A MODEL OF INFORMATION TECHNOLOGY CAPABILITIES TOWARDS SMES' INNOVATION CAPABILITIES THROUGH KNOWLEDGE MANAGEMENT

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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Faculty of Technology Management and Technopreneurship

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TALAL MOHAMMED ALTENEIJI

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

Faculty of Technology Management and Technopreneurship

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2024

DEDICATION

I dedicate this thesis to my family.

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ABSTRACT

Small and medium enterprises (SMEs), especially the service sector, are pivotal to the economic growth of the United Arab Emirates (UAE), serving as the backbone of the nation's economy. Acknowledged for their substantial contributions to job creation, innovation, and economic diversification, SMEs receive support from the UAE government through policies, financial incentives, and business incubation programs. Despite these efforts, the SME service faces challenges in innovation, particularly in information technology competencies that impact knowledge management and absorptive capacity. This research addresses this gap, utilising a quantitative methodology involving 321 SME managers in the service sector. The findings reveal that information technology competencies, particularly IT infrastructure, IT integration, and IT knowledge, play a significant role in influencing innovation capabilities. The research also confirms a positive relationship between IT competencies and knowledge management, with knowledge management mediating the link between IT competencies and innovation capabilities. This study's empirical model clarifies how IT competencies empower organizations to efficiently manage and utilize their knowledge assets, consequently boosting their innovation capabilities. The study underscores the pivotal role of IT competencies as a key driver of organisational innovation, suggesting that organisations should prioritise investing in the development of these competencies. It further emphasises the necessity for organisations to adopt effective knowledge management strategies to fully capitalise on the potential of their IT investments. This study contributes to an understanding of the role of information technology competencies in enhancing innovation capabilities within SMEs. The identified linkages between IT competencies, knowledge management, and innovation provide valuable insights for organisations seeking to leverage technology for innovation in the UAE SME sector. This study proposes an empirical model that provides a practical framework for organizations to manage their knowledge assets effectively and foster innovation, thereby advancing SMEs and the UAE's economic landscape.

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MODEL KEUPAYAAN TEKNOLOGI MAKLUMAT TERHADAP KEUPAYAAN INOVASI PKS MELALUI PENGURUSAN PENGETAHUAN

ABSTRAK

Perusahaan Kecil dan Sederhana (PKS) memainkan peranan penting dalam pertumbuhan ekonomi dan pembangunan Emiriah Arab Bersatu (UAE). Mereka dianggap sebagai tulang belakang ekonomi UAE, menyumbang dengan ketara kepada penciptaan pekerjaan, inovasi dan kepelbagaian ekonomi secara keseluruhan. Kerajaan UAE telah mengiktiraf kepentingan PKS dan telah melaksanakan dasar dan inisiatif untuk menyokong pertumbuhan dan pembangunan mereka, seperti menawarkan insentif kewangan, akses kepada pembiayaan, dan program inkubasi perniagaan. Bagaimanapun, sektor penting ini masih belum cukup inovatif kerana beberapa isu, termasuk kecekapan teknologi maklumat, yang menjejaskan pemindahan pengetahuan dan kapasiti penyerapan mereka. Oleh itu, penyelidikan ini bertujuan untuk merapatkan jurang ini dengan mengenal pasti keupayaan IT yang dikaitkan dengan keupayaan inovasi melalui KM dan mengkaji kesannya terhadap keupayaan inovasi. Metodologi penyelidikan kuantitatif yang didorong oleh soal selidik dikumpulkan daripada 321 pengurus PKS dalam sektor perkhidmatan. Dapatan kajian ini mendedahkan bahawa kecekapan teknologi maklumat memainkan peranan utama terhadap keupayaan inovasi, khususnya infrastruktur IT, integrasi IT, pengetahuan IT. Penemuan itu juga mengesahkan bahawa kecekapan IT adalah positif berkaitan dengan pengurusan pengetahuan, yang menjadi pengantara hubungan antara kecekapan IT dan keupayaan inovasi. Didorong oleh penyelidikan ini menyediakan model empirikal yang menerangkan cara kecekapan IT membolehkan organisasi mengurus dan memanfaatkan aset pengetahuan mereka dengan berkesan, yang seterusnya meningkatkan keupayaan mereka untuk berinovasi dan membangunkan produk, perkhidmatan atau proses baharu. Kepentingan kecekapan IT sebagai pemacu utama inovasi organisasi, dan mencadangkan bahawa organisasi harus mengutamakan pelaburan dalam pembangunan kecekapan IT sebagai cara untuk meningkatkan keupayaan inovasi mereka. Ia juga menekankan keperluan untuk organisasi menggunakan strategi pengurusan pengetahuan yang berkesan untuk memanfaatkan sepenuhnya potensi pelaburan IT mereka.

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LIST OF SYMBOLS

R^2	-	Coefficient of Determination
f^2	-	Effect Size

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LIST OF ABBREVIATIONS

IT	-	Information Technology
RBV	-	Research Based View
ROI	-	Return on Investment
SEM	-	Structured Equation Model
EFA	-	Exploratory Factor Analysis
CFA	-	Confirmatory Factor Analysis
IV	-	Independent Variables
IC	-	Innovation Capability
ITIF	-	Information Technology Infrastructure Flexibility
ITM	-	Information Technology Management

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LIST OF PUBLICATIONS

The followings are the list of publications related to the work on this thesis:

1. Al Teneiji, T.M., Ahamat, A., Murad, M.A. and Raheem, H.A.A., 2022. The Mediating Role of Knowledge Management in the Relationship between IT Capabilities and Innovation Capabilities. *Specialusis Ugdymas*, 1(43), pp.2734-2751.
2. Al Teneiji, T.M., Ahamat, A., Murad, M.A. and Raheem, H.A.A., 2024. Information Technology Capabilities Towards SMES Innovation Capabilities Through Knowledge Management: The Review Analysis. *Journal of Technology Management and Technopreneurship*, (In Press).

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Small and medium-sized enterprises (SMEs) constitute a crucial component of national economic progress in today's globalised world. However, in general, SMEs are facing a big challenge from both new entrants in the local market and multinational corporations in the foreign market. Thus, achieving SMEs' competitive advantages becomes the central goal of both SME owners and government policymakers. The Internet of Things (IoT) is the main driver of knowledge in the 4.0 industrial revolution era, which is the core of innovation development. Thus, this thesis presents how information technology (IT) influences the CA of SMEs under different conditions.

Globalisation has created continual competitive pressures, and evolving technology has made research relating to innovation creation extremely vital. An increasing body of research supports the link between what is referred to as innovation, knowledge management (KM), or IT competencies and the various measures of SMEs' CAs. However, there is no clear explanation for the existence of this link. Chapter 1 provides an overview of the issue as well as a research summary. This chapter introduces a quick outline of the current state of research in this field. The research questions, problem statement, research objectives, and research significance are all included in this chapter, in addition to the research background. The chapter concludes with a glossary of important concepts and a thesis outline. The essential principles linked to this thesis are explained in the following sections:

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1.1.1 Research Background

SMEs are critical to a country's economic as well as social development. In addition, SMEs play a crucial role in enhancing the trade balance, generating employment and income, and serving as key drivers of national economic advancement by creating jobs and generating income. Moreover, SMEs provide the starting point for a particular industry's growth. Apart from that, SMEs have become the majority of large corporations today (KO Oduntan, 2014). SMEs represent a significant business sector, accounting for 95% to 99% of all enterprises and contributing more than 60% to 70% to overall employment creation (Moss and Urban, 2017).

As SMEs advance, a country's economy will grow sustainably and consistently. Furthermore, a lot of governments possess national policies to encourage and promote SMEs, enhancing their country's competitive potential. SMEs, nevertheless, continue to face numerous challenges, including internal and external competition (Distanont and Khongmalai, 2018). Concerning SMEs, innovation is essential to increasing capacity and gaining a competitive edge. Schröder (2017). According to De et al. (2020), innovation may generate long-term growth and CAs in domestic and international markets. As a result, this study focuses on the IT elements that influence numerous aspects of KM practices and innovation, both of which can contribute to CAs in SMEs.

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There is no commonly agreed-upon definition of an enterprise (Ramdani, Chevers, and A. Williams, 2013). Numerous definitions have been proposed, and these descriptions are frequently associated with a country's economic development and activity. Khalifa Fund, 2013; AlSharji, Ahmad, and Abu Bakar (2018). Note that some academicians are looking at capital assets. In contrast, others look at turnover rates as well as labour skills, the company's ownership, legal status or process, or the industry sector. Ramdani et al. (2013); Cheng, Kadir, and Bohari (2014).

The Cabinet Resolution of 2016 is the most widely used framework for defining SMEs in the United Arab Emirates (UAE). This concept divides small businesses into three groups based on yearly sales turnover, the number of employees, and gross assets. Therefore, the UAE classifies SMEs as businesses with an annual turnover of less than AED 2 million and fewer than 50 full-time employees, while medium-sized businesses have an annual turnover of between AED 2 and 200 million and between 50 and 200 full-time employees. Silver, J. Reeves (2016); AlSharji et al. (2018).

In many aspects, SMEs differ from huge corporations (Ramdani, Chevers, and A. Williams, 2013). SMEs, for example, are more rigorously regulated. However, they are less inclined to hire specialists. (James, 1999; Thong, 2015). Other than that, SMEs ought to place greater emphasis on general capabilities and may lack IT technical and knowledge experience to fully comprehend and utilise its benefits. DeLone (2006).

Furthermore, because SMEs possess limited financial backing, they may be doubtful about investing in technical skills or large IT infrastructure (ITI), McCann and Barlow (2015). This is because they know they will not always possess the financial and management resources to deal with any issues. Baby and Joseph (2016). This study will aid in developing more strategic insights into SMEs' innovative technologies in the UAE.

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1.2 Innovation and SMEs in the UAE

The UAE is among the nations taking part in this global survey. However, the survey only reflects the attitudes of multinational and global companies operating in the country, as well as large state companies in sectors such as aerospace, energy, environment, logistics, and transport. The survey does not completely reflect the attitudes of SMEs towards innovation. The UAE appears to have a strong grasp and a positive attitude towards innovation (Khan, 2019), as per this assessment by Edelman (2014).

According to the GE Global Innovation study, innovation is quickly turning into a global game, and the only way to be successful is to combine and merge ideas, talents, resources, and insights from all over the world. Nonetheless, to meet specific market needs, innovation must be localised by improving internal capabilities rather than depending on external resources. Edelman (2014). The importance of innovation localization brings a strong CA to local firms and enables them to leverage their business through internationalization. Du, Zhu, and Li (2022). Many executives regard innovation as a strategic goal for driving corporate success, with more than half of respondents believing that building new business models is a potential method to improve future performance. Therefore, companies looking to innovate and gain a competitive edge consider business model innovation crucial. CA Casadesus-Masanell and Ricart (2011); Amit and Zott (2012); ABDI et al. (2018).

Executives cited collaboration, industrial internet, big data, and the IoT as significant drivers for innovation. Moreover, innovation is rarely a one-way street; it is a multidisciplinary and highly dynamic process involving a growing and diversified network of users, partners, and institutions. OECD, (2010).

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Collaboration and networking are already commonplace; 85% of business respondents among SMEs claimed that collaborating with start-ups and other entrepreneurs will help them succeed in their ventures. Schilirò (2015). Another important aspect of effective innovation. The time element is critical in innovation because it is better to come to market as soon as feasible to maintain a CA. Moreover, most respondents stated that innovation might come from any size company. Schiller (2015) and Faried, Saad, and Almarri (2018) view SMEs and individuals as potential collaboration partners and innovation champions. Younger and smaller businesses are particularly vulnerable to innovative challenges.

This includes the inability to scale successful innovations to a larger international market, difficulty coming up with radical and stimulating thoughts, a dearth of talent or skill, the incapability of the business to take risks, as well as difficulty establishing an effective business model to develop new business ideas and make them profitable (Khan, 2019). Finally, the executives hoped governments would create a framework to assist the top innovation drivers.

Business expectations for government assistance are as follows: aligning student curricula with market demands (85%), securing business confidentiality and trade secrets (86%), and reducing bureaucracy and red tape (87%). Schilirò (2015). The view of UAE corporations' innovative behaviour appears to be very positive. However, it only includes major private and state-owned businesses, not SMEs (Abou Hana, 2017).

Scholars have recognised entrepreneurial activities as the seeds for the development of innovation. Muhammad, Basha, and Hafidh (2021) stress the significance of entrepreneurial activities in developing innovation among UAE firms. This research focused on the Emirati people, utilising the GEM Adult Population Survey (APS) in 2020. The survey results painted a bleak image of innovation in Emirati-owned and operated SMEs. This in-depth analysis of the UAE business environment examined Emirati entrepreneurs' attitudes towards innovation, revealing that enhanced global competition has given the secret to CA for SMEs, notably providing services and goods that are unique or regarded as innovative by customers. The survey sought Emirati entrepreneurs' thoughts on how their customers perceived their products and services. Customers do not consider most UAE products and/or services to be innovative. Schilir (2015); Hanaysha, Al-Shaikh, Joghee, and Alzoubi (2022). These numbers demonstrated a high percentage of the entire population of recognised entrepreneurs in the UAE, which was greater than the UAE average.

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This finding demonstrated that Emirati entrepreneurs put less effort into continual product and service improvement after beginning a business to preserve a CA Schilirò (2015); Hanaysha et al. (2022).

The UAE GEM (2017) data shows a lack of originality and a drive to mimic rather than develop among Emirati-owned and operated businesses. Most companies offer products and services identical to those of their competitors, according to Brush and Greene (2017). Because of its ever-changing character and surroundings, measuring innovation is incredibly difficult. Innovation is equated with business rejuvenation and the establishment of new ventures in general, according to GEM. In particular, the GEM survey measures innovation in two ways: company competitiveness and product uniqueness. The survey's findings showed that Emirati entrepreneurs had little participation in the high-tech sector for various reasons, including the higher level of expenses and risk associated with technological innovation. Schiller (2015); Hanaysha et al. (2022).

The survey's outcomes summarise the characteristics of the innovation model of SMEs owned and operated by Emirati entrepreneurs. For starters, most Emirati SMEs have a low innovation level because their products are not very unique or new. Second, minimal efforts are required to constantly enhance products since companies prefer to duplicate items and methods instead of inventing or building something new. Finally, rather than focusing on high-tech products, Emirati SMEs specialise in low-tech things.

SMEs in the UAE are ineffective because they have low production, owing to a lack of motivation to work more. Many believe that these businesses lacked exposure to competition. Thus, it is critical to cultivate high-value entrepreneurs who can help the economy develop. The survey also found several significant barriers to entrepreneurship in the UAE, including a paucity of entrepreneurial skills and a lack of financial resources, as

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