



**ANTECEDENTS OF CLOUD ENTERPRISE RESOURCES PLANNING
IMPLEMENTATION AND THEIR EFFECTS ON BUSINESS FINANCIAL
PERFORMANCE THROUGH COMPETITIVE ADVANTAGE**

By

JAYEOLA OLAKUNLE

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

July 2022

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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July 2022

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Cloud computing (CC) is recognised as a disruptive technology capable of providing competitive advantage and improved performance to firms. However, Malaysian SMEs are still slow in implementing CC despite numerous government supports. In addition, the impact of implementing CC on the performance of firms remains controversial. Therefore, this study aims to examine the relevance of government financial support (GFS) in conjunction with two chosen antecedents of cloud computing (CC) implementation in Malaysian manufacturing SMEs, namely feature-task match (FTM) and top management support on change management (TMSCM) which are supported by Technology-Organisation-Environment (TOE), Task-technology Fit (TTF), Kotter's change management theories. Further, the study also examined the financial performance effect of CC implementation of Malaysian manufacturing SMEs directly and indirectly through competitive advantage (CA) with the support from the strategic management Resource-based view (RBV). A set of Google Forms questionnaire related to the implementation of cloud computing (CC) were sent to the owners and top-level managers of manufacturing SMEs in Selangor, Kuala Lumpur and Johor through emails. A total of 204 responses were usable for analysis and hypothesis testing. Statistical Package for the Social Sciences (SPSS) version 25 and Structural Equation Modelling (SEM) using SMARTPLS 3.3.2 were used to analyse the collected data. Findings show that feature-task match (FTM), top management support on change management (TMSCM) and government financial support (GFS) are valid predictors of cloud computing (CC) implementation. However, GFS only negatively moderates the relationship between TMSCM and CC implementation, while it does not moderate the FTM and CC implementation relationship. Additionally, GFS only impacts financial performance through the mediation of CC implementation. Finally, CC implementation significantly improves financial performance both directly and indirectly through competitive advantage (CA). This research makes contribution to the current body of literature by integrating several theoretical frameworks (such as TOE, TTF, Kotter's change management model and RBV) to develop a comprehensive model for

understanding relevant factors of CC implementation, feature-task match (FTM), top management support on change management (TMSCM) and government financial support (GFS) which were under-researched in the previous studies. Furthermore, this study empirically provides evidence that deepens insights into how environmental factor (GFS) of the TOE acts as a pull factor that dampens the positive influence of TMSCM on CC implementation. Finally, based on the RBV, this study extends prior understandings by showing the financial performance impact of CC implementation through CA. This study also discusses some implications for practitioners and policy makers to promote and sustain SMEs' CC implementation.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**ANTESEDEN PELAKSANAAN PERANCANGAN SUMBER PERUSAHAAN
AWAN DAN KESANNYA TERHADAP PRESTASI KEWANGAN
PERNIAGAAN MELALUI KELEBIHAN DAYA SAING**

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Pengkomputeran awan (CC) diiktiraf sebagai teknologi yang mengganggu yang mampu memberikan kelebihan daya saing dan prestasi yang lebih baik kepada firma. Walau bagaimanapun, PKS Malaysia masih perlahan dalam melaksanakan CC walaupun terdapat banyak sokongan kerajaan. Selain itu, kesan pelaksanaan pengkomputeran awan terhadap prestasi firma masih menjadi kontroversi. Oleh itu, kajian ini bertujuan untuk mengkaji kaitan sokongan kewangan kerajaan (GFS) dengan bersama dua anteseden terpilih bagi pelaksanaan pengkomputeran awan (CC) di kalangan PKS pembuatan Malaysia, iaitu padanan tugas-ciri (FTM) dan sokongan pengurusan atasan terhadap pengurusan perubahan (TMSCM) yang disokong oleh teori-teori Technology-Organisation-Environment (TOE), Task-technology Fit (TTF) dan pengurusan perubahan Kotter. Seterusnya, kajian itu juga mengkaji kesan prestasi kewangan pelaksanaan CC bagi PKS pembuatan Malaysia secara langsung dan tidak langsung melalui kelebihan daya saing (CA) dengan sokongan daripada pandangan berasaskan Sumber (RBV) pengurusan strategik. Satu set soal-selidik Google Form berkaitan pelaksanaan pengkomputeran awan (CC) telah dihantar kepada pemilik PKS pembuatan pengurus peringkat atasan di Selangor, Kuala Lumpur dan Johor melalui e-mel. Sebanyak 204 maklum balas didapati boleh digunakan untuk analisis dan ujian hypothesis. Statistical Package for the Social Sciences (SPSS) versi 25 dan Structural Equation Modelling (SEM) menggunakan SMARTPLS 3.3.2 digunakan untuk menganalisis data yang dikumpul. Penemuan menunjukkan bahawa pepadanan tugas ciri (FTM), sokongan pengurusan atasan mengenai pengurusan perubahan (TMSCM) dan sokongan kewangan kerajaan (GFS), adalah peramal yang sah untuk pelaksanaan pengkomputeran awan (CC). Walau bagaimanapun, GFS hanya menyederhanakan secara negatif perhubungan antara perhubungan pelaksanaan TMSCM dan CC, manakala ia tidak menyederhanakan padanan tugas sifat dan perhubungan pelaksanaan CC. Selain itu, GFS hanya memberi kesan kepada prestasi kewangan melalui pengantaraan pelaksanaan CC. Akhir sekali, pelaksanaan pengkomputeran awan meningkatkan prestasi kewangan secara langsung dan tidak langsung melalui kelebihan

daya saing (CA). Penyelidikan ini memberi sumbangan kepada badan kesuasasteraan semasa dengan menyepadukan beberapa rangka kerja teori (seperti TOE, TTF, model pengurusan perubahan Kotter dan RBV) untuk membangunkan model komprehensif untuk memahami faktor berkaitan pelaksanaan CC padanan ciri-tugas (FTM), pengurusan atasan sokongan terhadap pengurusan perubahan (TMSCM) dan sokongan kewangan kerajaan (GFS) yang kurang diteliti dalam kajian terdahulu. Tambahan pula, kajian ini secara empirikal memberikan bukti yang memperdalam pandangan tentang bagaimana faktor persekitaran (GFS) TOE bertindak sebagai faktor penarik yang melembapkan pengaruh positif TMSCM terhadap pelaksanaan CC. Akhir sekali, berdasarkan RBV, kajian ini memanjangkan pemahaman terdahulu dengan menunjukkan kesan prestasi kewangan pelaksanaan CC melalui CA. Kajian ini juga membincangkan beberapa implikasi kepada pengamal dan penggubal dasar untuk mempromosikan dan mengekalkan pelaksanaan CC PKS.

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

ACCA	Asia Cloud Computing Association
ADEQ	Adequacy
ADKAR	Awareness, Desire, Knowledge, Ability and Reinforcement
ALL	Alliance
ANOVA	Analysis of Variance
APAC	Asia-Pacific
ATO	Asset Turnover
AVE	Average Variance Extracted
BDA	Big Data Analytics
BSC	Balanced Score Card
β	Beta Coefficient
CA	Competitive Advantage
CB-SEM	Co-variance-based Structural Equation Modelling
CC	Cloud Computing
CERPIMPL	Cloud ERP Implementation
CFA	Confirmatory Factor Analysis
CIO	Chief Information Officer
Cloud ERP	Cloud Enterprise Resource Planning
CMS	Content Management System
CMV	Common Method Variance
COMP	Compatibility
CPU	Central Processing Unit
CPS	Cyber-physical Systems

CR	Composite Reliability
CRI	Cloud Readiness Index
CRM	Customer Relationship Management
CSF	Critical Success Factors
CSR	Corporate Social Responsibility
CVR	Cross-validated Redundancy
DIFF	Differentiation
DKN	Dasar Keusahawanan Nasional
DOI	Diffusion of Innovation
DTI	Digital Transformation Index
D&M	Delone & McLean IS success model
ECM	Expectation-confirmation Model.
EDI	Electronic Data Interchange
EMR	Electronic Management Records
EMRS	Electronic Management Record Systems
EOU	Ease of Use
e-POS	Electronic Point of Sale
ERP_usage	Cloud ERP Usage
ESM	Enterprise Social Media
EV	Electronic Vehicle
EY	Ernst & Young Malaysia Company
FINSYNC	Finances in Sync
FMM	Federation of Malaysian Manufacturers
FOC	Focus

FP	Financial Performance
FTM	Feature-task Match
f^2	Effect Size
GDP	Gross Domestic Product
GFS	Government Financial Support
GS	Government Support
HCO	Higher-order Construct
HRO	High Reliability Organisations
HTMT	Heterotrait-monotrait
IaaS	Infrastructure as a Service
IBM	International Business Machines
ICT	Information and Communications Technology
IDC	International Data Corporation
IFS	Industrial and Financial Systems
IMP2	Second Industrial Master Plan
IMP3	Third Industrial Master Plan
Infor/M3	Infor Cloud-based ERP Systems in Multicompany, Multicountry and Multisite platform
INNOV	Innovation
I/O	Industrial Organisation
IoT	Internet of Things
IS	Information System
IT	Information Technology
ITO	Information Technology Officer
ITM	Initial Trust Model

IV	Independent Variable
I1.0	First Industrial Revolution
I2.0	Second Industrial Revolution
I3.0	Third Industrial Revolution
I4.0	Fourth Industrial Revolution
KBV	Knowledge-based View
LM	Linear Model
LMS	Learning Management System
LOC	Lower-order Construct
MAE	Mean Absolute Error
MANOVA	Multivariate Analysis of Variance
MD	Managing Director
MDEC	Malaysia Digital Economy Corporation
NFGS	Non-financial government support
MSC	Malaysia Multimedia Super Corridor
NIST	National Institute for Standards and Technology
NSDC	National SME Development Council
OECD	Organisation for Economic Co-operation and Development
PaaS	Platform as a Service
PLS	Partial Least Squares
PLS-SEM	Partial Least Squares Structural Equation Modelling
Q ²	Predictive Relevance
RBV	Resource-based View
REL	Reliability

RFID	Radio-frequency Identification
RM	Ringgit Malaysia
RMSE	Root Mean Squared Error
ROA	Return on Asset
ROI	Return on Investment
R ²	Coefficient of Determination
SaaS	Software as a Service
SAP	Systems Applications and Products in Data Processing
SAP S/4 HANA	SAP Business Suite 4 High-performance Analytic Appliance
SCM	Supply Chain Management
Sdn Bhd	Sendirian Berhad
SEM	Structural Equation Modelling
SMARTPLS	Smart Partial Least Squares
SMEs	Small and Medium Enterprises
SME Corp	SME Corporation Malaysia
SRMR	Standardised Root Mean Squared Residuals
SPSS	Statistical Package for the Social Science
STR-ALIGN	Strategic Alignment of Cloud ERP
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TMS	Top Management Support
TMSC	Top Management Support Change
TMSCM	Top Management Support on Change Management
TMSR	Top Management Support Resources

TMSV	Top Management Support Vision Sharing
TOE	Technology-Organisation-Technology
TTF	Task-technology Fit
TWD	Tapei Water Department
UAE	United Arab Emirates
UK	United Kingdom
UTAUT	Unified Theory of Acceptance and Use of Technology
USD	United States Dollar
VIF	Variance Inflation Factor
VRIN	Valuable, Rare, Inimitable and Non-substitutable
WP	Wilayah Persekutuan
11MP	Eleventh Malaysia Plan

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides an overview of this study. The study's background commences in this chapter, where issues related to cloud computing (CC) implementation and consequences are highlighted. Next, the chapter proceeds to the manufacturing small and medium enterprises (SMEs) scenario in Malaysia, and discusses the industry's issues with possible solutions. The problem statement is discussed, and the research questions, objectives, and hypotheses of the study are underlined afterwards. The chapter continues with the discussion of the significance and scope of the study. Lastly, the operational definitions of key terms used in the research and the thesis's organisation are explained.

1.2 Background to the Study

The current business landscape is fiercely competitive, and organisations are turning to cloud computing (CC) to help them weather the storm and gain business benefits. Additionally, the widespread recognition of cloud computing (CC) as an information technology (IT) concept has significantly altered the provision of IT services (Chen et al., 2022). CC is a technology that enables businesses to outsource their information technology (IT) through a pay-per-use access to computing resources (such as storage space, servers, networks, software, databases, and more) over the internet (Martson et al., 2011; Salih et al., 2021; Yigitbasioglu, 2015). For example, firms subscribing to CC do not need to purchase high-cost hardware and software; they only need to pay for these in proportion of their usage rendered by a service provider through the internet from a pool of huge computing resources on their end. Furthermore, unlike traditional IT system, CC allows the connection of various devices such as desktop, laptops, mobile phones irrespective of the location-see Figure 1.1. According to Gartner (2016), by 2020, direct and indirect IT spending on CC implementation will approach \$1 trillion USD. It is projected that by 2024, the cloud computing market in Malaysia will be worth US\$3.7 billion, having grown at an annual growth rate of 13% from 2020 (BusinessToday, 2021).

The adoption and use of CC have altered existing corporate systems, offering enterprises more agility, productivity, and flexibility in the age of the fourth industrial revolution (I4.0), which has brought digitalization and automation in production and operations (Ooi et al., 2018). CC is comprised of three core internet-based services: (1) Software as a Service (SaaS), which gives customers access to software applications; (2) Infrastructure as a Service (IaaS), which offers operating systems, networks, storage, virtual machines, and servers; and (3) Platform as a Service (PaaS), which allows customers to test and deploy software. Out of these CC services, SaaS is recognised as the rising dominant delivery model in the information systems literature (Oliveira et al.,

2019) because it simplifies IT delivery (Sultan, 2011). Common SaaS CC applications are Facebook, Gmail, Twitter, and the more business-oriented types such as supply chain management (SCM), customer relationship management (CRM), and cloud enterprise resource planning (ERP). Of these SaaS CC business applications, the focus of this study is cloud ERP. This is due to the fact that while SCM is used to manage supplier and client relationships, CRM is used to harness customer data, and ERP is an all-encompassing software that can combine CRM, SCM, and other organisational processes such as finance, accounting, production, etc (Schomaker, 2020). Furthermore, cloud ERP was chosen because manufacturing companies which are the unit of analysis in this study are known to be major users of ERP (Alsadi, 2018; Oliveira et al., 2019).

ERP uses software modules to manage various processes across several organisational units using a single data source (Peng & Nunes, 2013). The implementation of an ERP system improves coordination across multiple functional units in an organisation in order to efficiently strategize and manage the entire company's resources (AL-Shboul, 2018; Gupta, Misra, et al., 2018). Traditionally, ERP systems were installed as premise-based products that consumers paid for (Christiansen et al., 2022). On-premise ERP, on the other hand, had various flaws, including a high initial investment in hardware, software, storage, and servers (Mangiuc, 2011), which has already been challenged by the cloud version, dubbed cloud ERP (Enquist & Juell-Skielse, 2010; Saeed et al., 2012). So, cloud-based ERP systems that are better at saving money, time, and power are important for small businesses (AL-Shboul, 2018). Cloud ERP basically integrates diverse business operations or units such as finance, productions, inventory and sale on a single data repository using the cloud technology (Alsharari et al., 2020)-see Figure 1.2. Therefore, cloud ERP automates and streamlines every firm processes and makes them visible throughout the firm. Cloud ERP has a variety of advantages for different businesses, particularly SMEs, who account for the great majority of Cloud ERP customers, and also, it is generally more effective for SMEs than large businesses (Fosso-Wamba et al., 2015; Utzig et al., 2013; Wrycza, 2011). Cloud ERP allows SMEs to leverage the advantages of an ERP system without investing in IT infrastructure (Fosso-Wamba et al., 2015; Gupta, Misra, et al., 2018). Furthermore, a cloud-based ERP eliminates the requirement for a small business to keep an IT staff. Because SMEs pay for services on a pay-per-use basis, there is no upfront cost (Gupta, Misra, et al., 2018).

According to Wrycza (2011), implementing Cloud ERP allows SMEs to compete with larger firms by utilising a low-cost, modern, and competitive ERP system. Furthermore, SMEs prefer cloud ERP for its adaptability, ease of control, and, most importantly, lower licensing, maintenance, and overall investment costs (Alsharari et al., 2020; Wrycza, 2011). However, network outages and security risks are some of the downsides of cloud ERP. There is also a lot of confusion about which cloud ERP system to choose, as well as difficulties moving from one service provider to another (Abd Elmonem et al., 2016). In Malaysia, SMEs are pertinent to the country's economic progress and constitute 98.5% (907, 065) of aggregate business entities (Economic Census, 2016; Fook Ming et al., 2018). SMEs account for 65% of total employment, about 18% of gross exports, and 36.3% of gross domestic product (GDP) in Malaysia (The World Bank, 2016). As a result, the Malaysian government has undertaken a number of measures to encourage SMEs to use cloud computing (CC) services such as cloud ERP in order to remain

globally competitive and economically viable. Examples include the "Cloud First" strategy initiative handled by the Malaysia Digital Economy Corporation (MDEC) (ACCA, 2018) to encourage CC adoption in both public and private sectors. Also, the SME cloud adoption programme managed by MDEC introduced an annual incentive of up to RM1,500 for any software-as-a-service (SaaS) such as cloud ERP (Hassan et al., 2017). A 50% grant of RM5,000 is also available for six-month subscription fees for cloud ERP, e-POS, and e-payroll services that are part of the 2020 national budget SME digitalisation initiative (Digital News Asia, 2019).

Malaysian SMEs, on the other hand, are hesitant to use CC (Digital News Asia, 2019; Hassan, 2017; The Edge Markets, 2019). According to a survey of 2033 SMEs, just 44% of Malaysian SMEs adopt CC, of which 82% utilise it for online data storage (e.g., Dropbox) and 35% use it for various business applications (e.g., Salesforce). Furthermore, according to SME Corp Malaysia and Huawei Technologies (2018), only 10.5% of SMEs use cloud ERP despite all the benefits of cloud ERP earlier discussed to SMEs globally, including Malaysia's. The recent Asia Cloud Computing Association (ACCA) cloud readiness index (CRI) assessment in 2020 supports Malaysia's slowness in CC implementation (See Table 1.1). ACCA assesses 14 economies in Asia-Pacific (APAC) on ten indicators to measure their readiness to use CC. Malaysia is the only APAC economy that has remained in the same position (8th) since 2014. It has achieved substantial progress in critical readiness areas in recent years, but has also faced significant decreases and stasis in other aspects. This is the scenario for 2020, which shows significant improvements in some categories (energy sustainability, connectivity, business sophistication, data centre risk, and freedom of information) but significant declines in others (regulatory environment, privacy, and intellectual property protection), even after Malaysia's purposeful efforts to promote cloud use and broader digital transformation. Since SMEs make up 98.5% of all business entities in Malaysia (Economic Census, 2016), Malaysia's low cloud readiness index has a direct implication on SMEs' low adoption of cloud computing (CC). Furthermore, this low SME adoption of CC indirectly indicates the low adoption of cloud ERP, which is one of the most popular CC applications among SMEs (AL-Shboul, 2018).

There are a lot of factors that play a role in whether or not people use CC, like compatibility, complexity, ease of use, government support, technology readiness, privacy and security, among others. However, studies neglected to specifically examine the impact of several important antecedents of cloud ERP implementation, such as government financial support (GFS), feature task match (FTM), and top management support on change management (TMSCM), especially from the perspective of Malaysian SMEs. Furthermore, according to Azizah All, Microsoft Malaysia's director, one major issue is that Malaysian SMEs are sceptical of cloud ERP's ability to improve their bottom lines, that is, provide economic value to their businesses (Microsoft Malaysia, 2017). In other words, SMEs require proof that cloud ERP can improve their financial performance. Meanwhile, some researchers argued that when compared to traditional on-premise IT services, CC services such as cloud ERP provide various operational and strategic benefits such as increased IT capabilities, improved inter-organisational collaboration, shared resources, and improved organisational flexibility and agility, allowing firms to achieve better performance (Lal & Bharadwaj, 2016; Liu et al., 2016,

2018). Others argue that cloud computing (CC) adoption necessitates significant effort, such as high purchase costs, investments in employee training, and firm reorganisations (Kobusiska et al., 2018; Razzaq et al., 2020), all of which incur additional expenses and may hamper financial performance.

Besides, existing research has yielded inconclusive evidence and mixed results on the impact of cloud ERP on firm performance. Although some of these studies found evidence to support the significant effect of cloud ERP on firm performance (Gangwar, 2017; Garrison et al., 2015; Mirrazavi & Khoorasgani, 2016; Shee et al., 2018), others found evidence to support the contrary (Cámara et al., 2015; Gupta, Kumar, et al., 2018; Novais et al., 2020). As a result, it is unclear whether the use of cloud ERP can experientially benefit SMEs in terms of providing economic value. Thus, it is crucial to empirically investigate critical factors influencing cloud ERP implementation and cloud ERP financial performance implications in order to guide theoretical and practical development regarding IT investment (Khayer, Bao, et al., 2020). Therefore, this research seeks to fill the gap in the literature by proposing an integrated model that combines and investigates factors influencing cloud ERP implementation from the Technology-Organisation-Environment (TOE), Task-technology fit (TTF), and Kotter's change model perspectives, along with the resource-based view (RBV), to investigate the financial performance impact of cloud ERP, taking into consideration the diverse mechanisms (moderating and mediating effects) in these relationships.

Thus, Malaysian manufacturing SMEs' management and key stakeholders can be provided with a realistic and holistic reference that can assist with successful and beneficial cloud ERP implementation making them come closer to fulfilling I4.0 goals and add value to Malaysia's economy.



Figure 1.1 : Cloud Computing
(Source: IES Solutions, 2017)

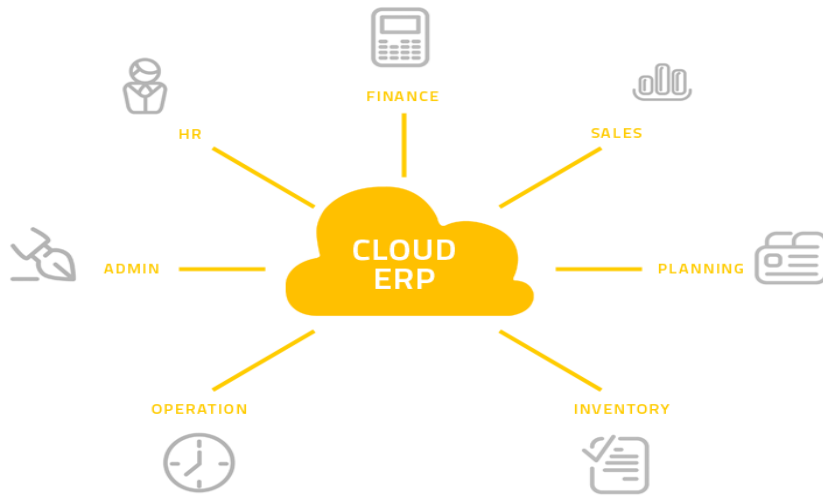


Figure 1.2 : Cloud ERP
(Source: Huawei, 2022)

Table 1.1 : Cloud Readiness Index 2020

Rank, Economy	CRI#01 International Connectivity	CRI#02 Broadband Quality	CRI#03 Power Grid, Green Policy, and Sustainability	CRI#04 Data Centre Risk	CRI#05 Cybersecurity	CRI#06 Privacy	CRI#07 Government Regulatory Environment	CRI#08 Intellectual Property Protection	CRI#09 Business Sophistication	CRI#10 Freedom of Information	TOTAL CRI 2020 SCORE (/100)	Rank Change
#1 Hong Kong	9.3	9.1	4.8	8.0	8.7	8.3	9.8	8.4	8.4	7.0	81.9	+1
#2 Singapore	6.5	9.9	6.1	8.8	9.0	9.2	9.8	9.0	8.5	4.9	81.5	-1
#3 New Zealand	4.2	6.4	6.7	7.8	7.9	8.3	9.7	8.6	8.7	8.9	77.1	-
#4 Taiwan	6.8	6.6	5.1	7.3	8.7	8.3	9.8	7.1	8.1	7.5	75.2	+1
#5 South Korea	2.6	8.2	4.3	7.0	8.7	9.4	9.9	6.6	8.4	7.5	72.7	+2
#6 Japan	1.7	6.6	5.2	7.1	8.8	9.2	9.7	8.4	7.6	7.1	71.3	-2
#7 Australia	2.9	4.6	3.6	7.4	8.9	9.2	9.8	8.3	8.0	8.3	71.0	-1
#8 Malaysia	3.0	5.6	4.5	7.2	8.9	8.3	8.9	7.7	8.1	6.3	68.5	-
#9 Thailand	4.0	6.0	2.5	6.2	8.0	8.3	6.5	5.3	7.8	5.6	60.2	+1
#10 India	1.7	4.3	2.5	5.5	7.2	7.2	9.5	6.6	6.7	5.4	56.7	+2
#11 Philippines	1.2	4.0	4.3	4.8	6.4	7.8	9.1	6.3	5.8	5.6	55.3	-2
#12 Indonesia	2.4	3.9	3.2	5.8	7.8	6.4	5.9	6.6	6.8	6.3	55.0	-1
#13 China	1.8	6.5	2.3	6.0	8.3	1.9	8.8	6.4	7.4	2.1	51.5	-
#14 Vietnam	2.9	4.6	2.5	5.6	6.9	2.2	7.1	5.0	6.8	2.5	46.2	-

(Source: Asia Cloud Computing Association, 2020)

1.3 SMEs in Malaysia

1.3.1 Definition of SMEs

In 2013, Malaysia's National SME Development Council approved a revised definition of SMEs. For manufacturing SMEs, the definition is as follows: micro-enterprises (annual revenue of less than RM300,000 or fewer than five full-time staff); small enterprises (annual revenue of less than RM15 million or up to five to fewer than 75 full-time staff); and medium enterprises (annual revenue of between RM15 million and RM50 million or between 75 and 200 full-time staff members) (SME Corp Malaysia, 2022a).

1.3.2 Distribution of SMEs According to Sectors

According to SME Corp Malaysia (2022b), 1,226,494 SMEs were registered as at 2021, accounting for 97.4% of all businesses in Malaysia. Since 2016, there has been an increase in the number of SMEs by more than 140,000, with an average growth rate of 5.2% (SME Corp Malaysia, 2022b). SMEs are distributed in the service, construction, manufacturing, agriculture and mining & quarrying sectors-see Figure 1.3. The service sector comprises of the largest number of SMEs with 1, 226,494 (83.8%) firms, followed by the construction sector with 98,274 (8.0%) firms. The manufacturing sector contributes the third largest number of SMEs with 71,612 (5.8%) units. Agricultural sector comprises of 23,633 (1.9%) SMEs, occupying the fourth position and the mining and quarrying had the least number of SMEs, 4,527 (0.4%) in Malaysia. Out of these sectors, this study focuses on manufacturing SMEs. The manufacturing SMEs continues to be a major contributor to the GDP after the service sector. It contributed 34.2% and 34.4% to Malaysia's GDP in 2017 and 2018 (Bank Negara Malaysia, 2019). There are a lot of small businesses in the manufacturing field that help make Malaysian exports, meanwhile 72.5% of Malaysian gross exports come from the manufacturing sector (Abdullah et al. 2013; Department of Statistics, Malaysia, 2019). Lastly, manufacturing SMEs are the second largest employment sector in Malaysia after the service sector (SME Corp. Malaysia, 2018).

1.3.3 Distribution of SMEs According to Sizes

Out of the three size categories of SMEs, namely micro, small and medium enterprises, the micro enterprises dominate SMEs with the highest percentage-see Figure 1.4. Based on the statistics of SME Corp Malaysia (2022b), 964,495 (78.6%) micro businesses were registered in 2021. The small businesses recorded the second highest number of firms, with 242,540 (19.8%) units. Lastly, the medium enterprises have the smallest number of firms in Malaysia with 19,459 (1.6%) units.

1.3.4 Distribution of SMEs According to States

The SME Corp Malaysia has updated the distribution of SMEs based on sectors and sizes till 2021, however, the last updated information of SMEs based on states is still till 2016. According to the 2016 Economic Census conducted by the Department of Statistics Malaysia, Selangor has the highest number of SMEs in Malaysia with 19.8%-See Figure 1.5. This indicates that Selangor is most the industrialized state in Malaysia contributing to the GDP. The second highest percentage (14.7%) of SMEs is in Kuala Lumpur, the capital city of Malaysia, while Johor plays host to the third highest percentage of SMEs (10.8%). Perak and Pulau Pinang are in the fourth and fifth positions respectively with 8.3% and 7.4% of total SMEs in Malaysia operating from these regions. The least percentage (0.1%) of SMEs are located in Putrajaya.



Figure 1.3 : Distribution of SMEs According to Sectors
(Source: Developed by Author)

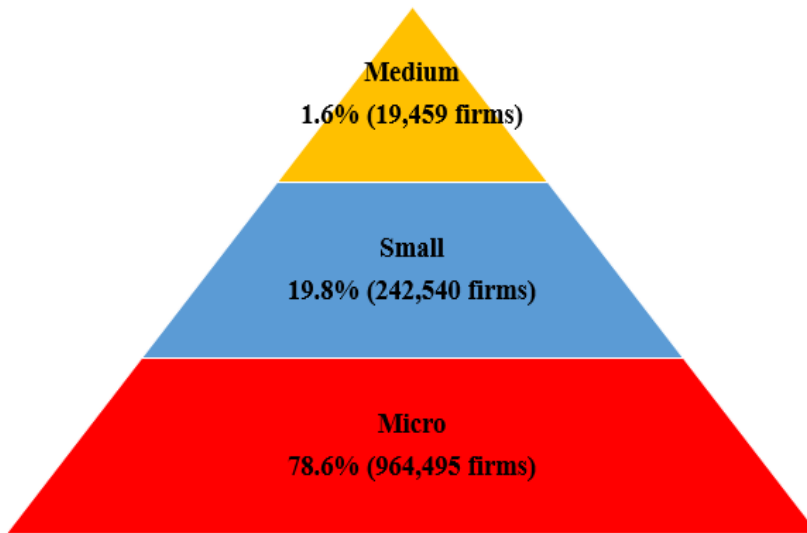


Figure 1.4 : Distribution of SMEs According to Sizes
 (Source: Developed by Author)

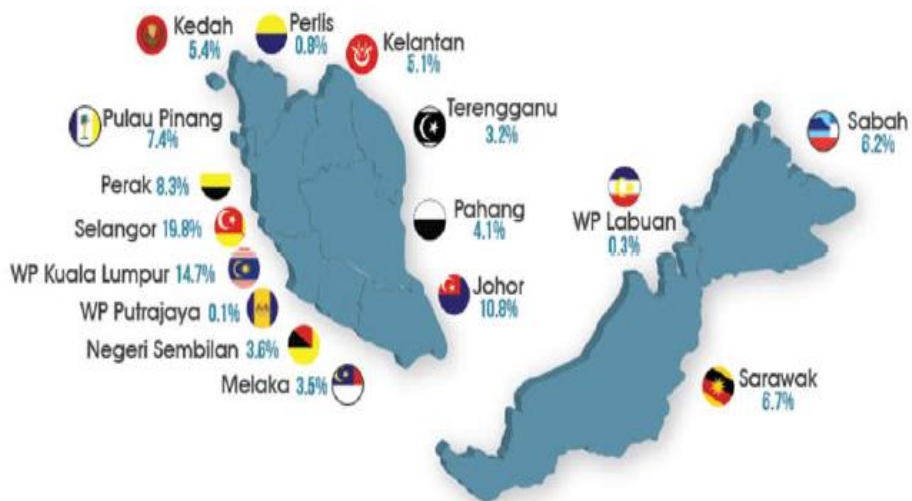


Figure 1.5 : Distribution of SMEs According to States
 (Source: Economic Census 2016, Department of Statistics Malaysia)

1.3.5 Policies on SMEs Development

Given the importance of SMEs in boosting Malaysia's economy, the Malaysian government has prioritised their development through various policies such as the Second Industrial Master Plan (IMP2) from 1996 to 2005, the Third Industrial Master Plan (IMP3) from 2006 to 2020, and, in particular, the SME Masterplan (2012-2020) (Chin & Lim, 2018). Many issues were tackled by IMP2 according to Chin and Lim (2018). These included expanding access to markets, enhancing technological capability and increasing ICT adoption as well. With the Eight Malaysia Plan from 2001-2005, a subset of Second Industrial Master Plan (IMP2), the government took a strong interest in the growth of resilient SMEs, particularly in sectors with high growth potential and exportability. Industrial infrastructure and facilities such as SME industrial parks (comprising factory units and incubator facilities) were put in place to support the growth of SMEs in Malaysia's key locations. Third Industrial Master Plan (IMP3) also handled the more challenging and competitive international environment for SMEs in Malaysia, which happened to coincide with the Ninth Malaysia Plan (9MP) within 2006 to 2010. Improvement in the manufacturing sector was prioritised, with an emphasis on value - adding activities and capacity-related service delivery (Chin & Lim, 2018).

Economic liberalisation and deregulation in Malaysia was part of the government's SMEs 10th Masterplan, which guided policies for small and medium-sized enterprises. The goal was to develop national, regional, and global leaders. SMEs have benefited from efforts to lower their regulatory burdens, improve their internal capabilities, foster an entrepreneurial spirit, improve their access to capital, and improve their entrepreneurial culture (Chin & Lim, 2018). During the 10th Masterplan (10MP), the government provided loans and guarantees totalling more than RM9 billion to help 414,000 Bumiputera-owned businesses grow (Chin & Lim, 2018). Some of these financial support includes 75 million ringgits by SME Corp. Malaysia for capacity enhancing and export for Bumiputera SMEs, and 1 billion ringgits of funding for Bumiputera SMEs through Syarikat Jaminan Pembiayaan Perniagaan (SJPP) and SME Bank (SME Annual Report, 2018/2019).

The Malaysian SME Masterplan aimed to assist SMEs in maturing outside of the local market, and it emphasises new technology implementation and innovation for growth and development. The goal is for SMEs to contribute 41% of GDP, 23% of exports, and 65% of total employment by 2020 (The World Bank, 2020). The Masterplan guided SME development in 11MP from 2016 to 2020. Part of the SME Masterplan's emphasis on innovation and technology is the adoption and use of cloud computing by SMEs. In order to increase efficiency, productivity, and sales, government agencies and trade associations in Malaysia have urged small businesses and manufacturers to adopt and utilise cloud computing technology (The Star Online, 2018). This is consistent with initiatives such as the Multimedia Super Corridor (MSC) Malaysia Cloud Computing Enablement Initiative and education and awareness campaigns aimed at facilitating the digital transformation of the economy (Microsoft Malaysia, 2017).

Recently, the Ministry of Entrepreneurship Development and Cooperatives of Malaysia unveiled the National Entrepreneurship Policy 2030 (Dasar Keusahawanan Nasional, 2030) in July 2019 to promote SMEs and entrepreneurship in Malaysia (Kuriakose & Tiew, 2022). The National Entrepreneurship Policy is a long-term strategy that supports the government's objective of creating a prosperous, equitable, and inclusive economy. Its stated objective is to make Malaysia a more entrepreneurial country by 2030 (Kuriakose & Tiew, 2022). The policy addresses a number of significant issues and challenges and provides measures and strategies to address them. Some of the issues and challenges include: demographic and socioeconomic trends; insufficient procedures, policies, and legislation; slow technological adoption; and restricted access to funds. Some strategies to address them include, enhancing regulatory frameworks and financial resources; promoting entrepreneurship at all levels of society; and catalysing economic development through the creation of innovative businesses.

1.3.6 Key Government Ministries and Agencies on SMEs Development

To realise the objectives of developing SMEs, some government agencies are saddled with the responsibilities to administering the programmes and policies of government. Some of these key agencies are discussed which include SME Corp Malaysia, MDEC, SMEBank, National SME Development Council (NSDC), and Ministry of Entrepreneurship Development and Cooperatives (MEDAC),

The SME Corp is fundamental to coordinating efforts for the overall development of SMEs and entrepreneurship in Malaysia; operating under the purview of the Ministry of Entrepreneurship Development and Cooperatives (MEDAC). In addition to developing strategies and policies, the SME Corp is responsible for gathering pertinent data and information from a variety of agencies and ministries, and then reporting this information yearly through the SME Integrated Plan of Action (Kuriakose & Tiew, 2022). Since its founding in 1996, the Malaysia Digital Economy Corporation (MDEC) along with its major administrative arm, Multimedia Super Corridor (MSC) have been at the forefront of digital transformation and adoption across Malaysia's public and private sectors. As the world continues to advance at a rapid pace, MDEC remains committed to advancing the nation's digital economy through the acceleration of three key initiatives: (1) Influencing digital investment to achieve maximal digital economy's contribution to the national economy; (2) the creation of policies and managing of all relevant parties to enable an innovative and thriving digital economy ecosphere; and (3) the development of regional entrepreneurs and international champions to boost the digital economy's contribution to GDP (MDEC, 2022). MDEC offers several digital initiatives for SMEs, entrepreneurs and corporations. Popular digital initiatives for SMEs include SME Business Digitalisation Grant, 100 Go Digital training and Smart Automation Grant (MDEC, 2022). The SME Digitalisation Grant specifically provides 50% matching grant of up to RM5,000 for SMEs to adopt services such as cloud computing (CC), enterprise resource planning (ERP), customer relationship management (CRM), e-commerce, procurement.

From its inception in 2004, the National SME Development Council (NSDC) has served as Malaysia's highest policy-making agency for SMEs across all sectors of the country's economy (SME Annual Report, 2018/2019). The NSDC was renamed the National Entrepreneur and SME Development Council (NESDC) in mid-2019 to reflect the government's emphasis on entrepreneurship development, and SME Corp was appointed to serve as the NSDC's secretariat (Kuriakose & Tiew, 2022). This first meeting of the council took place on April 8th, and the second meeting took place on October 29th, 2019. Policy measures to increase the economic contribution of SMEs were discussed at these two 2019 meetings (SME Annual Report, 2018/2019).

Since its inception in 2005, SME Bank has become one of Malaysia's most prominent Development Financial Institutions (DFIs), owned by the Ministry of Finance and regulated by the Bank Negara Malaysia (BNM). For the sake of the country's economic growth, SME Bank is wholly committed to assisting SMEs by offering not only financing support but also development expertise (SMEBank, 2022). It has been a decade since the Bank's strategic Five-Year Transformation Plan was implemented, which among other things resulted in the Bank becoming an Islamic Principle Based Development Financial Institutions (DFI) in 2015. The Bank's goal is to maintain its position as the financial institution of choice for SMEs (SMEBank, 2022). Some of SMEBank programmes for SMEs include (1) Young Entrepreneur Fund 2.0 (YEF 2.0), designed to help and support young entrepreneurs take their businesses to the next level and ensure that they remain viable after COVID-19. (2) SME Technology Transformation Fund (STTF) that fund provides financial assistance to SMEs to implement digitalization and/or automation into their business operations, resulting in increased productivity, operational efficiencies, and greater market penetration. (3) Bumiputera Supply Chain Fund Financing Program is a collaborative financing programme with TERAJU, the Prime Minister's Department of Malaysia's strategic unit for overseeing Bumiputera economic participation. For the Bumiputera Agenda to be implemented, a supplier network of Bumiputera SMEs must be developed. With the help of this programme, Bumiputera SME suppliers hope to expand their business and become more competitive (SMEBank, 2022). The primary mission of the Ministry of Entrepreneurship Development and Cooperatives (MEDAC) is to establish a holistic and hospitable entrepreneurial ecosystem in order to support Malaysia's long-term, knowledge-driven, innovative, and inclusive entrepreneurship development initiative. MEDAC's roles and functions include, among other things: (1) fostering an entrepreneurial mindset and values within the Malaysian community, particularly among bumiputera, young people, B40 (Bottom 40% of the Malaysian household income), women, the disabled, and other marginalised groups. (2) expanding access to inclusive financing and the financial system, which should include alternative sources of financing (3) enhancing the ecosystem of the entrepreneurial community in order to foster the development of entrepreneurs who are innovative, competitive, viable, and knowledgeable. Last but not least, the long-term goal of Ministry of Entrepreneurship Development and Cooperatives (MEDAC) is to transform Malaysia into a leading entrepreneurial nation that is prosperous, unified, and dignified (MEDAC, 2022).

1.4 Practical Issues and Potential Solutions

As previously stated, Malaysian SMEs are slow to adopt cloud computing (CC), which raises the question as to why they are reluctant. Factors such as security and privacy, ease of use, top management support, task technology fit, government support, and compatibility have all been found to influence CC diffusion (Alsharji et al., 2018; Cheng 2019a, Oliveira, Thomas, et al., 2014). However, not all factors are relevant in all contexts. Three relevant factors of the technology-organisation-environment (TOE) have been identified as antecedents for Malaysian SME cloud ERP implementation based on industry issues. These are feature task match, top management support on change management, and government financial support. Also, Malaysian SMEs including manufacturing SMEs are concerned about how cloud computing (CC) could help them improve their bottomlines (MicrosoftMalaysia, 2017). Hence, the financial performance implication of implementing cloud ERP that could help SMEs' bottom lines is also examined.

For the feature-task match (FTM) factor, during an interview for an industry report on the SME landscape, SME adoption of technology, and their primary challenges, Azzizah All, Microsoft Malaysia's director of small and mid-market solutions and partner group, said, "The landscape has changed over the years with the availability of the cloud, but the conversation has changed from technological evaluation to the evaluation of whether the technology fits business needs." Hence, the match of CC features with SME tasks is still a concern for them. Features vary by cloud ERP system. Ledford, a business technology analyst, says that cloud ERP applications come in different types for different industries and with different features.

Cloud ERP features for manufacturing SMEs, for example, will differ from cloud ERP features for service SMEs. However, the features common to all industries that firms should look for include ease of use, scalability, easy customization, customer support, training programs, and assistance (Ledford, 2015). From the practitioner literature, it is observed that some features of cloud ERP are general technological features while some are specific operational features. Some providers highlight general technological features. For instance, Oracle cloud ERP on their website includes easy access, ease of use, updates, low cost, zero up-front license, integration, convenience, and user interface (KnowOracle, 2021). On the other hand, some providers list specific operational features. For instance, Oracle Netsuite Cloud ERP features are designed for manufacturing, financial management, warehouse, order management, and CRM (Agile Dynamics Solution, 2021).

Also, manufacturing, inventory management, purchasing, e-Commerce, maintenance services, wireless warehouse management system, and order management are all features of Epicor Prophet 21 cloud ERP. Additionally, this study is focused on the cloud ERP features from the top management's task perspective of manufacturing SMEs, which includes planning, formulating policies, coordination, controlling, directing, and organising. As cloud ERP has diverse features, and SMEs have limited resources, they do not want to spend unwisely without evidence that the match of the selected cloud

ERP features with their task, especially the tasks of top management will bring about successful implementation. Furthermore, cloud ERP is commonly used by manufacturing firms (Usman et al., 2019), indicating that its features are more appropriate for the manufacturing SMEs used as a sample in this study. Hence, it is imperative to investigate FTM as an antecedent of cloud ERP implementation.

Based on the resistance of Malaysian manufacturing SME employees to adopting new technology, the top management support for change management (TMSCM) factor is examined (EY, 2019; SMEBank, 2017). According to SME Bank (2017), the most significant challenge that Malaysian manufacturing SMEs face when attempting to digitalize their operations is trying to get their staff to align with their digitalization strategy. In addition, a recent survey conducted by EY (2019) revealed that 67.8% of SME workers in Malaysia, including the manufacturing SMEs are resistant to adopting new digital skills. It indicates that resistance needs to be reduced and managed in Malaysian manufacturing SMEs for them to effectively deploy cloud ERP. Furthermore, top management needs to not only manage change but also know the process for such change management. Meanwhile, the change process that top management can follow to help firms successfully implement cloud ERP is yet to be addressed (e.g., Alsadi, 2018). As a result, it is important to evaluate TMSCM based on change process as an antecedent of cloud ERP implementation in manufacturing SMEs in Malaysia.

GFS is related to financial aid such as grants, loans, fee refunds, and tax deductions that governments offer to businesses to acquire additional resources such as new technology for improved performance.

In order to encourage the adoption of technologies that allow for online trading, remote working, or cashless payment methods, some governments are offering small businesses grants or subsidies. There are a wide variety of grant programmes available, some of which are tailored to specific business sizes or purposes, while others are open to a wider range of endeavours (Dreyer & Nygaard, 2020). To reap the benefits of IT innovation, businesses must have the financial resources which may be provided or supplemented by governments (Chang et al., 2019). In the past, research has shown that GFS plays an important role in the adoption and implementation of new technologies. According to Soto et al. (2018), farmers in the UK, Holland, Germany, Greece and Belgium were more likely to use precision agricultural technologies (PAT) (e.g., data sensors, GPS, remote control tools) if they received financial incentives from the government. Biotechnology SMEs in Korea benefited from financial assistance from the government (Kang & Park, 2012), as do Korean manufacturing SMEs (Jang & Chang, 2008) because they could acquire various innovative technologies for their businesses.

In the UK context, Ramanathan et al. (2014) affirmed that logistic companies that received GFS were able to maximise the business benefits of adopting and using RFID technology.

In South Korea, 285 drivers were found to be more inclined to use electric vehicles if they received financial assistance from the government (Kim et al, 2018). In addition, the Malaysian government's subsidies for renewable technologies (e.g., solar systems, IOT energy monitoring devices, and hybrid/electric vehicles) had a significant impact on the adoption of these technologies in service and manufacturing SMEs (Bakar et al., 2020). From the foregoing past research on GFS and technology implementation, it is clear that the impact of government financial support (GFS) has mostly focused on other technologies such as GPS, sensors, RFID and so on. The role of GFS on the implementation of affordable technologies such as CC are scant.

Government support for CC includes GFS and non-financial government support (NFGS) (Kim et al., 2018). Although the Malaysian government offers both support for Malaysian manufacturing SMEs, it appears Malaysian government is inclined towards government financial support (GFS) more than non-financial government support (NFGS). For example, according to the worldwide CC scorecard based on NFGS indexes provided by Software Alliance in 2018, Malaysia ranks 14th out of 24 leading IT nations, down from 13th in 2016. Based on this regression, Malaysia needs to improve its non-financial government support (NFGS) parameters such as privacy, cybersecurity legislation and internet infrastructure (BSA, 2018). In addition, the cloud readiness index based on NFGS indexes indicate that Malaysia is stagnant on the eight position among other Asia-Pacific (APAC) economies since 2014 and needs to improve on regulatory environment, privacy, and intellectual property protection (ACCA, 2020).

On the other hand, Malaysian government has offered many noticeable government financial support (GFS) to SMEs inclusive of manufacturing SMEs in the form of grants and incentives for affordable digital technologies, especially CC. For example, to help SMEs adopt CC, a programme called the SME Cloud Adoption Programme managed by MDEC was initiated in 2013 by the Malaysian government. SMEs can collect up to 6 months' subscription fee or RM 1,500 total subscription charge for SaaS from any qualified MSC Malaysia Status firms (Hassan et al., 2017). The 2020 national budget's SME digitalization plan also grants a 50% matching grant of the total invoiced by recognised service providers or up to RM5,000, whichever is lower (Digital News Asia, 2019). This matching grant, worth RM500 million over five years, would be available to the first 100,000 SMEs that want to use digital technologies, such as cloud ERP, which is designed for manufacturing SMEs to use. This grant is organised by the ministry of finance and MDEC and disbursed by Bank Simpanan Nasional (BSN). In addition, the budget for 2019 introduced the Industry4WRD Intervention Fund. It provides financial assistance to Malaysian manufacturing SMEs and related services to adopt Industry 4.0 technologies, of which cloud ERP is among them. All SMEs who have completed the government-funded Industry4WRD Readiness Assessment Programme are eligible. The fund's implementing agency is the Malaysian Investment Development Authority (MIDA). The grant will be matched 70% to 30% on eligible expenses up to a maximum of RM500,000.00 (Malaysia Investment Development Authority, n.d.).

Furthermore, the Selangor SME Digital Matching Grant was launched in 2021 to help SMEs in the state digitalize their operations in order to weather the COVID-19 storm.

Aimed at 1,000 Selangor SMEs looking to digitalize their operations, it consists of a 50% matching grant of up to RM5,000 for state SMEs for selected digital solutions such as CC, e-commerce, and payroll systems, and it is managed by Selangor Information Technology & Digital Economy Corporation (SIDECE) (Ross, 2021). Therefore, government financial support (GFS) is more favoured by the government over the non-financial government support (NFGS).

However, inspite of these numerous GFS, the rate of CC implementation is unsatisfactory. About 50% of Malaysian SMEs including manufacturing SMEs consider funding a major hurdle to digitalization, with 60% ignorant of funding possibilities and 34% having a misconception that CC is expensive (SME Corp Malaysia & Huawei Technologies, 2018), compounding the problem. Datuk Michael Kang, national president of the Malaysian SME Association, acknowledged that the RM5,000 grant is important, especially for micro businesses. He said, however, the layers of bureaucracy that small businesses must navigate in order to get these incentives have greatly hampered their ability to achieve their intended effect. Due to sluggish approvals, onerous documentation, and referrals to other agencies and departments, only around 5,000 of the 20,000 SMEs that were meant to receive the RM5,000 grant in 2020 received it. As a result, limited SMEs received the financial assistance while many footed the bill themselves (Lim, 2021).

For example, the following are the documentary requirements for the RM5000 matching grant specified in BSN (2020): Identification card or passport of the SME's Director (s) / Partner (s) / Proprietor (s), SME business registration permits, most recent audited financial statements for the last two (2) months, and the disbursing bank's right to change, vary, delete, or add to any of the T&Cs, in whole or in part, at any time. As a result, these requirements are too complicated for SMEs to meet. In addition, with a minimum initial fee of about \$1,357 (RM5,700) and monthly levies of \$99 (RM400) for cloud ERP (BetterBuys, 2021), some SMEs, especially medium enterprises, might be discouraged in taking government financial support since these costs are affordable. Based on the foregoing analysis, it is clear that a huge amount of taxpayers' money has been invested by government on SMEs CC adoption. Eventhough there are some challenges associated with GFS, some SMEs have successfully accessed it. It is thus worthwhile to empirically investigate the influence of government financial support on cloud ERP implementation, which may motivate SMEs that have not embraced GFS to do so and implement cloud ERP. Furthermore, because no prior empirical research on this relationship exist to date, this can assist the government in determining the efficacy or otherwise of such support.

Lastly, Malaysian SMEs are unaware of the financial impact of adopting cloud computing. In an interview for an industry report, Azizah All, Microsoft Malaysia's director of small and mid-market solutions and partner group, spoke about the SME landscape, SME adoption of technology, and their primary difficulties during an interview for an industry report. According to her, the main issues for SMEs, most importantly manufacturing SMEs right now are how CC will help them access their existing target markets and boost their bottom lines (Microsoft Malaysia, 2017). This

suggests that SMEs want evidence not just on how to implement cloud ERP, but also on whether the implementation can result in improved financial performance, which can drive owners' and top management's commitment to explore adoption. In addition to the three essential antecedents for cloud ERP implementation, this study proposes to examine the cloud ERP implementation's effect on financial performance through the mediation of competitive advantage from the RBV perspective, which can help manufacturing SMEs understand how CC can improve their bottom lines.

1.5 Statement of the Problem

SME's are vital to Malaysia's economic development, and the government has provided policies and numerous government financial support (GFS) to help them remain competitive through adopting digital technologies like cloud computing (CC) (Amini & Bakri, 2015; The Asean Post, 2019). However, industry evidence shows low adoption and implementation of cloud computing (CC). Only 44% of Malaysian SMEs use CC, of which 82% use it for online data storage and 35% for business applications like Salesforce (TechWire Asia, 2021). Furthermore, only 10.5% of SMEs use cloud ERP (SME Corp Malaysia & Huawei Technologies, 2018). According to Dell Technologies Digital Transformation Index (DTI) findings, 18% of Malaysian businesses are classified as digital adopters, and only 3% have fully implemented it in their companies (Digital News Asia, 2018). The Asia Cloud Computing Association (ACCA) cloud readiness index (CRI) study in 2020 supports Malaysia's low CC deployment, with Malaysia ranking 8th out of 14 Asian countries evaluated, and Singapore, Malaysia's neighbour, ranking first. This low cloud computing adoption record for Malaysia also indicates low CC adoption among SMEs, which are the largest business entities in Malaysia (94.7%), according to SME Corp Malaysia (2022b). Furthermore, enterprise resource planning (ERP) failure is another issue that may discourage businesses, particularly SMEs with limited resources, from adopting cloud ERP. According to some researchers, many new information systems, including ERP systems, do not fail because of flaws in the technology but rather because of shortcomings in the implementation, such as a lack of an environment that facilitates implementation, a lack of user commitment, insufficient user training, poor change management initiative, and more (Nandi & Kumar, 2016). Other reasons why ERP implementation fails include hidden costs that clients might not anticipate but emerge over time and resistance from the IT department due to loss of IT competency (Abd Elmonem et al., 2016). Therefore, a better understanding of the factors that affect cloud enterprise resource planning (ERP) implementation in SMEs that can subsequently enhance Malaysia's economic progress is vital.

Previous research has identified potential influencing factors of CC implementation based on the Technology-Organisation-Environment (TOE) model, such as relative advantage, cost savings, government support, compatibility, top management support (TMS), privacy and security, competence, and technological readiness (Amini & Bakri, 2015; Asiae et al., 2019; Fook Ming et al., 2018; Christiansen et al., 2022). However, current industry issues in Malaysia have pinpointed some different key TOE factors like feature-task match (FTM), top management support on change management (TMSCM), and government financial support (GFS), which were overlooked in previous studies and may be contributing to the low adoption of CC in SMEs [such as the 44% of SMEs using

CC and 10.5% using cloud ERP, according to SME Corp Malaysia and Huawei Technologies (2018)].

For the technological factor, feature-task match (FTM), it has been practically established that Malaysian SMEs are sceptical that the available CC services features might not match their tasks (Microsoft Malaysia, 2017). Therefore, it is warranted to examine FTM as an antecedent of cloud ERP implementation. The majority of previous FTM research has focused on other IT features such as social media (Fu et al., 2019), podcasts (Ip et al., 2008), and hotel information systems (IS) (Kim et al., 2010), while cloud ERP features studies are limited (Cheng, 2019a). Additionally, prior research has focused on IT features matching with various people's tasks, such as employees and managers (Cheng, 2019a), students (McGill & Klobas, 2009), tourists (Paulo et al., 2018), and consumers (Aljukhadar et al., 2014). Little is known about the empirical study examining feature-task match (FTM) from the perspective of top management tasks. There are also studies on multi-sector (Cheng, 2019a; Fu et al., 2019); higher education (Abugabah et al., 2015; Daud & Zakaria, 2017); hospitality and tourism (Kim et al., 2010; Paulo et al., 2018). However, studies on the manufacturing sector are limited and focused on developed countries (Mikalef et al., 2019; Spies et al., 2020). In addition, a few studies from Malaysia (Ghani et al., 2017; Mohd Daud & Zakaria, 2017) used textile SME and higher education contexts, not manufacturing SMEs. Thus, this study proposes feature-task match (FTM) as an antecedent of cloud ERP implementation from the perspective of top management tasks in manufacturing SMEs of a developing country (Malaysia).

Further, manufacturing SME employees in Malaysia are resistant to technological change as practically highlighted (EY, 2019; SMEBank, 2017), and top management may need to methodologically manage change for effective cloud ERP implementation. Therefore, it is important to examine top management support on change management (TMSCM) as an organisational factor of the TOE, and antecedent of cloud ERP implementation. Scholars contend that top management support (TMS) is a multi-dimensional construct which consists of top management support on change management (TMSCM), TMS-resource allocation (TMSR), and TMS-vision sharing (TMSV) (Dong et al., 2009). However, majority of past studies on top management support (TMS) and cloud computing (CC) implementation focused on the one-dimensional construct of TMS, with heterogeneous items that mix up all forms of top management support or behaviour. For example, top management support (TMS) items used include “empowerment” (e.g., Alsadi, 2018; Gutierrez et al., 2015), “provision of resources” (e.g., AL-Shboul, 2018; Gutierrez et al., 2015; Hassan et al., 2017; Lin, 2014; Qian et al., 2016), “commitment and support” (e.g., Alsadi, 2018; Zamzeer et al., 2019), encouragement (e.g., Gutierrez et al., 2015), vision (e.g., Lin, 2014), and communication (e.g., Ifinedo, 2008)

Clearly, TMS items such as communication, empowerment and encouragement measure top management support on change management (TMSCM) dimension. On the other hand, provision of resources and vision measure top management support-resource provision (TMSR) and top management support-vision sharing (TMSV) dimensions

(Dong et al., 2009). As a result, it is impossible to determine which support influences CC implementation in a given context. Although all the three dimensions of top management support TMSCM, top management support on change management (TMSCM) top management support-resource provision (TMSR) and top management support-vision sharing (TMSV) are important. However, only the TMSCM is considered to address the important practical issue of Malaysian manufacturing SMEs' employees being resistance to new technological change (EY, 2019; SMEBank, 2017) and in response to the call of Wang, Liang, et al. (2019) to focus on specific top management support (TMS) dimension. Moreover, in order to effectively manage the new technology resistance of the SME's employees, a systematic guide (change process) is important. Hence, the Kotter's change model (1996) with eight-steps that systematically measures the change process is adapted as top management support on change management (TMSCM) measurement scale to reflect the change process that can be followed to successfully implement cloud ERP. The findings of Auguste (2013), (Neumeier, 2013), and (Shonhe & Grand, 2019) support this study's proposition, where they used Kotter's 8-steps to measure change management and found it to be an effective tool for driving change during electronic medical records (EMR) implementation.

In terms of the environmental factor, government financial support (GFS), the Malaysian government has provided numerous financial support. For instance, to help SMEs adopt CC, a programme called the SME Cloud Adoption Programme managed by Malaysia Digital Economy Corporation (MDEC) was initiated in 2013 by the Malaysian government. SMEs can collect up to 6 months' subscription fee or RM 1,500 total subscription charge for CC from any qualified Multimedia Status Company (MSC) firms (Hassan et al., 2017). In addition, the 2020 national budget's SME digitalization plan also grants a 50% matching grant, or up to RM5,000, for SMEs to adopt cloud ERP and other digital solutions (Digital News Asia, 2019). On the other hand, practical issues have revealed that approximately 50% of Malaysian SMEs, including manufacturing SMEs, regard funding as a major barrier to digitalization, with 60% unaware of funding options and 34% believing that CC is expensive (SME Corp Malaysia & Huawei Technologies, 2018). Furthermore, excessive administrative bottlenecks impede the rapid allocation of GFS (Lim, 2021). Nonetheless, some SMEs have successfully implemented cloud ERP with government financial support (GFS), and there is a lack of empirical evidence on the impact of GFS on cloud ERP implementation that could encourage SMEs that have yet to embrace GFS to do so and implement cloud ERP. Furthermore, since the Malaysian government has invested heavily in CC adoption in SMEs, there is still no empirical evidence of the impact of government financial support (GFS) on the effectiveness of cloud computing implementation which can guide government on the efficacy or otherwise of such support. As a result, it is critical to investigate the impact of GFS on cloud ERP implementation.

Moreover, the literature on government support (GS) and CC implementation indicates contradictory findings, which can be attributed to the measurement of GS as a one-dimensional construct mixed up with both government financial support (GFS) and non-financial government support (NFGS) items, or implicitly NFGS items while erroneously treating them as a complete concept of government support (GS). For instance, some studies provided evidence of the critical role of government support (GS)

on CC implementation (e.g., AlBar & Hoque, 2019; Amimi & Bakri, 2015; Pathan et al., 2017). Others provided evidence of the insignificant role of government support (GS) in CC implementation (e.g., Alsafi & Fan, 2020; Senyo et al., 2016; Usman et al., 2019). The studies that mixed up the GFS and NFGS items employed items such as laws, regulations and financial resources (e.g., Amini & Bakri, 2015; Ezzaouia & Bulchand-Gidumal, 2020).

The studies that implicitly measured the Non-financial government support (NFGS) employed items including legal protection, rules, regulations, policies (e.g., Pathan et al., 2017; Wang, Liang, et al., 2019). This approach makes it difficult to ascertain which of the government support (GS) dimensions (GFS or NFGS) is influencing the CC implementation in the given context. Since Malaysia places a high priority on government financial support (GFS) for SMEs to adopt cloud computing (CC), yet, CC adoption is still not encouraging, and prior studies failed to consider the relevance of GFS on cloud computing (CC) implementation, it is crucial to investigate the impact of GFS on cloud ERP implementation in order to fully understand its relevance and fill the literature gaps.

Furthermore, the government financial support (GFS) is an environmental factor of the Technology-Organisation-Environment (TOE) model used in this study, and scholars have challenged the independence of the TOE factors and strongly advocated the interaction (moderation) of the environmental factors on the technological and organisational factors (Lai et al., 2018; Maroufkhani et al., 2022; Oliveira et al., 2019). For example, according to Maroufkhani et al. (2022) and Lai et al. (2018), the effects of organisational and technological factors on BDA adoption are moderated by environmental factors. Similarly, the study of Oliveira et al. (2019) on Software-as-a-Service (SaaS) adoption provides evidence for the moderating effect of environmental factors in the Technology-Organisation-Environment (TOE) model.

These studies, however, focused on environmental moderators which are external pressures rather than external support. Because SMEs have limited resources, external support, such as government financial support (GFS), may be more suitable than external pressures for their technology adoption. For instance, Oliveira et al. (2019) examined normative, mimetic, coercive pressures. Lai et al. (2018) focused on competitive pressure and government regulations, while Maroufkhani et al. (2022) evaluated government regulations. Therefore, GFS is explored as a new moderator of the environmental context in the TOE model. Moreover, this study is theoretically distinct from the abovementioned studies because the technological factors examined in these studies are technological competence and technological complexity, and the organisational factor is top management support (TMS), not feature-task match (FTM) and top management support on change management (TMSCM). Therefore, this study provides a new insight by examining the direct effects of FTM and TMSCM on cloud ERP implementation and the moderating effect of GFS in these relationships.

In addition, despite the majority of studies on government support (GS) and CC implementation neglecting to examine government financial support (GFS) specifically, they also focused on the adoption or implementation stage without explaining how implementation could bring about better performance. Therefore, this study examines GFS, cloud ERP implementation, and financial performance to holistically understand the phenomenon. Besides, studies on GFS and firm performance yielded mixed results. Some discovered a positive relationship (Ismail & Othman, 2014; Peter et al., 2018), while others discovered a negative relationship (e.g., Luo et al., 2021; Wang et al., 2021). So far, studies (Pergelova & Angulo-Ruiz, 2014; Songling et al., 2018a) have focused on the mediating effect of competitive advantage. Because GFS is an external resource, these studies did not adequately explain the resource-based view (RBV) proposition of an internal resource acquired with government financial support (GFS) that is valuable, rare, inimitable, and non-substitutable (VRIN), with the potential to lead to competitive advantage, and in turn better performance. To address this gap, this study proposes the mediating role of cloud ERP implementation as an internal resource with VRIN qualities that has the potential of enabling firms to gain competitive advantage which eventually leads to better financial performance. The research of Guo et al. (2014) and Gillani et al. (2020) lends credence to this study's proposition, as they discovered that the connection between external support like GFS and firm performance is mediated by VRIN internal resources like digital manufacturing technologies and the recognition of entrepreneurial opportunities.

On the other hand, Azizah All, director of Microsoft Malaysia noted that one significant difficulty is that Malaysian SMEs are sceptical about the ability of cloud ERP to increase their bottom lines, that is, to add economic value to their businesses (Microsoft Malaysia, 2017). In other words, SMEs require proof that cloud ERP can enhance their financial performance. Meanwhile, extant literature on the impact of cloud ERP implementation on firm performance have generally yielded inconclusive findings. Some cloud ERP studies, for example, found a significant relationship (e.g., Gangwar, 2017; Garrison et al., 2015; Mirrazavi & Khorasgani, 2016), while others found no relationship (e.g., Cámara et al., 2015; Gupta, Kumar, et al., 2018; Novais et al., 2020). As a result, research has focused on mediators such as supply chain integration (Cámara et al., 2015; Novais et al., 2020) and collaboration (Schniederjans & Hales, 2016), which has improved our understanding on the mechanisms through which cloud computing (CC), a resource, impacts firm performance. However, there is lack of understanding on the mediating effect of competitive advantage (CA) in the cloud computing (CC)-firm performance relationship according to the resource-based view (RBV) (Barney, 1991). The resource-based view (RBV) is one of the important theories in the strategic management literature, which purports to explain better firm performance via the mediating influence of competitive advantage (Sigalas & Pekka Economou, 2013).

RBV suggests that firms use resources and capabilities that are valuable, rare, inimitable, and non-substitutable (VRIN) to achieve superior performance through the mediation of competitive advantage (CA) (Barney, 1991). However, seldom do researchers investigate the relationship between the sources of competitive advantage, either a resource, or a capability and better performance through the mediation of competitive advantage (Sigalas & Pekka Economou, 2013, and it is particularly rare in

the cloud computing (CC) research domain (e.g., Cámara et al., 2015; Schniederjans & Hales, 2016; Novais et al., 2020).

Since cloud ERP is a resource that has the valuable, rare, inimitable and non-substitutable (VRIN) feature based on its “usage” and “strategic alignment” typology and conceptualisation in this study, it is proposed that competitive advantage will mediate cloud ERP implementation and financial performance. The finding of Anwar, Khan, et al. (2018) supports our proposition in which they provided evidence of the mediating effect of competitive advantage between the relationship between big data capabilities and firm performance.

Therefore, this study examines how cloud ERP implementation can help SMEs gain better financial performance through the mediation of competitive advantage. This study differs from others in that it aims to investigate not only the important and under-researched antecedents of cloud ERP implementation, but also its financial performance impact, taking into account the various mechanisms (moderating and mediating) in these relationships, which can boost managers' confidence and commitment to adopting it and, as a result, improve Malaysia's economic growth.

1.6 Research Questions

The main research question of this study is: Is feature task match, top management support on change management, and government financial support, antecedents of cloud ERP implementation, in which government financial support acts as a moderator in these relationships, resulting in better financial performance through the competitive advantage of Malaysian manufacturing SMEs?

The specific questions are:

1. Could feature task match, top management support on change management, and government financial support positively influence cloud ERP implementation in Malaysian manufacturing SMEs?
2. Could government financial support moderate the relationship between feature task match, top management support on change management and cloud ERP implementation in Malaysian manufacturing SMEs?
3. Could government financial support positively impact the financial performance of Malaysian manufacturing SMEs?
4. Could cloud ERP implementation mediate the relationship between government financial support and financial performance of Malaysian manufacturing SMEs?
5. Could cloud ERP implementation positively impact the financial performance of Malaysian manufacturing SMEs?

6. Could competitive advantage mediate the relationship between cloud ERP implementation and the financial performance of Malaysian manufacturing SMEs?

1.7 Research Objectives

The main objective of this study is to examine if feature task match, top management support on change management, government financial support are antecedents of cloud ERP implementation, in which government financial support acts as a moderator in these relationships, resulting in better financial performance through the competitive advantage of Malaysian manufacturing SMEs.

The specific objectives are:

1. To assess if feature task match, top management support on change management, and government financial support positively influence cloud ERP implementation in Malaysian manufacturing SMEs.
2. To examine if government financial support moderates the relationship between feature task match, top management support on change management and cloud ERP implementation in Malaysian manufacturing SMEs.
3. To determine if government financial support positively impacts the financial performance of Malaysian manufacturing SMEs.
4. To determine whether cloud ERP implementation mediates the relationship between government financial support and financial performance of Malaysian manufacturing SMEs.
5. To assess if cloud ERP implementation positively impacts the financial performance of Malaysian manufacturing SMEs.
6. To verify whether competitive advantage mediates the relationship between cloud ERP implementation and the financial performance of Malaysian manufacturing SMEs.

1.8 Significance of the Study

This study is significant academically, practically, and in terms of policymaking. From the academic standpoint, this study seeks to expand the theoretical study of the antecedents and firm performance impact of cloud computing (CC) implementation in SMEs. This study proposed and investigated relevant contextual factors as antecedents of cloud ERP implementation, which have been relatively inadequate in the literature to enrich theoretical knowledge.

Feature-task match (FTM) is a less-studied concept in the field of cloud ERP implementation research. Furthermore, studies rarely investigate FTM from the standpoint of IT features-match from the perspective of top management tasks. Studies have frequently focused on the alignment of IT features with the tasks of operational employees (Wamayu, 2017), students (Abubagah et al., 2015), or hotel staff (Paulo et al., 2018). Furthermore, there has been a significant paucity of studies on feature-task match (FTM) in the manufacturing context, especially from a developing country context such as Malaysia (Mikalef et al., 2019; Spies et al., 2020). Because this study adds to the body of knowledge, it gives more information about the FTM, which looks at how cloud ERP features and top management strategic tasks match up in the context of manufacturing SMEs in Malaysia, a developing country.

Furthermore, the literature on top management support (TMS) and CC implementation is replete with the use of a one-dimensional TMS construct that mixes up various supports for top management. This study selects one of the TMS multi-dimensions, TMSCM, out of three, top management support on change management (TMSCM), top management support-resource allocation (TMSR), and top management support-vision sharing (TMSV) (Dong et al., 2009), to provide a clearer picture of the specific role of top management in change management rather than the unclear uni-dimension employed by prior research. This research provides a new approach to theorising top management support (TMS) concept in cloud computing (CC) implementation and the Technology-Organisation-Environment (TOE) framework. It also improves our understanding of the change process. In this study, the eight steps of Kotter's (1996) eight-step integrated process were used as the measurement items to help guide top management through change management for a successful cloud ERP implementation.

This study recognised the bi-dimensionality of government support, government financial support (GFS) and non-financial government support (NFGS) and specifically examined GFS compared to past studies that treated it as a one-dimensional construct that mixed up both GFS and NFGS or implicitly measured NFGS while referring to it as government support. As a result, this study is important to solving the inconsistent findings of government support on cloud computing (CC) implementation and provides a starting gate for CC and Technology-Organisation-Environment (TOE) model studies in delineating between government financial support (GFS) and non-financial government support (NFGS) in order to provide a clearer view of their specific effects on CC implementation.

Furthermore, the moderating effect of the TOE's environmental factor on the organisational and technological factors has received little attention (Alsaad et al., 2018; Oliveira et al., 2019; Venkatesh & Bala, 2012). However, few studies that tested the environmental moderators used pressures (normative, coercive, mimetic) (Oliveira et al., 2019), and government policies and regulations and competitive pressure (Lai et al., 2018; Maroufkhani et al., 2022) focused on small and large firms. This study enriches the Technology-Organisation-Environment (TOE) model by focusing on the government financial support (GFS) as a new environmental moderator in the SME context, adding to the empirical literature. Furthermore, the direct relationship between

GFS and financial performance, as well as the mediating role of cloud ERP implementation, adds value to the literature by connecting the antecedents of an IT to the outcome, addressing mixed findings between GFS and financial performance. In this aspect, the new knowledge significant to the literature is the cloud ERP implementation as a mediator to show the resources acquired through the government financial support (GFS) that lead to better financial performance rather than the competitiveness used in prior studies (Perglova & Angulo-Ruiz, 2011; Songling et al., 2018a).

Furthermore, by examining the mediating effect of CA in accordance with the resource-based view (RBV) proposition, this study contributes to resolving inconsistencies in cloud ERP and performance studies. Unlike previous research (Cámara et al., 2015; Novais et al., 2020) that relied on relational strategies that may not result in competitive advantage (CA), this study adds to our understanding of how CA mediates the relationship between cloud ERP implementation and financial performance of firms. Lastly, this study extends the Technology-Organisation-Environment (TOE) model with the Kotter's change model (1996) and the task technology fit (TTF) model (Goodhue & Thompson, 1995) to better understand the antecedents influencing successful cloud ERP implementation. In addition, in conjunction with the aforementioned theoretical extensions, the resource-based view (RBV) theory was used to comprehend how cloud ERP as a resource contribute to a SMEs's financial performance through competitive advantage. To the best of the author's knowledge, this theoretical undergirding has yet to be explored empirically in the IT implementation literature to better understand its antecedents and business value.

Practically, the proposed key antecedents of cloud ERP, namely government financial support (GFS), feature-task match (FTM), and top management support on change management (TMSCM), are crucial in the SME context as they provide the information needed by the SMEs in planning their successful cloud ERP implementation. The present study examines GFS as a factor for successful cloud ERP implementation. SMEs do not have the large resources of big companies, and despite numerous government financial support (GFS), adoption is still low. Therefore, this study would shed light on whether GFS is relevant or irrelevant for SMEs to successfully deploy cloud ERP. Furthermore, managers and owners might have knowledge of how government financial support (GFS) could inhibit or facilitate their cloud ERP implementation by interacting with the feature-task match (FTM) and top management support on change management (TMSCM). That is, this study reveals whether GFS will strengthen, weaken or have no effect on the relationship between the technological factor (FTM) and organisational factor (TMSCM) and successful cloud ERP implementation. In addition, practitioners could learn more about whether government financial support (GFS) could help their businesses' financial performance directly or through the use of cloud ERP.

The proposed determinant of feature-task match (FTM) is based on the fit between the cloud ERP features and the user's task. It is crucial to establish FTM as it provides confidence or otherwise in the user, which determines the success or failure of cloud ERP implementation, especially top management in this study. Top management can learn how the alignment of cloud ERP features with their own strategic tasks can

motivate implementation. Top management assurance that they will be able to use the cloud ERP to plan, organise, direct and firmly control the organisational processes enhances their positive receptivity to cloud ERP. Hence, they will be determined to motivate the other members for successful implementation.

Cloud ERP vendors may also benefit from this research because it might help them strategize on developing software that aligns with both strategic, tactical, and operational firms' tasks. They can better understand how to improve cloud ERP functionalities, compatible interfaces, and ease of use for manufacturing SMEs. Furthermore, managers' roles in managing change triggered by new technology like cloud ERP implementation would be better understood. It would also be easier to manage resistance to change with the right tools if they used the eight steps of Kotter's change model, which were not used in previous cloud ERP implementation studies.

Furthermore, managers can use this study as an avenue to understand how cloud ERP implementation could be a tool for improving their financial performance through gaining competitive advantage (CA). Practitioners stand to gain an insight into how embracing cloud ERP with proper usage and strategic alignment can enhance their financial performance prior to gaining competitive advantage (CA). Hence, managers would understand how to strategically deploy cloud ERP.

The research is significant to policymakers as it can provide evidence on how successful cloud ERP implementation can make Malaysian SMEs globally competitive and economically viable. The research offers some evidence that SMEs in Malaysia are important, thus requiring more attention in the government's policies. The research also attempted to shed new light on some unique determinants of cloud ERP implementation, namely, government financial support (GFS), feature-task match (FTM), and top management support on change management (TMSCM), that are equally important in driving SMEs' successful cloud ERP implementation. These highlights require further attention and improvement in government policies, such as formulating policies on cloud ERP vendors to expand their cloud ERP module offerings to ensure their products fit the task needs of purchasing firms. Such policies can spur intense cloud ERP implementation from SMEs who are presently lagging in the implementation of CC. Policymakers through government agencies such as SME Corp and Malaysia Digital Economy Corporation (MDEC) can use the results of this study to devise an additional strategy to train and retrain SME managers on effective change management. This could be in the form of workshops, seminars, or conferences.

This study will guide the government on the effect of existing government financial support on CC implementation and actions necessary to further improve government financial support (GFS). As this study examines the performance impact of cloud ERP implementation, the implication is that the extended effect could finally improve the economic position of Malaysia, where the government is expected to show keen interest in further policy improvements. Specifically, policymakers may benefit from insight from the findings of this study to strengthen manufacturing SMEs in terms of their

contribution to exports, as suggested by The Malaysian Reserve (2019, p.14), that SMEs are the largest contributors to Malaysia's manufacturing activity. Moreover, the government can also gain from this research on how to assess and further improve SMEs' contributions to the gross domestic product (GDP) and their I4.0 attainment level. Lastly, and most importantly, policymakers can use this study's result as a guide to encourage SMEs to adopt and implement cloud ERP during the COVID-19 pandemic.

1.9 Scope of the Study

The study's overarching goal is to examine if government financial support, feature task match, and top management support on change management influence cloud ERP implementation in Malaysian manufacturing SMEs, resulting in competitive advantage and better financial performance. Manufacturing SMEs were selected particularly because, first, they are capital-intensive base sectors that have long been considered to be heavy enterprise resource planning (ERP) users (Usman et al., 2019). Second, because Malaysia is an export-oriented economy, manufacturing SMEs are the largest contributors to exports and the second largest source of employment and gross domestic product (GDP) (Department of Statistics Malaysia, 2019). Manufacturing SMEs in Malaysia are under a lot of pressure to stay profitable and stay in business because of changes in customer preferences, rising production costs and input prices, and rapid globalisation (Anuar & Yusuff, 2011). Cloud ERP is the right tool for this.

The antecedents of cloud ERP implementation selected- government financial support (GFS), feature-task match (FTM), and top management support on change management (TMSCM) are grounded in the technology-organisation-environment (TOE) framework. Although some TOE factors such as complexity, technological readiness, security and privacy, and competitive pressure can influence cloud ERP implementation and are well-researched, they are not the focus of this study. Additionally, IT consequences such as flexibility, agility, and productivity have been examined, but they are outside the scope of this study. In this study, the RBV was used as a theoretical lens to look at cloud ERP as well as its effects on financial performance.

The cloud services are mainly three: Software-as-a-Service (SaaS), Infrastructure-as-a-Service (IaaS), and Platform-as-a-Service (PaaS). SaaS service is the focus of this study since it is the major platform on which the type of CC application (cloud ERP) selected for this research is deployed. Many other CC applications also exist, like customer relationship management (CRM) and supply chain management (SCM), but they are not considered in this study. Cloud ERP was chosen because manufacturing companies are known to use ERP (Alsadi, 2018; Oliveira et al., 2019). Furthermore, unlike other cloud computing (CC) applications, cloud ERP integrates all organisational activities and allows for a holistic real-time picture of every process, system, and operation in the firm, making it one of the most cost-effective applications for all firm sizes, particularly SMEs (Alsharari et al., 2020). The sample for this study comprises of top managers or owners of companies that have already implemented cloud ERP and are more likely to have accurate strategic knowledge to answer questions related to cloud ERP implementation and its impact of firm performance. Lastly, the study covers two states and one Wilayah

Persekutuan (WP) (federating territories), namely Johor, Selangor, and Kuala Lumpur. These places were chosen because they have the highest number of small businesses in Malaysia, according to the Department of Statistics, Malaysia.

1.10 Definition of Key Terms

The following are the operational definition of the key terms employed in this thesis. They are defined according to definitions used by previous studies.

Cloud Computing

Release of IT infrastructure and applications as a service according to persons and organisations' demand through internet support (Senyo et al., 2016).

Cloud ERP

cloud ERP is defined as a firm-wide information system collection that contains an inclusive collection of software modules intended to synchronise the critical logistics in business processes which span multiple functional units and departments of an organisation by utilising a single data storage system (Rezaei, et al., 2016).

Information Technology

A set of interconnected components that assemble, process, store, and circulate data and information (Stair & Reynolds 2018).

Industry 4.0

The automation revolution in manufacturing innovation emanating from the broad networking and computerisation of the entire areas of production (Schröder, 2017).

SaaS

The access of internet-based software applications through the internet (Faasen et al., 2013).

Cloud ERP Implementation

The resolution by an organisation to utilise (Chiu & Yang, 2019) and strategically align (Fuzes, 2018; Rainer & Cegielski, 2018) cloud ERP with the organisation's objectives and goals.

Feature-task Match (FTM)

Correlating the qualities of technology to the requirements of the job, that is, the ability of technology to support successful task completion (Teo & Men, 2008).

Top Management Support (TMS)

The extent to which the firm's top management provides direction, authority, and resources during the acquisition of IT systems, including ERP systems (Ifinedo, 2008).

Top Management Support on Change Management

Top management's purposeful set of activities to facilitate, sustain, direct, approve, and provide resources for organisational change all through IT system implementation, which include ERP systems (Ifinedo, 2008; Wipfli LLP, 2014).

Government Support

The rules, regulations, instructions, policies and initiatives that support enterprises in cloud ERP (AL-Shboul, 2018).

Government Financial Support

The government's assistance in influencing the implementation of innovative technology by SMEs through cloud-based services, as well as providing firms with an additional type of financing (Huong & Cuong, 2019; Sandu & Gide, 2018).

Competitive Advantage

CA is the capability/set of capabilities or resource/set of resources that provide a firm with a comparative advantage over its competitors, resulting in higher relative performance. (Wiggins & Ruefli, 2002).

Firm Performance

Completing all tasks required to achieve organisational goals (e.g. growing profits) (Kopia, 2019).

1.11 Thesis Organisation

This thesis is divided into six chapters. Chapter 1 introduces the research by describing the study's background, followed by a discussion of key information about SMEs in Malaysia, such as their definition, distributions by sectors, sizes, and states. The chapter continues with practical issues and potential solutions, problem statement, research questions, research objectives, the significance and scope of the study, and key term definitions. The chapter ends with the organisation of the thesis and conclusion. The second chapter is a review of the literature in which the cloud computing and cloud ERP concepts are comprehensively examined in connection to their application in manufacturing SME contexts, comparison in different Asian countries, and conceptualization. Following that, the antecedents of cloud computing implementation from a Technology-Organisation-Environment (TOE) perspective are reviewed, and the selected factors are justified and further reviewed empirically. Firm performance in respect to cloud computing implementation is provided next, followed by a discussion of the competitive advantage concept. The research gaps are identified, and the chapter closes with a conclusion.

The development of hypotheses and the research framework are covered in Chapter 3. This chapter examines certain technology adoption theories and models, as well as information technology business value realisation theories. Following that, the underpinning theories and their justifications are discussed. Prior to discussing endogeneity and control variables and summarising developed hypotheses, the study framework and hypotheses are developed. The chapter ends with a conclusion. In chapter 4, the research methodology is presented, which includes the research paradigm, research design, study population, respondents and unit of analysis, sample size, sampling technique, data collection procedure, questionnaire development and measurements, pre-test, pilot test, data analysis, and chapter conclusion. Data preparation, demographic profiles, measurement model assessment, goodness of fit, descriptive statistics, structural model, overall hypothesis results, and chapter conclusion are all covered in Chapter 5. The final chapter, Chapter 6, discusses the study's findings, theoretical, practical, and policy-making contributions, limitations, recommendations for future research, and thesis conclusion.

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