Men, 2008). There are chances that the acceptance and utilisation of a new technology are higher when a higher compatibility level exist between the features of the technology and tasks to be executed (Ghani *et al.,* 2017). It is not out of reflection that IT acceptance by users (organisational employees) may not be fruitful when they cannot notice a match between the IT and their work assignments, while it seems that the IT is useful (Cheng, 2019b; Zhou, Yu, and Wang, 2010). Fu *et al.* (2019) found that the fit between enterprise social media (ESM) characteristics and task requirements significantly had effect on ESM usage. Ghani *et al.* (2017) found FTM as the most influential factor that have significant effects on textile cyberpreneurs' behavioural intention to use cloud- based m-retail application. The fit between cloud ERP features and task (FTM) was found to have significant effects on users satisfaction, confirmation and perceived usefulness which in turn led to continued intention of cloud ERP usage (Cheng *et al.,* 2019a). Therefore, it is predicted that when the cloud ERP features match the firm's tasks, employees will have a more positive attitude towards cloud ERP adoption. Hence the study proposes the following hypothesis:

H1: Feature-task match positively influences cloud ERP adoption.

Top Management Support on Change Management (TMSCM) is defined as purposeful set of activities by top management to facilitate, support, direct, authorise,

and provide resources for organisational change throughout IT systems adoption, including ERP systems (Ifinedo, 2008; Wipfli LLP, 2014). Abdollahzadehgan, Che Hussin, Gohary and Amini (2013) found top mangement support as part of the most significant critical success factors of CC adoption using TOE in a qualitative study on SMEs in Malaysia. Kim, Jang and Yang (2017) reported top management support as a major driver of SaaS adoption. CC triggers organisational change and resistance to change has been found to hinder adoption and usage of CC (Gangwar, 2017; Hsu and Lin, 2016; Yeboah-Boateng and Essandoh, 2014) and TMS has been confirmed as an antidote for tackling organisational resistance and guaranteeing success in IT implementation (Elbanna, 2013). Dong *at al.* (2009) found TMSCM as a critical factor for enterprise systems implementation in Canadian universities in a case study. Thus, the following hypothesis is proposed:

H2: Top management support on change management (TMSCM) positively influences cloud ERP adoption.

GFS is defined as the support given by government to influence the adoption of innovative technology by SMEs through cloud-based services in addition to provision of firms with an additional source of funding (Huong and Cuong, 2019; Sandu and Gide, 2018). Government support for organisations can assume different dimensions, which may include direct investment, grants, tax incentives (Jugend *et al.,* 2018) and policies. Most prior research found government support as key determinants that may influence innovative technology adoption particularly in countries that are classified as emerging economies (Amini, Sadat Safavi, Mirzaeyan Bahnamiri, Mirzaei Omran, and Amini, 2014; Ellahi, Hudzia, Li, Lindner, and Robinson, 2010). On GFS, Doh and Kim (2014) found that there was a significantly positive relationship between technology innovation and the Korean government's technology development assistance funds. Small business budgets a small amount for IT facilities, so government financial aid encourages the adoption of CC which boosts the performance of the whole SMEs sector (Raut, Gardas, Jha, and Priyadarshinee, 2017). Thus, the following hypothesis is proposed:

H3: GFS positively influences cloud ERP adoption.

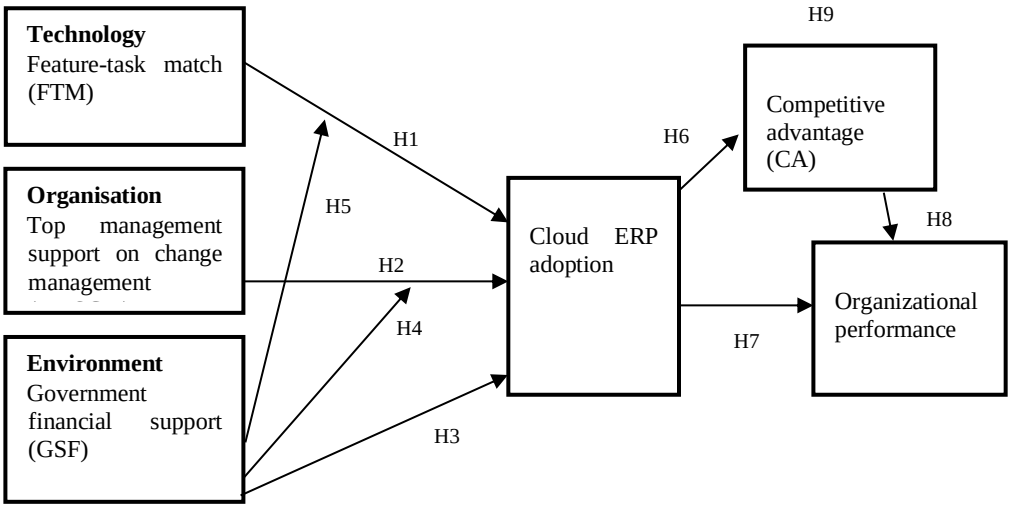
The literature suggests that the TOE model lacks the moderator effect in IT research and its implication in technology adoption regarding the probable environmental factors (Alsaad, Mohamad, and Ismail, 2018; Oliveira *et al.*, 2019; Venkatesh and Bala, 2012). Assessing the moderating influences of the environmental factors (such as government financial support) over the technological and organisational factors provides a more contextualised analysis of the topic under study and the TOE framework itself (O'Leary-Kelly, Martocchio, and Frink, 1994; Oliveira, Martins, Sarker, Thomas, and Popovič, 2019). Ramanathan, Ramanathan and Ko (2014) in the RFID adoption context show that there was a strong government support moderation relationship between RFID usability and its adoption. Similarly, in SaaS adoption, Oliveira *et al.* (2019) used the TOE framework, tested and confirmed the moderating

effect of the environmental context using the institutional theory variables (mimetic, coercive and normative pressure). Kim *et al.* (2018) found that government financial incentive positively moderated the relationship between perceived value and electric vehicle adoption in Korea. Based on the literature evidence, GFS is expected to strengthen the relationship between cloud ERP adoption and the technology (TMSCM) and organisation factors (FTM). Hence, the following hypotheses are proposed:

H4: GFS moderates the relationship between TMSCM and cloud ERP adoption.

H5: GFS moderates the relationship between FTM and cloud ERP adoption.

Figure 1. *Proposed Conceptual Framework with Hypotheses*



Source: *Developed by authors.*

Adopting CC contributes to changing the businesses operations in order to achieve CA (Chen, Jaw, and Wu 2016). CC helps companies to cut IT investment by providing on-demand computing power to allow rapid implementation, fewer IT staff, low maintenance, and lower overall IT expenditure (Lin and Chen, 2012; Yang and Tate, 2012). Internet adoption was positively significant to gaining CA by firms in diverse sectors in Singapore (Teo and Pian, 2003). Chang *et al.* (2019) found that cloud absorptive capacity and cloud usage positively and significantly influenced CA of firms. Hence, cloud ERP adoption can enable firms gain CA. Thus, the following hypothesis is proposed:

H6: Cloud ERP adoption positively influences competitive advantage.

IT adoption generally supports firms to achieve a better performance such as to gain market share, higher productivity, better product and services innovation, reliable

customer-oriented position and improved response to market changes (Cardona, Kretschmer, and Strobel, 2013; Hall, Lotti, and Mairesse, 2013; Tran *et al.*, 2014). Adopting a new technology is only vital if it really improves the performance of business organisations (Yunis, Tarhini, and Kassar, 2018). Effectively adopting and aligning an IT resource to enhance the organisational core competencies boosts firm performance (Ilmudeen, Bao, and Alharbi, 2019). The study of Gupta, Qian *et al.* (2018) showed that both cloud ERP and big data had a positive and significant impact on operational and market performance. Hunton, Lippincott and Reck (2003) compared the financial performance of 126 ERP adopters and non-adopters firms obtained by a past study and database (Compustat) in the US. Results of the study signified that return on assets (ROA), return on investment (ROI) and asset turnover (ATO) were significantly improved over a three-year period for adopters, in comparison to non-adopters. Further, the financial performance of non-adopters deteriorated over time whereas it held steady for adopters. Hence, the following hypothesis is proposed.

H7: Cloud ERP adoption positively influences organisational performance.

Given that the foremost aim of enterprises is to make high financial returns, achieving this goal can be aided through gaining a sustainable competitive advantage (Ma, 2000; Majeed, 2011). Meaning, the main objective of many business is to attain a competitive advantage that is sustainable (Saeidi, Sofian, Saeidi, Saeide, and Saiedi, 2015) and superior organisational performance. CA is the competence/set of competencies or resource/set of resources that give a firm a relative benefit on its business rivals which subsequently leads to higher relative performance (Wiggins and Ruefli, 2002). Organisational performance is defined as fulfilling all tasks which are necessary to reach organisational goals (e.g. increasing profits) (Kopia, 2019).

Rationally, when a firm demonstrates a superior performance, that is, it commands above-average economic rents, in that case the firm has achieved CA, an evidence that the relationship between CA and organisational performance is mutual (Breznik, 2012). The mutuality between CA and organisational performance has been confirmed in the extant literature. Lee (2015) confirmed the significant relationship between CA and firm market performance of the women entrepreneur in small-sized business in Korea. Potjanajaruwit (2018) found that CA significantly had an effect on SMEs start-ups perfomance. Handoko, Aryanto and So (2015) found that ERP showed a significant and positive relationship to CA and CA subsequently had significant impact on organisational performance. Thus, the following hypothesis is proposed:

H8: Competitive advantage positively influences organisational performance.

Most leading strategic management theories classify CA as an intermediate construct to performance (Sigalas and Papadakis, 2018). For instance, the RBV states that an organisation is very likely to achieve a superior performance from CA captured by the

distinctive capabilities and resources of the organisation (Barney,1991; Wernerfelt, 1984). Besides that, the dynamic capabilities theory by Teece, Pisano and Shuen (1997) claims that CA developed from the dynamic capabilities of the firm can result to superior performance. In the commercial banking context, Kamukama, Kyomuhangi, Akisimire and Orobia (2017) found a partial significant mediation impact of CA in the relationship between competence and financial performance in Uganda. Saeidi *et al.* (2015) established the mediating effect of CA in the relationship between corporate social responsibility (CSR) and financial performance. Similarly, Cantele and Zardini (2018) in the CSR context found CA to be a mediator that positively contributed to the financial performance of Italian manufacturing SMEs. Although the above mediation evidences of CA on performance are outside the IT-CA-Organisational performance context, nevertheless they provide insights on the CA mediation effect to performance. Furthermore, prior studies have been inconclusive on the relationship between IT and firm performance, (Sigalas and Economou, 2013; Sigalas and Papadakis, 2018; Breznik, 2012), hence a basis to investigate the mediating effect of CA in the relationship between cloud ERP adoption and organisational performance. Hence, the following hypothesis is proposed:

H9: Competitive advantage mediates the relationship between cloud ERP adoption and organisational performance.

5. Research Methodology

The target population of this study are the manufacturing SMEs in Malaysia. Top-level managers such as senior IT managers, information technology officer (ITO), chief information officer (CIO) and SMEs owners constitute the unit of analysis. They are suitable respondents for this study since they are usually more knowledgeable about issues concerning CC adoption and its business benefits which are strategic in nature, than a lower-level or operational employee. The sample size is derived from the use of Krejcie and Morgan's (1970) sample size determination formula which is 382. In this research, the stratified random sampling is used. According to Department of Statistics, Malaysia (2016), Selangor, Kuala Lumpur and Johor have the largest number of SMEs in the range of 19.8%, 14.7% and 10.8% respectively. Hence, each serves as a stratum to draw the sample size. Survey method with the aid of online and paper-based questionnaire will be employed to reach a larger potential respondents.

The questionnaire consists of the demographic profile part and the major constructs' part which has 63 questions in total. The second part of the questionnaire will be measured with a 5-point Likert scale ranging from "strongly disagree to strongly agree". The English version will be translated back to back into Malay language for understandability by language experts, after which it will be pre-tested by two senior IS faculty members and one industry expert. The pilot-test will be carried out by 30 manufacturing SMEs that will be excluded from the main sample. All items of the constructs are adapted from previous related studies on IT adoption and consequences. For data analysis, descriptive statistics and Structural Equation Modelling (SEM)

techniques will be used and SPSS 23.0 and SMART-PLS 3.0 are the software to be employed.

6. Discussion, Conclusion and Limitation

This study is on-going and the proposed conceptual framework will be empirically validated with data collected from manufacturing SMEs in Malaysia. This research is planned to comprehend the holistic cause and effect of cloud ERP adoption in the manufacturing SMEs in Malaysia. Therefore, it will contribute significantly to the adoption and strategic management literature.

First, this research includes only key contextual factors (FTM, TMSCM and GFS) as antecedents to cloud ERP adoption in the TOE model which were not altogether considered by prior studies. This research has the potential to help SMEs' managers in manufacturing sector to avoid one size fits all of cloud ERP and opt for the one that aligns with their tasks. Change resistance erupted by new technology adoption can be effectively managed by managers and the effect of GFS on CC adoption will be clearly exposed by this present study to the best of our knowledge for the first time, especially in Malaysia SMEs context.

Second, cloud ERP adoption is further examined simultaneously on strategic consequences- CA and organisational performance, since there exists a symbiotic relationship between these two strategic constructs based on the propositions of most strategic management theories. The relative new simultaneous investigation of cloud ERP on CA and firm performance and the mediation effect of CA between cloud ERP and firm performance contributes significantly to the RBV theory and practically managers can analyse cloud ERP's ability to exhibit dual, single and/or indirect strategic benefits in their organisations.

Third, the complete motivation and effect of adopting an IT like cloud ERP are embedded in a single research model for clarity and proper understanding, rather than partially examining the relationships as common in extant literature.

Fourth, the predictive capability of the TOE framework is strengthened through the inclusion of FTM, thereby addressing the shortcomings of individual characteristics and TTF the TOE lacks.

Lastly, policy makers will gain insights into the area to focus their support for SMEs to successfully adopt cloud ERP which can enhance their competitiveness and performance for higher GDP contribution, since SMEs make 98.5% of the business population in Malaysia (SME Corp Malaysia, 2016).

Although this study seeks to investigate key factors of cloud ERP adoption and how they subsequently influence CA and firm performance simultaneously and indirectly, it also has some limitations. Factors included as antecedents to cloud ERP are not

exhaustive, future studies may consider examining more novel key factors. This study criticized prior studies for not differentiating between GFS and government non-financial support in IT adoption, yet only the GFS is focused to prove its impact on cloud ERP adoption. Future studies can include both in their framework and test and compare their effects on cloud ERP adoption. Other types of TMS such TMS-resource, TMS-vision sharing, TMS-communication and more can be examined individually to identify the most significant for cloud ERP adoption. Even though this study has holistically embedded key contextual factors and strategic consequences of cloud ERP adoption in a framework, future study may consider investigating the key contextual factors of cloud ERP adoption directly on CA and organisational performance.

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