UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Faculty of Technology Management and Technopreneurship

BUSINESS INTELLIGENCE SYSTEM AND INNOVATIVE WORK BEHAVIOR IN UAE SME AND THE MEDIATING ROLES OF KNOWLEDGE SHARING AND SME INNOVATION

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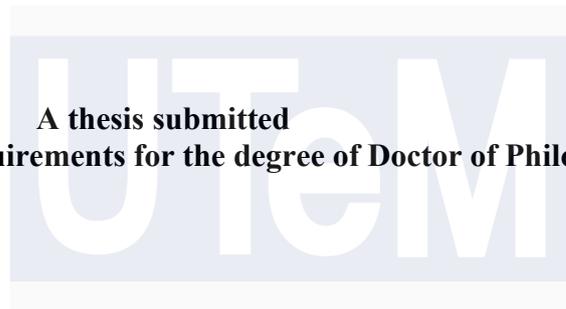
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SAIF KHALIFA MOHAMED MUBARAK ALDEREI

A thesis submitted
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DECLARATION

I declare that this thesis entitled "Business Intelligence System and Innovative Work Behavior in UAE SME and the Mediating Roles of Knowledge Sharing and SME Innovation" is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : ....

Name : SAIF KHALIFA MOHAMED MUBARAK ALDEREI

Date : 9/01/2026

APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Doctor of Philosophy.

Signature : ....

Supervisor Name : ASSOCIATE PROFESSOR DR. FAM SOO FEN
....

Date : 10/01/2026
....

DEDICATION

This work is dedicated to the inspiring person towards my life… my dear father and my dear mother who always want me to have the best, for her love, the prayers that she made for me.

…To my children…
I am deeply grateful to my children for their unwavering support in pursuing of my objectives, as their presence continues to enrich and complement my sense of happiness and fulfillment..

…To my great guide…
My dear supervisor, Associate Professor Dr. Fam Soo Fen for her visions in the use in business intelligence system.

ABSTRACT

In today's increasingly dynamic and competitive business environment, Business Intelligence Systems (BIS) serve as critical enablers of innovation and data-driven decision-making, especially for Small and Medium Enterprises (SMEs). In the United Arab Emirates (UAE), SMEs account for approximately 94% of all registered businesses, contribute over 60% to the non-oil GDP, and employ nearly 86% of the private sector workforce. Despite their strategic economic role, many UAE SMEs struggle to foster sustainable innovation, often due to limited adoption of BIS and underdeveloped knowledge-sharing cultures. This study investigates the impact of BIS on Innovative Work Behavior (IWB) and explores the mediating roles of Knowledge Sharing (KS) and SMEs Innovation (SMEI). Grounded in the Technology-Organization-Environment (TOE) framework and using a cross-sectional quantitative design, data were collected from 386 SME owners, managers, and shareholders across the UAE who have adopted or are in the process of adopting BIS. Partial Least Squares Structural Equation Modeling (PLS-SEM) was applied using SmartPLS 4 to analyze the relationships among variables. The findings confirmed that several BIS components specifically data integration, information access quality, information content quality, use of information in business processes, and analytical decision-making culture significantly enhance IWB. However, analytical capabilities alone did not demonstrate a significant direct effect on IWB. Knowledge sharing was not found to directly influence IWB significantly; nonetheless, it exhibited a statistically significant mediating effect in the relationships between analytical capabilities, use of information in business processes, and analytical decision-making culture with IWB. Similarly, SME innovation significantly mediated the relationships between analytical capabilities and information content quality with IWB. These findings suggest that while knowledge sharing and SME innovation may not universally mediate all BIS components, they play pivotal roles in shaping how specific BIS functions influence innovative behaviors. This study makes a notable theoretical contribution by refining the TOE framework through the dual mediation model involving KS and SMEI. It also provides practical implications for SME leaders and policymakers, urging them to prioritize BIS implementation alongside the cultivation of innovation-friendly and knowledge-sharing cultures. Strengthening these organizational capabilities can substantially enhance individual-level innovation, contributing to overall SME competitiveness and economic sustainability in the UAE.
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SISTEM KECERDASAN PERNIAGAAN DAN TINGKAN LAKU KERJA INOVATIF DALAM PKS UAE DAN PERANAN PENGANTARA PERKONGSIAN PENGETAHUAN DAN INOVASI PKS

ABSTRAK

Dalam persekitaran perniagaan yang semakin dinamik dan kompetitif hari ini, Sistem Perisikan Perniagaan (Business Intelligence Systems, BIS) memainkan peranan penting sebagai pemangkin inovasi dan pembuatan keputusan berasaskan data, terutamanya dalam kalangan Perusahaan Kecil dan Sederhana (PKS). Di Emiriah Arab Bersatu (UAE), PKS merangkumi kira-kira 94% daripada semua perniagaan berdaftar, menyumbang lebih 60% kepada KDNK bukan minyak, dan menggaji hampir 86% tenaga kerja sektor swasta. Walaupun memainkan peranan ekonomi yang strategik, banyak PKS di UAE menghadapi kesukaran untuk memacu inovasi mampan, sering kali disebabkan oleh tahap penggunaan BIS yang rendah serta budaya perkongsian pengetahuan yang masih lemah. Kajian ini meneliti kesan langsung BIS terhadap Tingkah Laku Kerja Inovatif (Innovative Work Behavior, IWB) dan meneroka peranan pengantaraan Perkongsian Pengetahuan (Knowledge Sharing, KS) serta Inovasi PKS (SMEs Innovation, SMEI). Berteraskan kerangka Teknologi-Organisasi-Persekitaran (Technology-Organization-Environment, TOE) dan menggunakan reka bentuk kuantitatif rentas seksyen, data dikumpul daripada 386 pemilik, pengurus dan pemegang saham PKS di seluruh UAE yang telah menguna pakai atau sedang dalam proses mengguna pakai BIS. Model Persamaan Struktur Kuasa Dua Terkecil Separa (Partial Least Squares Structural Equation Modeling, PLS-SEM) telah digunakan melalui perisian SmartPLS 4 untuk menganalisis hubungan antara pemboleh ubah. Dapatan kajian mengesahkan bahawa beberapa komponen BIS—khususnya integrasi data, kualiti capaian maklumat, kualiti kandungan maklumat, penggunaan maklumat dalam proses perniagaan, dan budaya pembuatan keputusan analitikal—mempunyai kesan signifikan dalam meningkatkan IWB. Walau bagaimanapun, keupayaan analitikal secara bersendirian tidak menunjukkan kesan langsung yang signifikan terhadap IWB. Perkongsian pengetahuan tidak memberikan pengaruh langsung yang signifikan terhadap IWB; namun, ia memainkan peranan sebagai pengantara yang signifikan secara statistik dalam hubungan antara keupayaan analitikal, penggunaan maklumat dalam proses perniagaan, serta budaya keputusan analitikal dengan IWB. Begitu juga, inovasi PKS berfungsi sebagai pengantara yang signifikan dalam hubungan antara keupayaan analitikal dan kualiti kandungan maklumat dengan IWB. Penemuan ini menunjukkan bahawa meskipun KS dan SMEI tidak mengantara semua komponen BIS secara menyeluruh, kedua-duanya memainkan peranan penting dalam membentuk cara fungsi-fungsi tertentu BIS mempengaruhi tingkah laku inovatif. Kajian ini menyumbang secara teoritikal dengan memperhalusi kerangka TOE melalui model pengantaraan berganda melibatkan KS dan SMEI. Ia juga memberikan implikasi praktikal kepada pemimpin PKS dan penggubal dasar, dengan menggesa mereka untuk memberi keutamaan kepada pelaksanaan BIS di samping membangunkan budaya perkongsian pengetahuan dan inovasi yang menyokong. Pengukuhan keupayaan organisasi ini berpotensi meningkatkan inovasi pada tahap individu, sekaligus menyumbang kepada daya saing dan kelestarian ekonomi PKS secara keseluruhan di UAE.

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

BIS	-	Business intelligence system
AVE	-	Average variance extracted
CFA	-	Confirmatory factor analysis
CR	-	Composite reliability
EFA	-	Exploratory factor analysis
EM	-	Expectation-maximization
GDP	-	Gross domestic product
GoF	-	Goodness of fit
I	-	Innovation
IT	-	Information technology
IWB	-	Innovative work behaviour
KBV	-	Knowledge-based view
KM	-	Knowledge management
KMO	-	Kaiser-meyer-olkin
KS	-	Knowledge sharing
PLS	-	Partial least squares
RBV	-	Resource-based view
SDG	-	sustainable development goals
SEM	-	Structural equation modelling
SPSS	-	Statistical package for the social science
VIF	-	Variance inflation factor
VRIN	-	Valuable, rare, inimitable, and non-substitutable

LIST OF PUBLICATIONS

Journal with Impact Factor

Al Derei, S.K. and Fam, S.F., 2023. The impact of business intelligence, knowledge sharing and SMEs innovation on innovative work behavior: A proposed framework for SMEs. *Calitatea, 24(*195), pp.98-105.

Al Derei, S.K and Fam, S.F., 2025. The Impact of Business Intelligence System on The United Arab Emirates' SMEs Innovative Work Behaviour, *International Journal of Academic Research in Business and Social Sciences, 15(*1), pp.156-176.
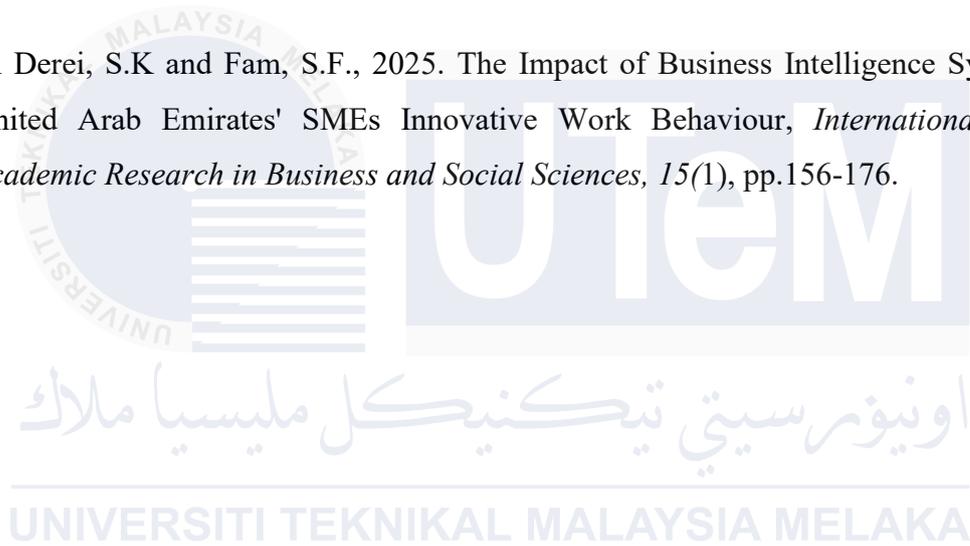
CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides an overview of the study and establishes its structural foundation. It outlines the research objectives and the research questions that this study seeks to answer. The significance and contributions of the research are discussed in the context of Small and Medium Enterprises (SMEs) in the United Arab Emirates (UAE). Finally, the organization of the thesis is briefly described, summarizing the contents of each chapter.

1.2 Background of the Research

Business Intelligence Systems (BIS) have become integral to modern organizations due to their ability to transform vast amounts of raw data into actionable insights, enabling better decision-making across various organizational levels. Defined as comprehensive frameworks, BIS integrate high-quality data from diverse sources with advanced analytical tools, allowing users to access, analyze, and visualize critical information for strategic decision-making (Ammar, 2017). Unlike traditional data management systems, which are limited to data storage and retrieval, BIS offer sophisticated analytical capabilities that support complex decision-making processes (Bach et al., 2016). By enhancing the organization's ability to process data, BIS play a crucial role in streamlining operations, optimizing strategic initiatives, and improving overall organizational performance (Calof, 2020). The rise of BIS has been driven largely by the exponential growth of data worldwide, which now doubles approximately every 18 months. This massive influx of data has created challenges for businesses in managing and utilizing information effectively, necessitating

systems that can not only store but also interpret and leverage data for strategic advantage (Somer and Richardson, 2004).

BIS are especially vital in today's competitive business landscape, as organizations across industries use them to optimize operations, foster innovation, and respond to evolving market trends. Several widely-used BIS tools, such as Tableau, Microsoft Power BI, and Qlik Sense, are renowned for their robust data visualization, integration, and self-service analytics capabilities. Tableau, for example, is known for its powerful data visualization features, enabling organizations to create interactive dashboards that provide real-time insights. Microsoft Power BI integrates seamlessly with other Microsoft products, making it particularly valuable for businesses already using the Microsoft ecosystem. Qlik Sense offers highly customizable analytics, supporting both guided and exploratory data analysis, which allows organizations to interact with data on a deeper level (Bhatiasevi and Naglis, 2018). These tools empower organizations to identify trends, understand customer behaviors, and make data-driven decisions essential for maintaining a competitive edge (Olszak and Ziemba, 2007). Beyond these technical functionalities, BIS support strategic decision-making by identifying patterns and deriving insights that drive operational efficiency, inform competitive strategies, and stimulate innovation (Eckerson and Sherman, 2008).

In sectors where quick decision-making and agility are essential, such as retail, finance, and healthcare, BIS are invaluable. In retail, BIS allow for real-time sales data analysis, enabling companies to adjust inventory levels and promotional strategies based on emerging consumer trends. In finance, BIS are used for risk assessment, market monitoring, and investment decision-making, giving financial institutions the tools to make informed choices in volatile markets. The healthcare industry also benefits from BIS, as these systems facilitate improved patient care, efficient resource allocation, and compliance with regulatory standards. By analyzing patient data, healthcare providers can identify trends that

improve treatment outcomes, manage resources more effectively, and ensure regulatory compliance (Calof, 2020). BIS enable organizations in these fast-paced sectors to operate efficiently and respond proactively to market dynamics, giving them a significant advantage in highly competitive environments.

An essential concept linked to BIS is Innovative Work Behavior (IWB), which refers to employees' behaviors in generating, promoting, and implementing new ideas that benefit their organization. IWB is crucial in today's rapidly changing business environment as it fosters a culture of innovation, helping companies to maintain a competitive edge. The relationship between BIS and IWB is particularly significant because BIS provide the data and insights needed for employees to identify opportunities for improvement, collaborate with others, and support innovation with data-driven decisions (Scott and Bruce, 1994). By providing employees with relevant, actionable insights, BIS create an environment where individuals feel empowered to propose and execute new ideas, essential for fostering a culture of innovation and encouraging risk-taking. This environment is critical in Small and Medium-sized Enterprises (SMEs), where resources may be limited. In these organizations, leveraging BIS to foster innovation can provide a substantial competitive advantage, enabling SMEs to be agile and responsive to market changes (Pieterse et al., 2010).

SMEs play a foundational role in economies around the world, contributing significantly to economic growth, job creation, and innovation. Globally, SMEs represent a large portion of businesses and make significant contributions to GDP and employment rates (Cronje, 2017). However, SMEs also face unique challenges, including limited financial resources, restricted access to advanced technologies, and difficulties in scaling operations. These limitations can hinder their ability to innovate, respond to market changes, and compete with larger organizations that have more resources at their disposal (Sulistyo, 2016). In the context of the UAE, SMEs are particularly critical to the economy, making up

a substantial portion of the business landscape. According to recent statistics, SMEs account for over 94% of all businesses in the UAE, employ more than 86% of the private sector workforce, and contribute approximately 60% to the country's non-oil GDP (SME Report, 2022). These figures highlight the essential role SMEs play in supporting the UAE's economic diversification strategy and underscore the importance of these businesses adopting advanced technologies like BIS to remain competitive.

By the end of 2022, it was estimated that there were around 557,000 SMEs operating in the UAE, further underscoring their significance to the nation's economic framework. The UAE government has ambitious goals for this sector, aiming to increase the number of SMEs to 1 million by 2030, demonstrating its commitment to supporting the growth and sustainability of SMEs. These efforts are part of a broader strategy to diversify the UAE economy, reduce dependence on oil revenues, and foster a vibrant business environment that supports innovation and entrepreneurship (ADSMEHub, 2023; Khaleej Times, 2023).

Despite their importance, SMEs in the UAE face a variety of challenges that can limit their growth and innovation potential. One of the most significant challenges is access to financing. Many SMEs struggle to obtain the funds needed to invest in new technologies, hire skilled employees, and expand their operations (Ahmad et al., 2019). This lack of financial resources can restrict SMEs' ability to innovate and adopt new business practices. Additionally, SMEs often face challenges in networking and building connections, which are essential for establishing a solid foundation for growth and accessing new markets. Another common issue is the lack of managerial expertise; many SME owners lack the experience and skills necessary to develop innovative strategies, implement best practices, and improve organizational effectiveness (Alefari et al., 2020). This skills gap can result in missed opportunities for growth and innovation, as SMEs may be unable to identify or capitalize on new market trends and emerging customer demands.

The adoption of BIS offers a potential solution to many of these challenges. BIS provide SMEs with advanced data analytics and insights that can help overcome limitations in management expertise and support more informed decision-making. For instance, BI tools can provide SMEs with real-time data on customer preferences, market trends, and operational efficiency, enabling them to make quick adjustments to their strategies and remain competitive. Moreover, by analyzing internal data, BIS can help SMEs identify inefficiencies, optimize business processes, and improve overall productivity. This enhanced productivity frees up resources that can be reinvested in innovation and expansion (Alsharari et al., 2020).

A critical component of innovation within SMEs is knowledge sharing, which enables the diffusion of ideas and best practices across departments and teams. Effective knowledge-sharing practices foster a culture of continuous improvement, enhancing an organization's ability to innovate and adapt to changes. This is particularly important for SMEs, where resources and expertise are often limited. However, many SMEs in the UAE face challenges in implementing effective knowledge-sharing practices, often due to organizational silos, lack of communication, and limited technological infrastructure (Temouri et al., 2020).

BIS can play an essential role in facilitating knowledge sharing within SMEs by providing a centralized platform for data storage, access, and analysis. By ensuring that all employees have access to the same information, BIS help to break down departmental silos and promote a culture of transparency and collaboration. Centralized data also reduces the likelihood of information hoarding, where valuable insights remain confined to specific teams or individuals. Moreover, the analytical capabilities of BIS enable organizations to uncover trends and patterns that may not be immediately apparent, providing insights that can drive innovation and support strategic decision-making (Eckerson and Sherman, 2008).

In addition to supporting knowledge sharing, BIS can foster a collaborative culture within SMEs. When employees have access to a shared pool of data and insights, they are more likely to engage in discussions, share ideas, and build on each other's contributions. This collaborative environment is essential for fostering innovation, as it allows employees to co-create solutions to business challenges, leading to more creative and effective outcomes. By integrating BI tools into their operations, SMEs can enhance their knowledge-sharing practices and unlock their full innovative potential, enabling them to remain agile and competitive in a rapidly changing business environment (Olszak and Ziemba, 2007).

Innovation is a key driver of competitiveness and growth for SMEs, particularly in dynamic markets like the UAE. However, SMEs' ability to innovate is often limited by resource constraints, lack of access to advanced technologies, and challenges in attracting and retaining skilled employees (Gupta and Mirchandani, 2018). The integration of BIS within SMEs can help overcome these constraints by providing the insights and data necessary to drive innovation. By leveraging BIS, SMEs can quickly analyze large volumes of data, identify emerging trends, understand customer needs, and develop new products and services that align with market demands. This capacity for innovation is critical for maintaining competitiveness, especially in sectors characterized by rapid change and high competition (Alsharari et al., 2020).

BIS not only enhance innovation but also support organizational efficiency by optimizing business processes. BIS allow SMEs to identify inefficiencies, reduce costs, and improve overall productivity, thus freeing up resources that can be reinvested in other strategic areas, such as RandD and product development. This optimization capability is particularly valuable for SMEs, as it enables them to achieve more with limited resources, maximizing their potential for growth and innovation (Temouri et al., 2020).

In summary, the integration of BIS in SMEs is crucial for promoting IWB, which refers to employees' actions in generating, promoting, and implementing new ideas that benefit the organization. By providing access to data and insights, BIS empower employees to engage in IWB, thus contributing to a culture of innovation within the organization. This culture is particularly important for SMEs, where agility and adaptability are critical for success. By supporting knowledge sharing, fostering collaboration, and facilitating innovation, BIS provide SMEs with the tools they need to thrive in today's competitive landscape. Furthermore, by improving organizational efficiency and optimizing business processes, BIS help SMEs to overcome common challenges, such as limited financial resources and managerial expertise.

Ultimately, BIS are more than just data management tools; they are strategic assets that can drive growth, enhance competitiveness, and support sustainable development. As SMEs in the UAE continue to play a pivotal role in the country's economic landscape, the adoption of BIS represents a powerful means to unlock their full potential. With BIS, SMEs can transform data into actionable insights, enabling them to make informed decisions, foster innovation, and adapt to changing market dynamics. This capability is essential for the UAE's vision of economic diversification and sustainable growth, making BIS a valuable investment for SMEs aiming to thrive in the modern economy.

1.3 Problem Statement

In the rapidly evolving global economy, SMEs in the UAE face intense pressure to innovate in order to maintain competitiveness and contribute to national economic diversification goals (Dubai SME, 2023). Innovative work behaviour (IWB), defined as the gener-

ation, promotion, and realization of novel ideas within a work role or organization, is increasingly recognized as a vital component for SMEs' success. However, fostering innovative behavior within SMEs remains a significant challenge.

Business Intelligence systems (BIS), which provide analytical tools for gathering, processing, and interpreting business data, have the potential to support and stimulate innovative work behavior by enhancing decision-making, opportunity recognition, and strategic agility. Yet, empirical evidence on the direct impact of BIS on employees' innovative behaviors, particularly in the SME sector of the UAE, is limited and inconclusive. SMEs play a crucial role in the economy of the UAE, representing over 94% of all businesses and contributing more than 60% to the non-oil GDP (Dubai SME, 2023). However, SMEs in the UAE face significant challenges in fostering innovation and maintaining competitiveness, particularly in the face of global and local market expansion. A key challenge for SMEs is their relatively low levels of IWB, which is essential for continuous improvement and adaptation to fast-paced market changes (Gupta and Mirchandani, 2018).

The relationship between BIS and IWB in UAE SMEs is influenced by technological adoption, leadership support, and strategic alignment with innovation goals. Business analytics, as part of BIS, has been shown to enhance competitive advantages for SMEs by improving decision-making and resource allocation (Aljumah et al., 2022). Additionally, factors such as top management's commitment and the availability of technology assets mediate the effectiveness of BIS in fostering innovation. The UAE's government-led initiatives to bolster innovation have created a conducive environment for SMEs to adopt BIS for enhanced productivity and creativity (Mohammed, 2019). However, barriers such as limited funding, inadequate skill sets, and resistance to change persist. Addressing these barriers

through targeted training programs and policy support can amplify the impact of BIS on fostering a culture of innovation, thereby driving sustainable business growth.

The interplay between BIS, knowledge sharing, and IWB in UAE SMEs is critical for fostering a culture of innovation and competitive advantage. BIS acts as an enabler for effective knowledge sharing by facilitating data-driven insights, collaborative platforms, and real-time information dissemination, all of which empower employees to engage in innovative practices. In UAE SMEs, knowledge sharing bridges the gap between data and actionable ideas, allowing employees to contribute creatively to business processes. However, challenges such as organizational silos, insufficient training, and resistance to BIS adoption hinder its potential. Studies emphasize that leadership's role in promoting a knowledge-sharing culture, alongside BIS integration, significantly enhances IWB by encouraging employees to experiment, share insights, and collaborate on problem-solving initiatives. The UAE's emphasis on technology and innovation policies provides a favorable context, yet SMEs must overcome resource constraints and align BIS adoption with their strategic goals to maximize the benefits of knowledge sharing in driving innovative behaviors.

BIS are widely recognized as essential tools for supporting data-driven decision-making and fostering innovation (Olszak and Ziemba, 2007). However, the relationship between BIS and IWB remains underexplored, particularly in the unique cultural and economic context of the UAE. Prior research has largely focused on the technical and operational benefits of BIS (Calof, 2020; Bhatiasevi and Naglis, 2018), but has not adequately examined how BIS can directly influence innovative behaviors within organizations. Furthermore, there is limited understanding of the mediating roles of knowledge sharing and SME innovation in this relationship.

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Knowledge sharing, defined as the process of disseminating and applying insights within an organization, is recognized as a key enabler of innovation (Temouri et al., 2020). However, many SMEs struggle to implement effective knowledge-sharing practices due to organizational silos and inadequate technological infrastructure (Alsharari et al., 2020). Likewise, SME innovation including product, process, and organizational innovation is a critical driver of competitiveness (Gupta and Mirchandani, 2018), yet its role as a potential mediator in the BIS-IWB relationship has not been sufficiently studied.

In the dynamic and competitive environment of UAE's Small and Medium Enterprises (SMEs), fostering innovation is critical for sustainable growth and resilience. BIS have emerged as powerful tools for enhancing decision-making by transforming raw data into actionable insights. However, while BIS hold the potential to support IWB among employees, the actual realization of this potential depends significantly on knowledge sharing within organizations. Despite the widespread adoption of BIS in UAE SMEs, there exists a gap in understanding how these systems directly or indirectly influence innovative work behavior. Knowledge sharing, a crucial enabler of organizational learning and creativity, often faces challenges due to cultural, technological, and structural barriers. Without robust knowledge-sharing practices, the benefits of BIS may remain underutilized, limiting their impact on fostering innovation.

SMEs are the cornerstone of the UAE economic diversification strategy. Despite their critical role, many UAE SMEs struggle to sustain competitive advantage due to limited innovation capacities. In today's dynamic business environment, BIS have emerged as essential tools, offering data-driven insights that can enhance decision-making and foster IWB among employees. However, the mere adoption of BIS does not automatically translate into higher innovation performance.

A key gap exists in understanding how BIS influence IWB within SMEs. Research suggests that Knowledge Sharing (KS) — the active exchange of information and expertise — and SMEs Innovation — the firm's capacity to develop new products, services, or processes — may act as critical mediators in this relationship. Yet, empirical studies investigating these mediating mechanisms within the UAE's unique socio-economic context remain scarce.

Given the UAE's strong emphasis on technological transformation and entrepreneurship (e.g., UAE Vision 2031), there is a pressing need to explore whether and how BIS catalyze innovation at the individual and organizational levels. Addressing this gap will provide valuable insights for SMEs aiming to leverage business intelligence not just for operational efficiency but also for driving continuous innovation through enhanced knowledge sharing and IWB.

1.4   Research Questions

Based on the previous section, here are research questions that could guide an investigation into how Business Intelligence Systems (BIS) influence the Innovative Work Behavior (IWB) of SMEs in the UAE:

1. What is the relationship between Business Intelligence Systems (BIS) and Innovative Work Behavior (IWB) of SMEs in the UAE?

2. Does knowledge sharing mediate the relationship between BIS and IWB in UAE SMEs?

3. Does SME innovation mediate the relationship between BIS and IWB in UAE SMEs?

4. What are the combined effects of BIS on IWB in UAE SMEs, considering the mediating roles of both SME innovation and knowledge sharing?

1.5   Research Objectives

This research to assess whether there is a measurable relationship between the level of BI system on the innovative work behavior of (SMEs) in the UAE. These objectives are constructed and need to be answered at the end of the study. Specifically, the objectives are as follows:

1. To determine the relationship between Business Intelligence Systems (BIS) and the Innovative Work Behavior (IWB) of SMEs in the UAE.
2. To examine the mediating role of knowledge sharing in the relationship between BIS and IWB in UAE SMEs.
3. To analyse SME innovation mediates the relationship between BIS and IWB in UAE SMEs.
4. To assess the combined effects of knowledge sharing and SME innovation as mediators in the relationship between BIS and IWB in UAE SMEs.

1.6   Significance of the Research

The use of business intelligence system can aid in the resolution of data difficulties and operational challenges that arise inside an organization in this situation. All employees and managers require up-to-date information in order to make sound decisions. In addition, business intelligence system may generate reports and interface with data warehouses and data marts. So business intelligence system helps organizations enhancing decision-making. Environmental factors, like organizational factors, can either hinder or accelerate the adoption of new technologies. Moreover, it provides imprecise definitions of the major structures and variables in each of the scenarios. Because the factors that influence technology adoption differ from one another, each technology requires its own set of measures.

In filling gaps in understanding how business intelligence system affects business knowledge sharing and innovation and Innovative work behavior, this research has an important role to play. It serves as a reference point for entrepreneurs and Innovative work behavior managers in the small and medium-sized enterprises (SME) industry who are aware of potential financial problems, as well as to evaluate their optimum level of Intelligence enterprise in order to achieve the profitability of the organisation.

Furthermore, the analysis of the optimal composition of the Intelligence organization contributes to the optimization of the shareholder's return and has a favorable impact. In addition, it provides vital insights into the successful decision of Market Intelligence and Innovative work behavior to increase the business intelligence system by exploiting the debt and equity financing ratio to entrepreneurs and Innovative work behavior managers. As a result, this study will go into depth and include additional information on smart business practices for SMEs in the United Arab Emirates, which will assist entrepreneurs or Innovative work behavior managers in making decisions about their company's Innovative work behavior corporate strategy.

This research will benefit from a better understanding of knowledge sharing and innovation practices among SMEs in the United Arab Emirates in order to gain a significant understanding of the factors influencing innovative work behavior in the future. When it comes to SMEs and Innovative work behavior managers, the importance of this research tends to provide new learning that will help these individuals and organizations make good decisions on the Intelligence leverage of their sector as a benchmark in determining overall enterprise success is unquestionable. If a firm's business operations are dependent on debt financing, this might put the company's future in jeopardy, and it could even result in the company going bankrupt. Following a better understanding of small and medium-sized enterprise financial activities in the UAE, policymakers should establish a motivating

scheme and cultivate a Innovative work behavior climate for the viability of small and medium-sized enterprises. This scheme and climate should focus on attainable sources of Innovative work behavior in order to satisfy the demand for small and medium-sized enterprises.

1.7   Scope and Limitations of the Research

This study concerns the interrelationship between business intelligence systems, SMEs knowledge sharing and innovation, and SMEs Innovative work behaviors in the UAE. This study relies on theories that interpret the adoption of business technology as a resource of the organization toward improving its knowledge sharing and innovation and Innovative work behavior. Theories adopted by this study includes resource-based view theory and Innovative work behavior theory. The population of this study inclusion of all managers within the SMEs operate in the UAE, while the sample will be 500 managers. The quantitative data analysis will be carried out using the IBM Statistical Package for Social Sciences (SPSS) and the PLS-SEM version 4 data packages. PLS-SEM is a statistical software package that stands for structural equation modelling. PLS-SEM is designed for Structural Equation Modeling (SEM), path analysis, and confirmatory factor analysis (CFA) procedures. The current study is limited to the perceptions of the research sample. The study is also limited to the acadiemc year of 2022-2023.

1.8   Operational Definition

Business intelligence system

A business intelligence system is a technology-driven process for collecting, integrating, analyzing, and presenting data from various sources to facilitate decision-making and support strategic planning within organizations. In this thesis, the term "business intelligence system" refers to the tools, technologies, and processes used by small and

medium-sized enterprises (SMEs) in the UAE to gather, analyze, and transform data into actionable insights, fostering innovation and enhancing business performance.

Business intelligence systems combine data gathering, data storage, and knowledge management with data analysis to evaluate and transform complex data into meaningful, actionable information, which can be used to support more effective strategic, tactical, and operational insights and decision-making (Ammar, 2017).

Knowledge sharing

Knowledge sharing is the process through which individuals, teams, and organizations exchange, disseminate, and apply knowledge, experience, and expertise to solve problems, develop new ideas, and enhance performance. In this study, knowledge sharing refers to the interactions and communication channels among SME employees and stakeholders in the UAE that facilitate the transfer and application of knowledge, skills, and best practices, ultimately contributing to the development of innovative work behaviors. Knowledge sharing is defined by organizations that have processes in place to exchange critical information across the workforce (Calof, 2020). Organizations that do it really well have a culture of knowledge where employees are encouraged to share what they know with others instead of hoarding it. Team leaders, here's everything the employees need to know about knowledge sharing, its benefits, and how to encourage it in the company.

SMEs innovation

SMEs innovation refers to the process of generating, developing, and implementing new ideas, products, services, or business models that improve the performance, competitiveness, and growth of small and medium-sized enterprises. In this thesis, SMEs innovation specifically relates to the innovative activities and initiatives undertaken by UAE-based (SMEs) that lead to enhanced business performance, market presence, and value creation.

Innovation in small and medium- sized enterprises (SMEs) is at the core of inclusive growth strategies: more innovative SMEs are more productive SMEs that can pay better wages and offer better working conditions to their workers, thus helping reduce inequalities (Choudhary, 2019).

Innovative work behaviour

Innovative work behaviour is the extent to which individuals or teams within an organization engage in proactive, creative, and risk-taking activities that result in the generation, promotion, and realization of new ideas, processes, products, or services. According to Janssen (2000), innovative work-behavior can be defined "as the intentional creation, introduction and application of new ideas within a work role, group, or organization, in order to benefit role performance, the group, or the organization" (p. 228).

1.9   Structure of the Thesis

The first chapter of this study describes the background of the study as well as the problem statements related to business intelligence system for SMEs in the United Arab Emirates. This chapter discusses the research aims, the significance of the study, and the definitions that were used.

An overview of the theoretical and empirical literature on business intelligence system is included in Chapter 2 of this study. In conjunction with one another, these studies provide valuable insights that can be summarized in a conceptual framework of factors that influence the selection of business intelligence system tools for SME Business intelligence system and Innovative work behavior.

The rationale for using a particular methodology in this study is described in three chapter.The steps involved in defining a research design, determining a sample size, determining a data collection method, and constructing a survey questionnaire are

demonstrated in detail. Additionally, the definitions of independent and dependent variables are discussed.

Fourth chapter delves into the specifics of the survey questionnaire and the quantitative data that will be acquired throughout the process. With the use of statistical software such as SPSS and PLS-SEM, the data, which include the relationship and difference between variables, will be interpreted (Statistical Package for Social Science). The outcome is presented in relevant tables and graphical charts, which are backed up by descriptive and inferential statistical analysis.

Fifth Chapter of this study comes to a close with Chapter 5. It begins by examining the aims of this study as well as its contributions to SMEs in the United Arab Emirates as well as for academic purposes. The conclusion provides a succinct summary of the findings as well as a discussion of the limitations of the research. A few recommendations are made for future research in this area towards the conclusion of the research

1.10   Summary

Chapter One points out the context of the thesis, the main problem in this research, and the goals that needed to be met in research. The chapter also discusses the study content or opens the content before heading to chapter two, which outlines a thorough description of the literature review of the study.

CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

This chapter will discuss the literature review of the Business Intelligence Systems (BIS) and Innovative Work Behavior (IWB) on Small and medium-sized enterprises (SMEs) in UAE. Then, the   development of hypothesis according to research framework are discussed.

2.2   United Arab Emirates Economy

Small and medium-sized enterprises (SMEs) are pivotal to the UAE's economy, driving job creation, innovation, exports, and the development of new business models. They are considered the backbone of the economy, embodying entrepreneurial spirit and innovation. The International Federation of Business states that SMEs represent 95% of the total number of companies in the UAE (International Federation of Business, 2022). These enterprises contribute significantly to the workforce and the economy, with SMEs accounting for 43% of the workforce and generating 40% of the total value added in the emirate (SME Report, 2022). The UAE's SME sector is defined by specific criteria, which include aspects like the number of employees, annual turnover, and the nature of ownership. According to the Ministry of Economy, an SME in the UAE is characterized based on these factors, which helps in assessing the size and condition of SMEs and facilitating comparisons with other economies (UAE Ministry of Economy, 2022). This official definition is crucial for policymakers and researchers to understand the landscape of SMEs in the UAE and to devise strategies for their growth and development.

The UAE has witnessed a transformation in its SME sector, with these enterprises increasingly recognized as critical drivers for economic diversification and long-term development. Their agility and innovative capacity, particularly in the burgeoning services and technology sectors, position SMEs as key contributors to the UAE's economic strategy (Al-Mubaraki and Busler, 2017). Understanding the business models of SMEs, the challenges they face, and the support systems they require is essential for fostering a conducive environment for their growth and innovation. In recent years, the UAE has enhanced its focus on SME development, providing support through various initiatives aimed at nurturing startups and entrepreneurs. The country's commitment to fostering a competitive SME ecosystem is evidenced by comprehensive efforts involving government entities, financial institutions, and international collaborations, aiming to position UAE SMEs at the forefront of global economic activity (UAE Ministry of Economy, 2022).

2.2.1 Business Intelligence in the UAE Economy

In the rapidly evolving business landscape of the UAE, enterprise Business Intelligence System (BIS) solutions are increasingly recognized for their pivotal role in enhancing organizational decision-making, knowledge sharing, innovation, and profitability. BIS solutions empower organizations to store, retrieve, and analyze vast amounts of operational data, facilitating improved strategic and tactical decisions. This analytical capability is instrumental in fostering innovative work behavior within industries, enabling companies to maintain a competitive edge (Ramakrishnan et al., 2012; Jones, 2005; Davis, 2002). Business Intelligence, as defined by Zeng et al. (2006), involves the processes of collecting, analyzing, and distributing purpose-specific information, aiding in reducing uncertainty in strategic decision-making. In the context of the UAE, where the economy is characterized by rapid growth and diversification, the integration of (BIS) across sectors is crucial. By leveraging BI, UAE

enterprises can harness the power of data-driven insights to navigate market complexities, identify new opportunities, and enhance operational efficiencies, ultimately contributing to the nation's economic resilience and dynamism.

An organisation's knowledge base is a collection of ideas. methods, and strategies for improving business decisions that make use of information from various sources (both internal and external, provided by customers, partners, or third parties) to understand business dynamics are referred to as organisational knowledge (Upadhyay et al., 2023). Utilising the phrase "business intelligence," (Jafari et al., 2023) defined it as a set of data analysis and reporting tools that help top-level, middle-level, and lower-level managers make better decisions by using relevant and timely information.

It has been a few decades since the significance of business intelligence system (BIS) has risen significantly, both in the business and academic sectors (Saxena and Mishra, 2023). Business intelligence system (BIS) has been in use by companies and other organisations for many years and is not a new idea in information technology. Because it encompasses concepts such as analytics, big data, and artificial intelligence, all of which are integral parts of digital transformation, this term has gained in popularity in recent years, particularly among business executives in organisations of all sizes and industries, as well as those in the public sector.

To achieve the ultimate objective of improving knowledge sharing and fostering innovation within an organization, businesses should base their decisions on business intelligence systems (BIS). Research by Hamidinava et al. (2023), Qaffas et al. (2022), Rodrigues et al. (2022), Shiau et al. (2022), and Tsuchimoto and Kajikawa (2022) has found that the promise of BIS is fully realized only when the information it provides is effectively utilized to enhance decision-making. This, in turn, leads to improvements in business processes, product and service innovation, as well as product and service differentiation.

Small and medium-sized enterprises (SMEs) are increasingly recognizing that BIS serves as a crucial enabler, helping them make better decisions based on available data (Hamidinava et al., 2023). The findings suggest that BIS may also have an indirect positive impact on organizational performance (OP) through this mechanism.

Furthermore, business intelligence system is often just one component of a more extensive set of efforts targeted at enhancing operational knowledge sharing and innovation in the first place. Improvements in process efficiency are achieved via business process management, which is a well-established method for improving operational knowledge sharing and innovation. Since they both seek to accomplish the same primary objective, integrating business intelligence system into efforts to enhance business process management seems to be a logical fit. When business intelligence system is used to manage cross-functional business processes, the efficiency with which BIS assets are used may be increased.

When distributing resources, businesses use business intelligence system (BIS) assets to aid decision-making. However, in practice, multiple teams often implement these systems with minimal coordination, resulting in unsynchronized efforts (Shiau et al., 2022; Tsuchimoto and Kajikawa, 2022). Consequently, BIS is frequently viewed as merely an IT installation project rather than a comprehensive business initiative capable of generating value through data analytics. Numerous studies have demonstrated that BIS offers tangible business advantages, enabling decision-makers across the organization to make informed choices for various business operations (Rodrigues et al., 2022; Sharma et al., 2022). Senior management utilizes BIS data for both strategic and tactical decisions, while operational-level decisions also benefit from this information. According to a recent study, BIS implementation has been identified as the most effective method for enhancing knowledge sharing and innovation within businesses. By providing actionable insights to executive

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decision-makers, BIS enables better decision-making (Rodrigues et al., 2022). One industry expert describes BIS as "both a process and a product," reflecting its dual role in business operations. However, some remain unconvinced of its full potential.

In the business world, "intelligence gathering" refers to how businesses acquire critical information and intelligence that they may use to help them survive and thrive in the global economy. A great degree of trust may be placed in the product's ability to correctly anticipate customers, suppliers, competitors, products and services, market circumstances, and the whole business environment, enabling companies to make better choices (Qaffas et al., 2022). Since the early 1990s, the vast bulk of business intelligence system research has concentrated on the application of BIS in organisations rather than on the theory of BI. In preparation for the IBM Tech Trends Report, more than 4,000 information technology experts from 93 countries and 25 industries participated in a survey. The survey findings revealed that business intelligence system is among the four most powerful technologies being used by businesses worldwide (IBM, 2011).

According to an annual survey of information technology executives, business intelligence systems (BIS) have been rated as the most significant technological development of the past decade (Okunlaya et al., 2022). A Businessweek (2011) study revealed that nearly all businesses with annual revenues exceeding $100 million were using some form of BIS software. However, the scarcity of data-savvy managers who can effectively analyze data for decision-making is expected to create a shortfall of 1.5 million by 2018, leading to a 50–60% mismatch between the supply and demand for individuals with business analytics skills. Despite the emergence of other technologies, BIS has remained a key focus for many organizations in recent years. Its numerous benefits have attracted a growing number of proponents in the field (Mukherjee, 2022). Today,

organizations increasingly depend on BIS to assist with management decision-making, data analysis, and the evaluation of business knowledge sharing and innovation.

Business intelligence systems are extensively used or are being widely utilised, across a broad range of sectors, including manufacturing. For many businesses today, the development of business intelligence system platforms represents a significant investment, with billions of dollars being spent to accomplish the objective (McBreen et al., 2022b). Because of the company's expansion, it has provided services to customers from a diverse variety of industries. Such sectors include banking and insurance and the fields of finance, trade, healthcare, and telecommunications, to name a few. It has been adopted by a wide range of businesses involved in management processes, and some have even created their systems with specific characteristics that are unique to their industry (McBreen et al., 2022a).

2.2.2 Innovation in the UAE Economy

Innovation is a key driver for the UAE's economic growth, particularly in SMEs. The ability to innovate and adapt is crucial in the fast-expanding sectors like services and technology. Understanding the barriers to innovation and the necessary support systems is vital for SMEs to thrive in a competitive environment.

The Growth Engine (GE) Global Innovation Barometer, a significant global innovation survey involving more than 3,200 executives in 26 countries, is the first study. One of the countries participating in this worldwide survey is the UAE. In particular, however the survey describes multinational and global corporations operating in the country and large state-owned companies in sectors such as energy and the environment, aerospace, transport and logistics, though not fully representing the innovation attitude of small and medium-sized enterprises. In any event, according to this study, the UAE is emerging as a nation with a clear understanding of innovation and a positive attitude towards it. The GE

Global Innovation Report highlights that innovation is rapidly becoming a global game; the only way to be effectively innovative is to integrate and incorporate skills, concepts, experiences and resources around the globe. However, innovation needs to be localised to satisfy particular market needs more than ever before (McBreen et al., 2022b). The survey shows that innovation is considered a strategic priority by a very high percentage of executives to help drive business growth, with more than half of respondents reporting that creating new business models is a promising way to improve potential results. Therefore, this finding confirms the critical role of innovation in the business model as the best way for businesses to embrace innovation and to build a market lead (Lateef and Keikhosrokiani, 2022).

The following main factors for innovation are defined by the executives surveyed: teamwork, big data, the industrial internet or the Internet of Things. Innovation is actually rarely isolated; it is a highly collaborative and multidisciplinary operation, and collaboration between a growing and diverse network of stakeholders, organisations and users is increasingly involved (OECD, 2020). Collaboration and networking are now mainstream, with 85% of respondents claiming that collaboration with start-ups and other entrepreneurs would drive the growth of innovation (Kapetaneas and Kitsios, 2022). For example, the UAE is one of the countries in which the revenues and profits generated by collaborative innovation activities have increased over the past year. The rapid introduction of new technologies is another key to effective innovation; the time factor is decisive in innovation, since it is best to get to the market as soon as possible to maintain a Innovative work behavior. In addition, most respondents assume that innovation can come from organisations of any size and that SMEs and individuals are seen as the pioneers of innovation and the most promising partners for collaboration (Kapetaneas and Kitsios, 2022).

Small and medium businesses, however, suffer the most from creative obstacles, such as the inability to scale successful technologies to a wider foreign market, inadequate funding and financial support, a lack of talent/skills, difficulty in coming up with radical and stimulating concepts, difficulty in identifying an appropriate business model to support new business ideas and make them more effective Finally, as far as the position of government is concerned, the executives interviewed expect governments to have a mechanism to help top innovation drivers. The top business expectations for government funding are: battling bureaucracy and cutting red tape (87%); maintaining proper security of business secrecy and trade secrets (86%); aligning student curricula with business needs in the education system (85%). According to this GE Global Innovation Barometer, the picture of the innovative behaviour of companies in the UAE looks reasonably good but as explained above, it is a picture that describes in particular the large private companies and state companies operating in the region, rather than (SMEs) . Entrepreneurship is yet another big study.

Ji and Tia (2022) examine the relationship between entrepreneurship and business success in the UAE, with a specific focus on small and medium-sized enterprises (SMEs). The UAE government systematically builds and expands the funding landscape for SMEs, offering a variety of financial support options. SMEs can also access robust development funds and schemes provided by government ministries and agencies, such as the Credit Guarantee Corporation (CGC). In addition to traditional funding sources, SMEs have alternative financing options beyond the banking sector. These include microfinance institutions (MFIs), the Equity Crowdfunding (ECF) framework, Peer-to-Peer (P2P) financing, and the Investment Account Platform (IAP). The rise of Financial Technology (FinTech) has further expanded the financing alternatives available to SMEs, opening up new opportunities for growth and innovation.

SMEs play a critical role in the growth of the economy of the UAE. It is important for financial institutions to enable them to legitimately classify SMEs according to business size, stage of development and industry. Both for the purpose of start-ups or for the growth of small and medium-sized enterprises, small and medium-sized enterprises need to operate in a strong financial climate, many of which are in the post-financial crisis struggle of 2008 and have not recovered as they are now. Most banks will, as usual, withdraw funding, but small and medium-sized businesses have to continue to collect growth capital to improve profitability. Figure 2.1 shows the investments of small and medium-sized enterprises in the company life cycle phases and shows that small and medium-sized enterprises spend most of the money, which is 85.5% during their early phase and development phase.

Figure 2.1: SMEs Investment by stages of business cycle
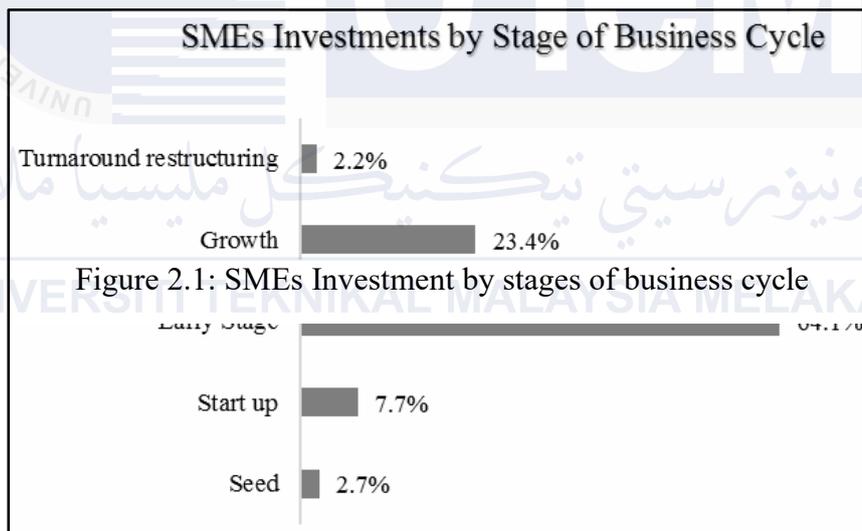
Source: Adapted from SME Corporation UAE Annual Report (2018/2019)

Government programmes and the selection of new financial products may be complicated or have restricted outreach to SMEs around the country during the recession, from SME financing schemes, term loans, leases, bond issuance, Innovative work behavior funds, crowdfunding and P2P Innovative work behavior to better suit their needs. Before securing the right source of Innovative work behavior for their business plan and growth, it is extremely necessary for SMEs to consider the differences and disadvantages of each fund.

In order to support their financial objectives, which matched the corporate plan, the size of the enterprise and process of the business life cycle are generally searched for various sources of Innovative work behavior (Ji and Tia, 2022). Nevertheless, without good judgement, SMEs frequently make an inadequate decision on Business intelligence system and Innovative work behavior, particularly when choosing the ideal financing options to overcome the problems of Innovative work behavior constraints. This is partly due to the lack of financial information and guidance from experts who can provide them with sufficient assistance.

SME in the United Arab Emirates (SMEs) is releasing a new study, titled "The State of Small and Medium-Sized Enterprises in the (UAE)," which is titled "The State of Small and Medium-Sized Enterprises in the United Arab Emirates" (UAE). Micro, Small, and Medium-Sized Enterprises (MSMEs) in the (UAE) will be profiled in this study, emphasising their characteristics, knowledge sharing and innovation, and goals being discussed. The first study of this type was published in 2014. The current research serves as an illustration of the significant changes that have occurred in the SME environment and priorities over the last five years, as detailed in the previous report. The SME environment and priorities have changed significantly over the last five years. Small and medium-sized businesses (SMEs) in the (UAE) have lately embarked on several ground-breaking initiatives, including the grading and development of SME skills, the regulation of startup accelerators, and the introduction of novel alternative financing methods.

The sector is growing more competitive due to economic diversification and government-led initiatives, even though these efforts have expanded the number of possibilities and support systems available to SMEs in general (Dubai SME, 2023; Khaleej Times, 2023). To keep up with the constantly changing SME environment and challenges, organizations must improve their ability to analyze and respond to situations more quickly (Khaleej Times,

2023). A survey performed among 518 small and medium-sized enterprises (SMEs) in the United Arab Emirates was used in this research to evaluate the present status and characteristics of SMEs in the country. According to the study results, SMEs have made significant strides in various areas, including the emphasis placed on innovation, digital readiness, and corporate governance, among others (Alsharari et al., 2020).

Following the most recent study results, small and medium-sized enterprises (SMEs) engaging in innovative activities have grown by 2.3 times since the previous survey was conducted in 2012 (SME Report, 2022). The percentage of companies having a designated IT budget has almost quadrupled in the last five years, increasing from 27% to 73% of all businesses (Khaleej Times, 2023). However, labor productivity continues to be a significant source of concern for the industrial sector. SMEs should focus more on investing in their workers' development to ensure that they are future-ready (Ahmad et al., 2019). SMEs should also rethink their current business strategies and put their efforts into reinventing themselves to ensure they are prepared for the future (Temouri et al., 2020). Beyond the availability of funds, there is a need for the continuous support and cooperation of all parties involved to ensure sustainable growth (Alsharari et al., 2020).

The absence of customized, low-cost financing options for SMEs that rely on external capital to survive and expand is the most significant issue they confront. Banks demand very high-interest rates on their loans, which is a source of concern, with rejection rates for short-term loans varying between 14% and 65%, depending on the product being offered (Organization for Economic Cooperation and Development, 2023). This is notably higher than the global average, creating a substantial barrier for SMEs in securing necessary funding (Ahmad et al., 2019; Alsharari et al., 2020).

SMEs in the United Arab Emirates are anticipated to continue promoting and growing their businesses in the future, with a multi-stakeholder strategy being utilized to accomplish this (Dubai SME, 2023). The information gathered helps identify gaps and opportunities, as well as the most effective methods to bridge those gaps and realize these opportunities (Khaleej Times, 2023). Using data and analytics to achieve success in this context is critical, as it allows for a better assessment of where SMEs stand in terms of future readiness (Alsharari et al., 2020). In the research, SMEs are evaluated based on various criteria such as their emphasis on innovation, information technology adoption, human capital development, corporate social responsibility, corporate governance, access to finance, and long-term viability (Temouri et al., 2020). This research, which is an authoritative study on SMEs' characteristics, knowledge sharing, innovation, and contribution in the United Arab Emirates, may be of interest to all stakeholders in the Middle East and North Africa's SME sector. It is a valuable resource for SMEs across the region and beyond (Dubai SME, 2023).

As a consequence of the results of the study, small and medium-sized enterprises (SMEs) in the United Arab Emirates will create suitable plans and activities over the next several years. These policies and efforts are designed to assist the SME sector as a whole while also boosting the amount of value contributed to the UAE economy due to the sector's growth and development. Efforts by all parties involved in the country's economic and business development, including the Department of Economic Development (DED) and small and medium-sized enterprises (SMEs), are required to establish Dubai as the world's leading destination for entrepreneurs looking to start, grow, and expand their businesses into global enterprises and to improve the environment for SME development.

2.2.3 Corporate Social Responsibility (CSR) in the UAE Economy

CSR is increasingly becoming a focus for UAE businesses, aligning organizational structures and operations to generate positive social and economic values. The Dubai Chamber Centre for Responsible Business conducts surveys to identify CSR trends in Dubai, helping managers make informed decisions and improve CSR practices (World Economic Forum, 2011).

According to a recent report by the World Economic Forum (WEF), corporate social responsibility (CSR) is becoming more popular among businesses of all kinds across the globe, according to a recent report by the World Economic Forum (CSR). Because of this, an increasing number of businesses are reevaluating their organisational structures and operating processes to generate good social and economic value via practical corporate social responsibility efforts. In the same way that businesses' objectives and methods of doing business change through time, so do the problems and opportunities they must deal with. For the past six years, the Dubai Chamber Centre for Responsible Business (DC-CRB) has been conducting the Dubai Chamber CSR survey. The survey is intended to track the most critical trends in corporate social responsibility (CSR) in Dubai and assist managers in making well-informed decisions about their companies. A comprehensive database on the state of corporate social responsibility (CSR) in Dubai is being built to identify challenges, opportunities, and areas for improvement in developing and implementing effective CSR practices in the UAE.

The survey, which has been running for over a decade, is also being built to develop recommendations and tools to help companies improve their CSR efforts in the UAE. The company will be able to read the whole report by clicking on the link provided above. The findings of the Dubai Chamber's 2019 Corporate Social Responsibility survey, which emphasised small and medium-sized businesses, are given in this study (SMEs). There are

three sections to this report, which the company may read by clicking here. SMEs will benefit from the terminology and background information provided in the book's first section (SMEs). This section covers the methodology and findings of the study, which focused on the drivers and obstacles to corporate social responsibility in small and medium-sized enterprises (SMEs).

For modern companies, on the other hand, Intelligence data processing and analysis is a necessity. Managers can make efficient and effective decisions with this modern method. The following are the various ways in which these data are handled, their uses and how much it impacts the organisational landscape. Intelligence of Industry, Communications of the Information Association Systems, 13, 77-195, (1999) said that Business Intelligence Systems (BIS) is a theory and process that utilises procedures that make efficient business decisions. (Carvalho et al., 2022) notes that BIS is a data-driven decision support systems (DDDSS), often referred to as a data-driven DSS. It has a query option that allows historical database searches and offers a periodic overview of reports for business situations. The phrase BIS is often referred to as a briefing book or as an executive information system.

BIS is also a mixture of instruments, tools, techniques and solutions that provide a summary of the past, a glimpse of the present and the future, and facilitates successful future business decisions. It also helps to better and accurately understand, measure, analyse and know the circumstances. As an enabler, this technology eliminates the knowledge disparity that prevails between middle-level and top-level managers. It also allows executives at all levels to take educated decisions. It also encourages the improvisation of activities through different instruments, methods and techniques.

The organisation can be directed towards particular targets and objectives, and it also offers an atmosphere for achieving goals as well. It allows managers to better handle organisational situations by offering situational flexibility, and it also offers facilities at

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different levels of the organisation. It also offers space for the handling and informed decision making of structured and unstructured new circumstances. (Boustani, 2022) assessed and concluded that BIS is an integrated, organic and systematised approach and method for knowledge collection, analysis and management. This helps to control the internal and external climate and its processes in order to make informed decisions. Binzafrah and Taleedi (2022) suggest that business intelligence is the most effective and reliable method for managing vast amounts of data and utilizing business resources. It also serves as a tool for converting data into reports and insights that can be applied to everyday business operations.

Business intelligence system increases business efficiency and helps to make deliberate decisions (Arora and Sharma, 2022). Business-related decisions are made with the aid of data that is important and given by BI. As it improves the business management framework and processes, the BIS technology offers added value and efficiency. It also requires the use and management of knowledge that can ensure smart decision making and prudent results.

Ünal and Kılınç (2021) found that business intelligence systems (BIS) act as knowledge-oriented mechanisms that enable organizations to organize, orient, and utilize inputs effectively, turning them into efficient, purposeful, and confident decisions. These capabilities enhance a company's ability to innovate and implement unique solutions to business challenges. BIS also ensures a smooth flow of knowledge within the organization, helping to reduce unpredictable circumstances and difficulties in the workplace. In such situations, companies can leverage BIS to shift towards information-oriented, strategic decision-making. Similarly, Talaoui and Kohtamäki (2021) describe BIS as a vital tool with in-depth applications and features that, while simple in nature, serve critical business functions. BIS gathers knowledge purposefully, organizing, handling, and analyzing

information from various data sources. In different business contexts, it supports users by interpreting data and offering tailored solutions for specific needs.

Talaoui and Kohtamäki (2021) suggest that business intelligence systems (BIS), through the use of statistical analysis in ad-hoc and predictive scenarios, employ a wide range of methods and applications to support intelligent business decisions. BIS is designed to provide insights into descriptive, purposeful, and critical business challenges, ultimately improving management decisions, organizational efficiency, and revenue.

Similarly, Stjepić et al. (2021) found that BIS focuses on developing and maintaining organizational strategies to navigate market conditions. It helps monitor time-sensitive customer deliveries and operational processes. BIS ensures tactical, operational, and strategic decision-making by utilizing data warehousing as a reactive component in business scenarios, effectively responding to organizational challenges.

Paesano (2021) concluded that BIS uses market records, databases, technology of application and practises of research. All these characteristics and implementation methods make this a smart approach for the modern economy. Although this is true in theory, in practice, the inInnovative of BIS is common among non-profit organisations, especially those located lack impoverished countries. Organisations are encountering difficulties while attempting to adopt business intelligence systems and processes. The technological aspects of business intelligence system (BIS) have already been investigated; nevertheless, many businesses in developing countries have yet to achieve success with BIS. Business intelligence system solutions are becoming more prevalent (Nuseir, 2021). This is possibly due to a lack of business insight into the relationship between organisational factors such as corporate strategy, organisational structure, organisational process, and organisational culture, in addition to the relationship between organisational factors and the Innovative of business systems is crucial to intelligence. It is essential to conduct additional research into

the relationship between business intelligence system and organisational knowledge sharing and innovation.

2.3 Business Intelligence System (BIS)

Interpreting business intelligence system is a complex concept (Ahmadi et al., 2020). Not because of its definition, which is simple to state and understand, but mainly because many technologies, methodologies, processes, and strategies converge on it, which greatly complicates the initiation of the neophyte (Arora and Sharma, 2022). In addition, throughout the life cycle of these information systems, the complexity of the architecture increases, as do the business needs and the technologies that support them.

However, the vast majority of organizations currently need this type of information system to make better decisions and be more competitive and have identified business intelligence system as one of their main needs (Binzafrah and Taleedi, 2022). And that is why it is necessary to be able to build solid solutions from deep-seated knowledge. A. Ahmad (2015) introduces the main concepts of business intelligence system through the main design phases of a project of this type and constitutes a solid basis for the acquisition of deeper knowledge. Some of the technologies that are part of Business intelligence system are: Data warehouse. Reporting. OLAP Analysis (On-Line-Analytical Processing). Visual analysis Predictive analysis. Dashboard. A detailed dashboard. Data mining Performance management. Forecasts. Business rules Dashboard. Data integration (including ETL, Extract, Transform, and Load).

Interpreting BIS by Calof (2020), the basic objective of business intelligence system is to sustainably and continuously support organizations to improve their competitiveness by providing the necessary information for decision-making. The first to coin the term was Howard Drenner, who, when he was a consultant for Gartner, popularized Business Intelligence, or BI, as an umbrella term to describe a set of concepts and methods that

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improve decision making by using information about what has happened (facts) (Carson et al., 2020). Through the use of business intelligence system technologies and methodologies, it intend to convert data into information and, from the information, be able to discover knowledge.

To define BI, it starts from the definition of the GARTNER glossary of terms: "BIS is an interactive process to explore and analyze structured information about an area (normally stored in a data warehouse) to discover trends or patterns from which to derive ideas and draw conclusions (Carvalho et al., 2022). The business intelligence system process includes communicating findings and making changes areas include customers, suppliers, products, services, and competitors. But let's break down this definition in detail: • Interactive process: When it talk about BI, it assume that it is a continuous analysis of information over time, rather than just at one point in time. Although this last type of analysis can provide us with value, it is incomparable with what a continuous process of information analysis can provide us, in which, for example, it can see trends, changes, variabilities, etc. Chung (2019) indicates that BIS is the process by which the resources (human, technological, and assets of an organization) are used for the generation of timely, accurate, and reliable information. That allows for agile and effective decision-making in the direction of an organization, the understanding of the business, and the execution of its processes. With this, it is sought to maintain control over the fulfillment of objectives, generating value and competitive advantage in real time, which translates into greater profits for its owners or shareholders (Eriksson et al., 2020). To apply adequate business intelligence, the following must be taken into account: Data availability and quality. The participation of the different areas or actors involved in the registration or creation of the necessary data to generate information and knowledge. Have a low or non-existent reliance on technology areas for consultation and exploration of available information.

Business Intelligence Systems (BIS) encompass an array of strategies, technologies, applications, and processes utilized by enterprises to gather, analyze, integrate, and present pertinent business information. The essence of BIS is to transform raw data into meaningful insights, facilitating informed decision-making across strategic, tactical, and operational levels. Core components of BIS include data mining, online analytical processing, querying, and reporting, each playing a pivotal role in the data to insight transformation process (Eriksson et al., 2020).

At the heart of a typical BIS framework lies the integration of various data sources, both internal and external, consolidated into a data warehouse or data mart. This data is then processed, cleaned, and transformed to ensure accuracy and relevance. Analysis tools delve deep into this curated data, uncovering trends, patterns, and anomalies, while reporting tools translate these analyses into reports and dashboards for easy consumption and decision-making. Several examples of BIS tools exemplify the diversity and capability of these systems in enhancing business intelligence within SMEs. Microsoft Power BI, for example, turns disparate data sources into coherent, visually immersive, and interactive insights, allowing SMEs to analyze sales data for trend identification (Carvalho et al., 2022). Similarly, Tableau offers interactive data visualization tailored to business intelligence, enabling SMEs to understand customer behavior and preferences for strategic marketing. SAP Business Objects provides a centralized suite for detailed financial and operational reporting, while QlikView offers a platform for dashboard development and interactive supply chain analyses. Google Data Studio stands out for its ability to integrate data from multiple sources like Google Analytics and Google Ads, creating comprehensive business performance dashboards.

The implementation of BIS in SMEs follows a systematic approach, starting from the assessment of specific business intelligence needs, through to the selection of appropriate

BI tools that align with the organization's size and requirements (Binzafrah and Taleedi, 2022). The process involves integrating data from diverse sources into a centralized database, analyzing this data, and generating reports that offer actionable insights. Through this methodical implementation and the judicious use of BI tools, SMEs can significantly enhance their decision-making processes, operational efficiency, customer satisfaction, and competitive edge in the market.

The creation of human capital is another factor that is very critical for creative actions, because the economic and production climate is changing rapidly today. In the UAE, nine out of ten jobs come from small and medium-sized enterprises (SMEs), but the capacity of the small and medium-sized enterprises (SMEs) sector is constrained by the relatively large size of the government sector and the related bureaucracy. The UAE is distinguished by a share of the economy in the public sector that crowds out entrepreneurialism and a vibrant private sector. Moreover, like other countries in the region, the UAE has high levels of youth unemployment (around 24%), as around half of the population is under 25 years of age. Finally, the population's most highly educated members, particularly women, do not make it into the workforce.

In the UAE, women represent 70% of university graduates but are underrepresented in the workforce, accounting for only 25% of employment. Boosting entrepreneurship and strengthening the private sector is becoming a strategic focus for the UAE economy. In this context, Kulkov (2023) emphasizes the critical role of entrepreneurship education. They suggest that more efforts are needed, particularly at the university level, to incorporate entrepreneurial skills into the UAE's education system (Hoang and Bui, 2023). These authors highlight that the core building blocks of entrepreneurship include imagination, innovation, and problem-solving (El-Sokari et al., 2013, p.92). Unfortunately, despite some promising

initiatives at various levels, there is no clear national strategy for entrepreneurship education in the UAE (Hamidinava et al., 2023).

Deb et al. (2023) further reinforce the importance of developing human capital to foster creativity and innovation. They argue that leadership must be grounded in multifaceted skills, particularly in the global economy, with a deep understanding of the shifting economic landscape, technological advancements, and talent management. Young Emiratis now face global competition for jobs and must adapt to evolving skill sets in response to an ever-changing economy. The increasing role of information and communication technology (ICT) in today's world is transforming production processes and human capital skills on a global scale, as ICT is a key enabler of innovation. Moreover, technologies like social, mobile, analytics, and cloud (SMAC) are reshaping business models, rendering many traditional skills obsolete. Many skills and technologies that are relevant today may no longer be relevant by 2020.

In the coming years, job growth will focus primarily on four main areas collectively known as STEM, or Science, Technology, Engineering and Mathematics. At a time when many businesses are conscious that their contribution and their diversity can become a strategic asset, the digital natives are entering a multi-generational and cultural workplace. For example, digitalization of trade may give young Emirates real opportunities, particularly because connectivity is very good in the UAE. For young people who grow up as digital natives and for women who are searching for more versatility in where and how they operate, this is an opportunity (Caruso et al., 2023). Since information technology today affects every aspect of business in ways that traditional enterprise technology has never done before the success of businesses, particularly small and medium-sized enterprises, is achieved by leveraging ICTs. But the implementation of ICTs is solely connected to the companies' innovative capabilities.

However, the creative potential of small and medium-sized enterprises, as already stated, depends on the entrepreneurial culture and the overall climate, including market conditions and the regulatory structure. Besides, business intelligence system is an efficient and powerful instrument that increases organisations' competitiveness and knowledge sharing and innovation (Arora and Sharma, 2023). For managers in a variety of business environments, this method may make practical and impactful decisions. The elements of BI, its benefits in organisational circumstances, are given below:

Tsuchimoto and Kajikawa (2022) highlight the various components of Business Intelligence (BI), such as data warehouses, data marts, corporate knowledge sharing, innovation management, and advanced analytics. Nobari et al. (2022) concluded that BI system (BIS) experts interpret BIS from diverse viewpoints, applying different reasoning and approaches. Some experts agree that BIS is a relatively new and emerging field, characterized by complementary methods and emphasis. The authors view BIS through the lens of advanced data structures and data mining tools, treating it as an advanced data management method. These tools also support the application of algorithms, helping organizations respond to evolving customer needs, utilities, and service requirements. Such developments enable organizations to undergo rapid transformation, which has significant implications for business operations and leadership.

BIS also offers a good view of market management and helps companies remain ahead of future developments and requirements. It also assists enterprises in real-time activities and market research and in particular, front office business. It also allows for the consolidation of multiple operating systems and the Innovative of full-fledged enterprise data management. Competitive exploitation of data ensures business success through this approach. It is an efficient instrument that provides historical knowledge (Mohammad Shafiee,

2022). To a larger extent, BIS is used for reporting, online analysis, processing and management, data mining and business knowledge sharing and innovation management in business situations. BIS uses information for internal research and market processing to a larger degree, while competitive intelligence focuses on monitoring and controlling rivals.

Ji and Tia (2022) describe Business Intelligence Systems (BIS) as not just a management theory but also an orientation and approach for making successful business decisions. They argue that BIS represents a mindset that offers practical, realistic solutions. It functions as a market practice and process enabler, providing effective and implementable solutions. Similarly, Ledro et al. (2022) emphasize the need for urgent attention and solutions due to the diverse responsibilities, challenges, and issues faced by organizations. BIS refines, modifies, and alters the essence and content of business knowledge used in decision-making.

There are three distinct orientations within BI. First, a management strategy focuses on applying BIS in external contexts to address business challenges. Second, the technical approach enables the system to provide concrete, practical solutions that can be applied through intelligence. Lastly, the enabling method offers the capabilities required to add value and improve decision-making processes.

2.3.1 Organisational Factors and Business Intelligence Systems

Researchers have mainly used the resourced-based method to investigate this relationship to determine the connection between organisational resources and their effect on value creation (Caruso et al., 2023). According to the resource-based perspective, organisations may gain long-term Innovative work behaviors by using organisational resources that are uncommon, precious, or one-of-a-kind in the natural environment. Management skills, organisational strategy, culture, procedural frameworks, and organisational features are just

a few of the many important assets that an organisation may claim as its own. Every one of these assets enables the organisation to use and ensure improved knowledge sharing and innovation. They include a wide range of valuable assets such as managerial skills, organisational strategy, culture, procedural frameworks and organisational structure, and firm characteristics, among other things (Arora and Sharma, 2023).

To achieve long-term success for businesses, academics have advocated for adopting a resource-based approach for many years. This strategy includes assessing the strategic worth of information technology resources (Tsuchimoto and Kajikawa, 2022). It is even more critical to have the greatest possible organisational design, which considers various internal and external factors, to ensure a good match between organisation resources and organisational objectives.

Previous research based on contingency theory has also emphasised the significance of fit between subsystems of an organisation and factors such as people, information, strategy, culture, process, and organisational structure (Nobari et al., 2022). Non-IT resources, subsystems of a business, and resources that are complementary to information technology resources (IT) are considered as organisational factors, on the other hand (Mohammad Shafiee, 2022). The resource-based view and the contingency approach assert that organisation-wide factors such as organisational strategy, structure, culture, and procedure impact the Innovative of business intelligence systems, which in turn impacts the organisation's Innovative as a whole.

2.3.2 Benefits and Limitations of Business Intelligence System

In the modern economy, small and medium-sized enterprises (SMEs) play a significant role. One topic of academic debate is what drives their popularity and success. The value of knowledge sharing and innovation within SMEs has been widely recognized

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by scholars across various disciplines for its contributions to work efficiency, wealth creation, and socio-economic growth. According to Pletnev and Barkhatov (2016) and Muller et al. (2017), SMEs contribute approximately 56% of the gross domestic product (GDP) in several European countries.

Nuseir (2021) highlights additional factors demonstrating the importance of SMEs, such as empowering populations, alleviating poverty, and creating job opportunities. In recent years, academics, practitioners, and policymakers have increasingly focused on the factors that drive knowledge sharing and innovation within SMEs. An analysis of peer-reviewed literature on Critical Success Factors (CSFs) reveals that these variables have been, and continue to be, a central topic in various fields. For instance, studies have explored CSFs for start-ups in countries like China and Malaysia (Mattera and Alba Ruiz-Morales, 2021; Mele et al., 2021; Mikalef and Gupta, 2021; Mishra and Pani, 2021).

Similarly, scholars have analyzed CSFs for micro, small, and medium-sized enterprises (MSMEs) in the Kingdom of Saudi Arabia (KSA), either broadly or within specific areas such as information management and e-commerce (Al-Ghamdi et al., 2011; Sin et al., 2016), technology transfer (Merdah and Sadi, 2011), and enterprise resource planning (Aldayel et al., 2011). Theoretical analyses of these CSFs provide valuable insights for investors, entrepreneurs, financial institutions, and government agencies, helping them develop strategies to enhance SME success and protect these ventures from management and financial failures.

This research is particularly important in presenting a conceptual model that explains the influence of CSFs on SMEs in the United Arab Emirates (UAE). The study's findings also provide a foundation for adapting the model to the Saudi Arabian context, potentially serving as a basis for further research. The main objective of this study is to identify the

CSFs that contribute to the sustainable development of SMEs in the UAE, utilizing structural equation modeling (SEM) to explore the success factors of 347 SMEs.

In the realm of Business Intelligence (BI) within UAE's SME sector, understanding the Critical Success Factors (CSFs) is pivotal for maximizing the benefits of (BIS) and mitigating their limitations. Research highlights several CSFs crucial for BI implementation success, including management commitment and support, which ensures resource allocation and strategic alignment, and a clear strategic vision that aligns BI initiatives with long-term business objectives. The integrity and quality of data are foundational for deriving accurate insights from BI systems, while user training and effective change management practices are essential for fostering a culture of data-driven decision-making within SMEs.

These CSFs are directly linked to enhancing innovative work behavior and decision-making processes in SMEs, underscoring the study's focus on how (BIS) influence SME performance in the UAE. The benefits of BI systems, such as improved decision-making, enhanced innovation, and operational efficiency, are crucial for SMEs to navigate the competitive business landscape. However, SMEs must also navigate challenges, including implementation complexities, data quality issues, and resource constraints, which can impact the effectiveness of BI initiatives. By delving into these aspects, the study aims to offer a comprehensive understanding of BI's role in advancing the innovative capabilities and overall success of UAE SMEs, elucidating the mechanisms through which BI impacts SME performance and aligning with the critical success factors to ensure a successful BI implementation and utilization.

Hamidinava et al. (2023) analyzed the nature and procedures of business intelligence (BI) systems and found that, compared to enterprise resource planning (ERP), BI offers stronger functionality in various circumstances. BI is a comprehensive method that

integrates multiple processes and applications, providing enterprises with significant strategic advantages. Turk (2005) also assessed the value of BIS investments, comparing returns through approaches such as Net Present Value (NPV), Internal Rate of Return (IRR), cost-benefit analysis, and overall cost-to-business analysis. He concluded that BIS investments in IT platforms provide clear economic rationale when evaluating both investments and the benefits received. However, Turk noted that direct associations between sales and benefits were not easily observable. He emphasized the need for forecasting tools to better recognize and evaluate these advantages.

Economic benefits and rationale for investments are often clearly seen to be very difficult to ascertain and still remain a complicated subject to be measured and evaluated. it may observe explicitly that BIS offers knowledge that is critical for smart and efficient decision-making. However, variables such as growing the company's brand image or strengthening customer relationships need to be analysed and assessed in a more detailed and in-depth manner.

Deb et al. (2023) note that the processing and management of information for timely decision-making is one of the most critical tasks for business organizations. The challenge lies in the collection, review, and coordination of large volumes of data, which can sometimes take weeks. Efficient decision-making relies on the ability to gather and process this information in a timely manner, a task that business intelligence systems (BIS) handle effectively. Caruso et al. (2023) assert that BIS provides organizational direction and drives operational transformation. BIS enables businesses to efficiently manage vast amounts of data related to competitors, clients, vendors, partners, products, services, and transactions, enhancing overall business performance.

Arora and Sharma (2023) found that numerous international studies have shown a high level of awareness of business intelligence (BI) among IT professionals. Their study

also emphasized that business intelligence systems (BIS) have been a top priority for businesses aiming to improve operational efficiency over a five-year period. In both 2009 and 2010, managing BIS and enhancing company performance remained a key focus for organizations. The study highlights the knowledge, understanding, and significant benefits of BIS in business contexts.

Tsuchimoto and Kajikawa (2022) enumerate the advantages of BIS in dynamic environments and in addressing new, unforeseen challenges. BIS provides organizations with a clear and simplified perspective on complex information, enabling faster, more informed decision-making. It enhances productivity, knowledge sharing, and innovation, while facilitating seamless and efficient data flow. BIS also helps streamline and redefine existing processes, offering support for the development of new opportunities.

This discussion shifts its focus to SMEs in Dubai, where managerial literature is limited but growing. Nobari et al. (2022), through a survey of 200 SMEs, aim to outline the innovative characteristics of Dubai's SMEs. They note that the UAE, including Dubai, has a relatively low share of early-stage entrepreneurial activity compared to other innovation-driven economies, a trend also highlighted by Shafiee (2022). According to Al-Ansari, Pervan, and Xu (2013), Dubai's SMEs typically feature centralized organizational structures, a short-term focus, strong administrative control, and top-down communication patterns. Despite limitations in the number of survey respondents, Ledro et al. (2022) present significant findings on the relationship between innovation and knowledge sharing. Their survey identifies key drivers of innovation in Dubai's SMEs, including management, clients, technology, and employees. Furthermore, the platforms for innovation include quality improvement, added consumer value, strategic development, and the introduction of new business models.

A surprising finding from the survey is that Dubai's SMEs have produced more radical innovations than incremental ones over the last three years. Additionally, creativity in these firms is driven externally by industry dynamics—such as the development of new goods and services—and internally by organizational culture. The most significant obstacles to innovation include economic risks, limited financial resources, intense competition, a scarcity of qualified labor, and restrictive legislation and regulatory policies.

Unlike Al-Ansari's research, the present study did not conduct a specific survey on SMEs in Dubai. Instead, it analyzes two recent and influential studies from Dubai's SME government agency. One of these, The State of SMEs in Dubai, is the first comprehensive report on the SME sector. It consists of a survey of 500 SMEs in Dubai, evaluating them across various dimensions: international orientation, innovation prevalence, IT adoption, human capital development, corporate governance, access to finance, and scalability potential. The findings reveal that the current state of innovation among Dubai SMEs is relatively poor. This result aligns with the broader trends observed in the UAE by Ji and Tia (2022) and does not contradict Elbashir et al.'s (2022) more selective survey.

The report also differentiates between SMEs in trade, services, and manufacturing sectors. It shows that SMEs in the service sector are less innovative, while those in the manufacturing sector exhibit the highest innovation orientation. Moreover, smaller enterprises particularly micro and small firms tend to be less innovative compared to medium-sized businesses, a pattern consistent with other global economies.

SMEs are the backbone of Dubai's economy, accounting for 95% of all businesses in the Emirate. They play a critical role in job creation, innovation, exports, and the development of new business models. In fact, SMEs employ 42% of the workforce and contribute approximately 40% to Dubai's total value added (Dubai SME, 2014, p. 4). Among

these, micro-enterprises make up 72% of all SMEs, small businesses 18%, and medium-sized firms 5%.

The main pillars of Dubai's economy are the trade and service industries, with the Emirate striving to become a global hub for services and trade. Foreign trade is a key driver of Dubai's economic development. The trading sector constitutes the majority of SMEs in Dubai, accounting for 57%, followed by the services sector at 35%, and the manufacturing sector at 8% (Dubai SME, 2014, p. 23). With 90% of the population coming from various countries around the world, Dubai has truly become a global village.

However, Dubai is less focused on research and development (RandD), partly due to the limited number of Emirati researchers and the transient nature of expatriate workers, who often do not stay in the country long enough to engage in RandD activities, which require stability and a long-term outlook. Instead, Dubai has increasingly concentrated on sectors like banking, tourism, shopping, real estate, and exports and re-exports.

To assess whether SMEs in Dubai focus on innovation and RandD, survey respondents were asked about the allocation of their annual RandD budgets, the adoption of business innovation at the product or process level, and their primary motivation for innovation. Key findings from the survey include the following: only a small percentage (8%) of respondents indicated that they maintain an annual RandD and product development budget, and just 13% reported implementing some degree of innovation, either in product development or process improvement.

Similar to trends in other countries such as New Zealand, the United Kingdom, and Malaysia, manufacturing SMEs in Dubai showed a higher rate of innovation (29%) compared to those in the services (16%) and trading sectors (4%). Finally, the survey revealed that innovative SMEs tend to be more globally oriented. A higher prevalence of

innovation was observed among exporting enterprises (75%) compared to non-exporting SMEs (48%).

Creativity and technology are crucial for boosting exports and selling intellectual property in a small knowledge economy like the UAE. The survey also examined the level of IT adoption among Dubai SMEs, as it is closely linked to innovation. The findings suggest a moderate orientation toward IT adoption. However, the survey highlights a strong foreign orientation among SMEs in Dubai, with a significant focus on exports.

Moreover, the study emphasizes that more internationalized SMEs in Dubai tend to be more creative and demonstrate higher rates of IT adoption. The correlation between internationalization and creativity has been supported by empirical literature on SMEs (Binzafrah and Taleedi, 2022; Carvalho et al., 2022). This important relationship appears to be confirmed by the SMEs in Dubai, according to the study.

2.3.3 The Different Aspects of BIS Adoptions and Usages in SMEs

Adopting and utilizing Business Intelligence System (BIS) in SMEs is a multifaceted process influenced by various organizational, technological, and environmental factors (Falcão et al., 2021). This section delves into the distinct aspects of BIS adoption and usage within SMEs, highlighting how these systems can be leveraged to enhance decision-making, improve operational efficiency, and foster competitive advantage (Han et al., 2021). For BIS to be effectively adopted, SMEs need to possess organizational readiness, which includes the necessary IT infrastructure, skilled personnel, and a culture that supports data-driven decision-making. Leadership commitment is also vital, as it drives the investment in and prioritization of BIS initiatives.

The BIS chosen must align with the existing technological framework of the SME. This compatibility ensures that the system can be seamlessly integrated, minimizing disruptions and facilitating a smoother adoption process (Köseoglu et al., 2021). Adequate training and ongoing support are crucial for ensuring that employees can effectively utilize the BIS. This empowers users across different organizational levels to extract valuable insights from the data, enhancing their contribution to the company's objectives.

Ensuring the quality and integrity of data within BIS is paramount. SMEs must implement robust data management practices to cleanse, standardize, and maintain the accuracy of the data being analyzed. The adoption of BIS in SMEs can vary widely depending on the specific usage scenarios (Li et al., 2021). These might include financial analysis, customer behavior analysis, market trend analysis, and operational performance monitoring, each contributing uniquely to the SME's strategic and operational goals. Post-adoption, it's essential for SMEs to regularly evaluate the usage and impact of BIS, adapting their strategies and usage practices to maximize the benefits and address any emerging challenges.

All of these projects will have funding of approximately USD 1.2 billion from the UAE government. This innovation scheme for schools and universities and the National Innovation Strategy are undeniably crucial for boosting innovation among citizens and businesses in the UAE, but it must be evaluated in the long term, as any innovation strategy. Innovation is actually a long-term planning phase in which short-term effects can not be apparent, making it difficult to produce results. What is essential, however is the successful execution of a plan for innovation. In conclusion, as Sheikh Mohammed bin Rashid Al Maktoum claimed in presenting the National Innovation Strategy, the quickest and most sustainable way to improve the competitiveness of the UAE on a global level is to have a scalable and innovative economy focused on a national culture of innovation.

If BIS is implemented as a method for the organization's Innovative work behavior and strategic orientation, it will discover that organisations benefit to a large extent. Here are the different strategies and means of implementing and using BIS as a tool:

(Nuseir, 2021) have identified several problems that play a crucial role in BIS implementation. The most significant factor found was the help of top management, which is very important for the effective implementation of BIS in SMEs in terms of nature and significance.

S. Li et al. (2021) reported that business intelligence systems (BIS) have been increasingly introduced and utilized in SMEs. Current research supports this trend, showing the growing prevalence of BIS in small and medium-sized enterprises. A critical issue for SMEs is the processing and management of knowledge and information, which is often hindered by the significant investment required, typically accessible only to larger organizations. Köseoglu et al. (2021) found that BIS has become a valuable tool for SME managers and decision-makers, enabling them to make key decisions in a competitive market environment. He further explains that the modern challenge lies in managing diverse and complex knowledge from various sources. The assimilation, integration, and decision-making processes are essential to producing informed and intelligent business decisions.

Han et al. (2021) emphasized the need for BIS as a decision-making tool to help businesses handle complex and evolving market challenges. BIS supports SMEs in navigating these demands by improving their capacity to manage intricate decisions. Falcão et al. (2021) describe BIS as a knowledge-driven intelligence framework that empowers business managers to make critical decisions for SMEs. By utilizing BIS, knowledge sharing, innovation, and market analysis are significantly enhanced. BIS also helps SMEs effectively manage turbulent market environments, improving their overall resilience and adaptability.

Small and medium-sized enterprises (SMEs) are characterized by a highly customized corporate outlook and active, efficient management by leaders or owners, often relying on internal capital to address environmental challenges. Cavallo et al. (2021) highlight the benefits of SMEs, including their role in generating income, raising per capita income, and enhancing economic stability. Since the 1940s, SMEs have increasingly contributed to the global economy. However, they have also faced significant challenges, such as environmental issues, technological advancements, competition, and market innovation. The growing use of business intelligence systems (BIS) has proven effective in addressing these complex challenges, helping SMEs navigate a rapidly changing business environment.

Yiu et al. (2020) suggested that intense industry competition, rival products, and new business policies have a significant influence on the operations of SMEs. The challenge for SMEs is to manage and operate efficiently amid these changes. Strategic decision-making, supported by business intelligence systems (BIS), enables SME managers to make effective decisions in response to these dynamics. Wamba-Taguimdje et al. (2020) note that BIS enhances overall market efficiency, creates consumer value, and offers value-oriented advantages across the entire enterprise. BIS also delivers precise business insights in a short period of time, improving decision-making capabilities.

Suša Vugec et al. (2020) found that effective information management within an organization is dependent on its capabilities. These include organizational insight, management skills, experience, and stability. Additionally, success hinges on balancing both tangible and intangible resources. The organization's technical capabilities also play a key role in achieving these outcomes. Rane et al. (2020) found that implementing business intelligence systems (BIS) presents numerous challenges, particularly for ensuring long-term success and adaptability in SMEs. These obstacles stem from the need for internal

organizational changes and the turbulent external market environment. BIS must be capable of providing business managers with timely, processed information tailored to their needs, all while operating within the limited capacities of SMEs.

Nyanga et al. (2020) affirm that despite the complexities of implementing BIS in SMEs, the long-term effects could be positive. This is partly due to rapid external changes in consumer preferences, technological advancements, and business conditions, all of which influence internal knowledge sharing and innovation within companies. Lim and Teoh (2020) concluded that BIS is essential for assessing business processes, identifying challenges, and providing tailored solutions for various issues. BIS also facilitates smarter, more efficient decision-making by integrating critical knowledge and forecasting business conditions, helping organizations manage them more effectively.

Iskhakova and Ott (2020) described BIS as an integrated decision support system (DSS) that collects, analyzes, and delivers crucial information to SMEs at the right time. Similarly, Freyn and Farley (2020) noted that BIS helps monitor and adapt to changes in the external environment, offering SMEs a forward-looking, strategic orientation for productive future management. However, Eriksson et al. (2020) caution that a one-size-fits-all BIS cannot be implemented across all organizations or industries. BIS must be customized to fit the unique processes and applications of each business. Given their smaller, informal structures, SMEs require BIS solutions that promote efficiency, productivity, and innovation.

Carson et al. (2020) emphasized that one of the biggest challenges for BIS in SMEs is ensuring the quality and relevance of information. BIS must provide quality data at various organizational levels to support better decision-making, maintain knowledge sharing, and foster innovation. It also helps organize business, technological, analytical, and IS skills effectively. Calof (2020) observed that while SMEs are prepared for market transitions, their

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structure, scale, and operational capacity are often limited. To achieve intelligent and efficient management, SMEs need qualified personnel and resources. Ahmadi et al. (2020) further highlighted the importance of change management in SMEs, noting that BIS contributes to achieving organizational goals by delivering timely and reliable solutions in complex situations.

2.3.4 Managerial Aspects of Implementation of Business Intelligence System

Theorists such as Hinterhuber (1995) and Hammer and Champy (1993) argue that business processes can only be effectively managed if they are consistently monitored. In contrast, scholars like Burlton (2001) and Hammer (2007b) emphasize the importance of focusing on processes rather than organizational units. According to Vujošević et al. (2019), an empirical study found that a process-centered organizational design positively impacts knowledge sharing and innovation within a business. Ratia et al. (2019) advocate for the integration of business intelligence systems (BIS) into business process management, high-lighting how BIS can assist in executing operational processes. A new concept, "process-centric business intelligence," has emerged, which refers to BIS's ability to transform business-relevant data into analytical insights, creating new knowledge and facilitating necessary process changes (Priporas, 2019). As a result, BIS not only supports decision-making within business processes but also plays a crucial role in enhancing and optimizing those processes (Li et al., 2019).

Hermawati et al. (2019) conducted a comprehensive literature review that demonstrated how business intelligence systems (BIS) can generate new information to support more efficient business processes. Case studies have shown that BIS not only improves the efficiency of specific business processes but also facilitates the flow of information across cross-functional processes, business divisions, and between business

units. According to Garcia and Pinzon (2017), the key success factors for effective BIS implementation include: (1) clearly defined business processes and models, (2) identification of key performance indicators (KPIs) for knowledge sharing and innovation, and (3) a user-oriented approach to change management. One of the authors noted that "the business value of BIS lies in its ability to enhance the innovation of key business operations, which serve as the driving force behind organizational activities."

Even though organizations are increasingly aware that business intelligence systems (BIS) can enhance knowledge sharing and innovation in business processes (Ghaida, 2018), they often underestimate BIS's potential to improve decision-making and overall process efficiency (Ghaida, 2018). Olszak (2016) highlights how BIS is frequently viewed as a "technical concept" with minimal connection to business operations, while its strategic importance is often overlooked (Hellström and Ramberg, 2019). Many BIS projects are handled solely by IT departments, isolated from corporate strategy and efforts to foster knowledge sharing and innovation (Chung, 2019).

Knowledge sharing and innovation intelligence systems are potentially valuable for assessing and managing cross-functional business processes. Ratia et al. (2018) were early pioneers in discussing the alignment between business intelligence and business processes and their impact on operational innovation. As Michailova and Ott (2018) point out, it is crucial to evaluate and make accessible the information on knowledge sharing and process innovation. Additionally, harmonizing the language used in business intelligence systems with that of business process management is emphasized. Mariani et al. (2018) stress the importance of process owners, who should have access to accurate, up-to-date information about the state of their processes through knowledge sharing and innovation systems that rely on continuously collected data.

Caseiro and Coelho (2018) emphasize the importance of ensuring effective integration of process knowledge sharing and innovation within organizational structures, providing examples of successful implementations. Similarly, Upadhyay et al. (2023) conducted a qualitative study that examined the characteristics of organizations with varying levels of business intelligence system (BIS) maturity. The study found that companies with higher BIS maturity are more focused on business processes compared to their less mature counterparts. The study highlighted several key areas for improvement, including the standardization of business processes, the implementation of "fact-based" business process management, and the development of a process-oriented culture that fosters learning and information sharing.

Organizations with higher BIS maturity are more likely to align BIS with their business process management systems, a trend observed across the industry. According to Ladeira et al. (2016), this alignment positively impacts operational innovation. They argue that two key factors influence organizational knowledge sharing and innovation: business process orientation and analytical capabilities. Chen and Nath (2018) suggest that integrating business analytics into business processes can further enhance operational knowledge sharing and innovation. Cao and Duan (2017) found that a stronger alignment between BIS and organizational processes can improve data-driven decision-making, which in turn positively influences operational knowledge sharing and innovation. This suggests that the alignment between BIS and business process management plays a crucial role in enhancing overall productivity.

In the framework of business intelligence systems (BIS) and their implementation, the managerial component plays a crucial role. In organizational environments, administrators rely on BIS for efficient and effective decision-making. The managerial

perceptions, outlooks, and challenges associated with BIS implementation are outlined as follows:

Thakur et al. (2023) emphasize that organizations must reorient and center themselves in response to complex external changes. Using BIS, organizations can reshape their procedures, strategies, and approaches to adapt to rapid shifts in business environments. This process enables businesses to make effective decisions, while also helping them bridge the gap between intended objectives and actual outcomes. BIS methods are categorized and implemented across a variety of circumstances, particularly in addressing challenges related to innovative work behavior. Predictive analysis, a key feature of BIS, allows organizations to forecast future events, offering valuable support for financial, tactical, and strategic decision-making. BIS tools are designed to manage diverse organizational situations, assist in complex decision-making, and provide timely information for value-oriented choices. Additionally, BIS offers data extraction and integration solutions, further enhancing its ability to address various business needs.

2.3.5 Data Integration in Business Intelligence

Data integration is a strategic solution that consists of unifying all the data from the different departments of a company into a single place, usually a data warehouse . Data integration is not a simple process, and in addition to the unification of data, it also includes its transformation and treatment (Abderazak et al., 2020). That is, once the data has been collected, it is cleaned (exclusion of null values or unnecessary information, for example), it is filtered (it is verified that it is reliable, valid and of interest), and it is converted to the same format so that it can be treated as a whole. That is to say, order them, add them, and combine them to be able to extract new information that is more useful and now, completely reliable

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(Afsar et al., 2021). Finally, the curated data is uploaded to a single storage location where it is inventoried and updated over time.

With data integration, all this information is in the same place and all departments have access to it. In addition, it has already been filtered, processed, and merged, so drawing new conclusions is much faster, more efficient, and more reliable. This process not only greatly facilitates work but also represents a great growth in productivity and enhances performance and business intelligence system decision making (A. Ahmad, 2015). Data integration, therefore, is the best way to obtain useful and efficient information to carry out the appropriate operations and achieve optimal results .

The Advantages of Data Integration

- Time savings: Data collection typically accounts for 60% to 80% of a company's business intelligence system time. The automation of the process implies an enormous reduction of this time, eliminating unnecessary tasks. Through data integration, the information is ready to be used .

- Significant money savings: The elimination of unnecessary tasks, as well as the release of human and physical resources, translates into significant money savings and a very high return on investment .

- Because the data has been processed and filtered, the process ensures that the information obtained is completely reliable and useful.

- Obtaining a historical record of information: A single data storage allows the company to have a historical inventory of all the company's information.

New business strategies: Data integration can become the engine to improve the company's business initiatives, since obtaining new information translates into better knowledge of all the parts and processes that make up the company, as well as the customer. Also, by integrating data, the company can enrich the strategic operations and reduce risks.

2.3.6 Analytical Capabilities in Business Intelligence System

Business intelligence system displays current and historical data within its business context to help companies make better decisions (Ahmad et al., 2020). Analysts can leverage BIS to provide competitive and performance benchmarks to help the organization run more smoothly and efficiently. Analysts can also more easily spot market trends to increase sales or revenue. When the right data is used effectively, it can help with anything from compliance to recruiting efforts.

Business intelligence system includes data analytics and business analytics, but the company use them only as part of the whole process. BIS helps users draw conclusions from data analysis. Data scientists dig into the details of data, using advanced statistics and predictive analytics to uncover patterns and forecast future patterns (Ahmad et al., 2019). Data analysis asks "why did this happen and what can happen next?" Business intelligence system takes those models and algorithms and breaks the results down into actionable language.

According to Gartner's IT Glossary, "Business analytics includes data mining, predictive analytics, applied analytics, and statistics." In short, organizations perform business analysis as part of their larger business intelligence system strategy (Ahmad et al., 2018). BIS is made to answer specific questions and give a quick look at the data so that decisions can be made or processes can be planned. However, companies can use analytics processes to continually improve follow-up questions and iteration.

Business analysis should not be a linear process because answering one question is likely to lead to follow-up questions and iterations. Rather, think of the process as a cycle of data access, discovery, exploration, and information sharing (Ahmadi et al., 2020). This is called the analytics cycle, a modern term that explains how companies use analytics to react to changing questions and expectations.

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2.3.7 Information Content Quality in Business Intelligence System

Information Content Quality refers to the accuracy, completeness, relevance, and timeliness of the data provided by BI systems. This quality dimension is crucial because it directly impacts the reliability of insights derived from BI analysis. High-quality information content ensures that decision-makers have access to precise and comprehensive data, reflecting the current business environment accurately (Akram et al., 2020). This enables SMEs to make informed strategic decisions, reducing risks associated with incomplete or outdated information. In essence, Information Content Quality focuses on the intrinsic value of the information itself its ability to accurately represent the business realities it purports to describe.

Data quality is a broad concept that encompasses the processes, operations, techniques, and algorithms used to ensure that a company's or organization's information remains complete, accurate, consistent, up-to-date, unique, and, most importantly, valid for reliable use in analytical studies and decision-making (Ain et al., 2019). In essence, maintaining high data quality allows a company to manage its information effectively, making it available for trustworthy decision-making. One key characteristic that stands out is the confidence data quality instills in business actions. Studies and surveys indicate that more than 50% of companies currently lack full control over their data, with enhancing data security being one of their top priorities (Akram et al., 2020).

Companies must be aware that, by enhancing data quality, they are enhancing decision-making and that the benefits provided by data quality are many. Companies and organizations that care about the quality of their data get a lot of benefits that make their business more valuable and help them stand out from their competitors (Alefari et al., 2020). The quality of the data will depend not only on the characteristics of the data, but also on the business environment in which the data is used, including processes and users.

To establish data quality standards, common data quality characteristics are selected and then adapted to meet the specific and current needs of the business (Alkaabi, 2021). Each dimension is broken down into associated elements, with each element having its own set of quality indicators. These standards follow a hierarchical structure and include several key components. First, availability is a critical factor. Accessibility ensures that a data access interface is provided, allowing data to be easily made public or acquired. Timeliness further guarantees that data arrives within a specified time frame, is regularly updated, and the interval between data collection and processing meets the organization's requirements.

Next, usability focuses on the reliability of data sources. Data originating from specialized organizations—whether from a country, field, or industry—is regularly audited, and its accuracy is verified. Additionally, the data must fall within known or acceptable value ranges to ensure its usability. Reliability encompasses several dimensions. Data accuracy ensures that the data is accurate, reflects the true state of the source information, and is unambiguous. Consistency means that after processing, the data's concepts, domains, and formats remain consistent and verifiable over time. Data integrity ensures that the data format meets structural and content criteria, maintaining its integrity throughout. Finally, completeness ensures that any missing components do not affect the data's accuracy, integrity, or usability.

Relevance is also important. Coexistence refers to the requirement that data may not perfectly align with the given theme but must maintain relevance within the required context for users or present a meaningful relationship to the theme. Lastly, presentation quality focuses on legibility. Data must be clear and understandable, meeting the needs of the user. The description, classification, and content must be easy to interpret, ensuring that users can readily understand and apply the information provided.

2.3.8 Information Access Quality in Business Intelligence System

Information Access Quality pertains to the ease with which users can retrieve and interact with the data provided by BI systems. This includes aspects such as user-friendly interfaces, the efficiency of search functions, the customization of dashboards, and the overall navigability of BI tools (Han et al., 2021). Information Access Quality is critical because it influences user engagement with BI systems. Even if the information content is of high quality, it loses its value if users cannot easily access, understand, or utilize it in their decision-making processes. Therefore, this dimension ensures that the BI system is not only a repository of high-quality data but also a tool that is practically useful for its intended users, facilitating timely and user-centric access to information.

Data quality management involves the processes and practices required to continuously maintain high-quality information. This includes identifying poor-quality data, cleaning it, and making it usable within business intelligence system (BIS) platforms (Almtiri and Miah, 2019). With an effective data quality management system, organizations can gain valuable insights from their data and use those insights to drive growth. Many companies are now implementing systems to clean up poor data, but preventing low-quality data from entering the database in the first place is equally important (Alsharari et al., 2020). By identifying the root causes of poor data quality, companies can take proactive steps to prevent these issues.

There are several major causes of poor data quality, which organizations must address to ensure accurate and reliable data for decision-making. One key issue is manual entry, where reliance on employees to input data increases the risk of errors, despite the availability of automated solutions. Acquisitions and mergers present another challenge, as large volumes of data are transferred and often formatted according to the policies of the acquired company, leading to invalid formats, duplication, or incorrect data that affect

analysis quality. Real-time updates are essential for making timely decisions, but the fast-paced nature of this process can result in incomplete or inaccurate data being entered. Indiscriminate data collection, where organizations gather vast amounts of information without distinguishing between useful and irrelevant data, can waste storage space and time in sorting. Furthermore, system upgrades whether software or hardware pose a risk of data corruption or deletion, leading to poor data quality. To maintain high data quality, businesses need to ensure that their data is accurate, consistent, and complete, as these elements are crucial for effective decision-making and business success.

2.3.9   Use of Information in Business Processes in Business Intelligence System

Business Intelligence Systems (BIS) are technology-driven processes used to analyze data and present actionable information, helping executives, managers, and end users make informed business decisions (Ammar, 2017). Gartner defines BIS as an umbrella term that encompasses applications, infrastructure, tools, and best practices that enable access to and analysis of information to improve and optimize business performance (Arain et al., 2020). BIS enhances process transparency, providing insights that help individuals work more efficiently (Arora and Sharma, 2022; Asghari et al., 2020).

A critical component of BIS is analytics, which supports more strategic decision-making related to business processes (Asurakkody and Shin, 2018). By embedding analytics within business processes, BIS not only allows companies to gain intelligent insights into their current state but also helps them project probable outcomes of future adjustments. Additionally, prescriptive analytics within BIS can identify process changes that will have the greatest positive impact, driving more informed, data-driven improvements moving forward.

BIS has the ability to guide the most critical business processes at every step in order to trigger the best possible outcome for the next step (Azevedo and Shane, 2019). And as analytic tools become more powerful, analysis happens faster and becomes more accurate. Combining the two creates data warehouses that collect information from multiple systems in order for managers and end users to study and analyze them to make better-informed decisions (Bach et al., 2016). This promotes better financial forecasting, customer retention, and competitive advantages from intelligent insights.

Business Intelligence Systems (BIS) serve as pivotal tools in analyzing data and presenting actionable insights, which significantly influence the decision-making processes within SMEs. The technology not only enhances the transparency of business processes but also equips executives, managers, and end-users with the necessary information to optimize business performance. For instance, in supply chain management, BIS can analyze historical data and current trends to forecast supply needs, identify potential bottlenecks, and suggest optimal inventory levels, thus preventing overstocking or stockouts. In customer relationship management, BIS tools can analyze customer data to provide insights into purchasing behaviors, preferences, and trends, enabling SMEs to tailor their marketing strategies effectively. For example, by understanding the buying patterns and preferences of their customers, a retail SME can personalize marketing messages, recommend products, and develop loyalty programs that increase customer retention and acquisition.

Moreover, in financial management, BIS facilitates enhanced financial forecasting by integrating and analyzing financial data from various sources. This integration allows SMEs to have a comprehensive view of their financial status, predict future financial trends, and make informed decisions regarding investments, cost-cutting, and revenue optimization strategies.

Another example is in operational efficiency, where BIS can analyze workflow and process data to identify inefficiencies and bottlenecks. By applying prescriptive analytics, BIS can not only highlight the areas needing improvement but also recommend the most effective interventions to enhance operational performance, such as reallocating resources or re-engineering processes for better efficiency.

2.3.10 Analytical Decision-Making Culture in Business Intelligence System

Although organizations implement decision support systems in order to improve the delivery of information to decision-makers and to support their decision-making activities, the anticipated benefits are not always realized, especially if organizations neglect factors affecting how the information these systems provide is used (Binzafrah and Taleedi, 2022). For effective information use organizations must excel not only in deploying IT, information management practices, information sharing, and information integrity practices, which together will result in a high level of IQ (Bhatiasevi and Naglis, 2018). They must also combine those capabilities by establishing proactive use of an information environment in which decision-making is based on rationality, i.e. on the comprehensive analysis of information.

Knowledge workers with analytical decision styles will adopt and use the enterprise's IS and their information to a greater extent than knowledge workers with conceptual decision styles. Hence, an analytical decision-making culture can help with overcoming the well-known trade-off between reach and richness; a larger number of knowledge workers will use more complex BISs and more comprehensive information (Božič and Dimovski, 2019b). Thus, when studying the relationship between IQ and use of information as two dimensions of BIS success, the attitude to the use of information in decision-making processes must be taken into account. Decision-making models are characterized by the use of resources,

mainly information, and specific criteria. The rational or classical decision-making model is based on quantitative disciplines with one of the main characteristics being the comprehensiveness of the analysis, while on the other side of the spectrum the non-rationalmodel assumes that most information is not actually used in decision-making (Božič and Dimovski, 2019a). Clearly, there are several levels between the two extremes, sometimes called the boundedly rational model or the organizational model.

The results of several studies reveal several factors that impact the extent of rationality and consequently the use of information in decision-making processes, e.g. junior managers with limited years of service are less likely to use a rational process, the strategic decision-making process in large and medium organizations seems to be more rational than in smaller sized organizations, established practices of monitoring an organization's performance will make the task of analysis easier (Carson et al., 2020). Knowledgeworkers' choice of using information is therefore likely to be affected by the decision-making style and the decision-making culture in the organization: of whether a decision-making process exists and is understood, of whether organizations consider the available information regardless of the type of decision to be taken and tend to use such information for each decision process

Creating an analytical decision-making culture in business intelligence is vital for organizations to fully harness the potential of their decision support systems. While these systems aim to enhance the information delivered to decision-makers, the actual benefits hinge on the organization's ability to effectively utilize this information (Binzafrah and Taleedi, 2022). This involves not only implementing advanced IT and information manage-ment practices but also fostering an environment where decision-making is deeply rooted in analytical and rational examination of data.

For organizations to reap the maximum benefits of business intelligence, they must prioritize information quality (IQ) and promote an organizational culture that values and encourages the analytical use of information (Bhatiasevi and Naglis, 2018). Knowledge workers with an analytical mindset are more likely to leverage the organization's information systems and BI tools extensively, compared to those with a more conceptual approach (Božič and Dimovski, 2019b). This analytical culture helps organizations balance the trade-off between the breadth and depth of information usage, enabling a broader range of knowledge workers to engage with more sophisticated BIS and complex information sets.

Studies have shown that the degree of rationality in decision-making and the consequent use of information vary across organizations. Factors such as the experience level of managers, organizational size, and established performance monitoring practices significantly influence the decision-making process's rationality (Carson et al., 2020). Moreover, the organization's decision-making style and culture, including the existence of a defined decision-making process and the propensity to consider available information irrespective of the decision type, play a crucial role in determining how information is used in decision-making processes.

2.4   SMEs in the UAE

Small and Medium Enterprises (SMEs) form the economic cornerstone of the UAE, representing a crucial segment that significantly shapes the nation's economic landscape. SMEs account for over 94% of companies in the UAE and are pivotal in driving employment, contributing more than 86% of the private sector workforce, and playing a substantial role in the country's GDP (Ministry of Economy, 2019). The UAE government recognizes the essential role of SMEs in achieving economic diversification and has implemented various initiatives to enhance their competitiveness and innovation

capabilities. These efforts align with the broader vision of transitioning to a knowledge-based economy, with a strong emphasis on fostering an entrepreneurial ecosystem that promotes innovation and sustainable business practices.

SMEs in the UAE are classified based on specific criteria related to employee count and annual turnover, which facilitates targeted policymaking and support mechanisms. This structured approach ensures that SMEs receive tailored assistance, strengthening their integration into the global economy and fostering resilience and adaptability. Initiatives like the National Innovation Strategy and the designation of 2015 as the Year of Innovation highlight the government's commitment to embedding innovation within the SME sector, propelling the UAE towards its goal of becoming one of the world's most innovative nations.

Moreover, the government's investment in education, particularly in STEM fields, and vocational training underscores a strategic move to equip the future workforce with the necessary skills to support SME growth and innovation. This is complemented by public-private partnerships and initiatives to establish innovation incubators, which are instrumental in nurturing a conducive environment for SME development and entrepreneurship.

Despite the supportive ecosystem, challenges such as access to finance and adapting to rapid technological changes persist. However, the government's proactive stance, exemplified by financial support schemes and regulatory reforms, demonstrates a clear intent to address these hurdles, fostering an environment where SMEs can thrive and contribute significantly to the UAE's economic aspirations.

Small and medium-sized enterprise (SME) definitions serve as the foundation for identifying and evaluating the impact of different small and medium-sized enterprise (SME) policies and programmes. Further, these initiatives aim to promote market development and export growth while also making it easier for businesses to obtain credit and network with

other entrepreneurs. The result of Innovative work behavior, the increase in business sophistication, the increased penetration of technology, the facilitation of greater access to finance, and the expansion of market opportunities are all included in a framework that is designed to bring the benefits of these programmes and policies for small and medium-sized enterprises (SMEs) together in one place (Qaffas et al., 2023). These advantages also translate into an increase in the worldwide competitiveness of the UAE's SME sector, an increase in the country's ability to attract foreign investment, and the development of high-value-added jobs across the economy. In general, the definition was the first move taken by SMEs in the United Arab Emirates toward the growth of the SME sector by the Emirate's and the United Arab Emirates' Economic Development Plan, which was released in December.

A thorough and official definition of small and medium-sized businesses (SMEs) in the United Arab Emirates was established due to the formulation process. To be classified as a small and medium-sized business (SME) in the United Arab Emirates, a company must satisfy specific criteria regarding employee headcount and turnover, which vary according to the sector of the economy to which it belongs (trading, manufacturing, or service provision). Also taken into consideration are characteristics specific to the industry in which the firm works when categorising business sizes into three groups (Micro, Small, and Medium).

According to the definition, "an enterprise" is defined as "a legal entity engaged in economic activity that has a legal form, which is defined as "a legal entity engaged in economic activity [that] has been registered as an entity with a Commercial Registry or with authority over a free trade zone or an industrial zone." A company must meet both of the criteria for certification since the SME definition is based on a combination of the Employees

Headcount1 and the Turnover2 indicators; otherwise, the business will not be considered for certification.

A three-by-three matrix is used to identify a small and medium-sized business, with thresholds for a cross-section of each company size (Micro, Small, Medium, and Large) and thresholds for each industry (Manufacturing, Services, Services, Trading). The definition also includes recommendations for defining the terms "independence" and "autonomy" in the context of commercial businesses, as well as a set of criteria for evaluating these characteristics (this is explained within the subsequent section on independence criteria). Figure 2.2 depicts the concept of a small and medium-sized enterprise (SME) in the United Arab Emirates, which is split into groups depending on the sectors and sizes of companies represented.

	TRADING		MANUFACTURING		SERVICES	
	Employees	Turnover	Employees	Turnover	Employees	Turnover
Micro	<=9 &	<=AED 9mn	<=20 &	<=AED 10mn	<=20 &	<=AED 10mn
Small	<=35 &	<=AED 50mn	<=100 &	<=AED 100mn	<=100 &	<=AED 100mn
Medium	<=75 &	<=AED 250mn	<=250 &	<=AED 250mn	<=250 &	<=AED 250mn

Figure 2.2: SME definition for The UAE classified according to the sectors and size of businesses

During the past decade, the United Arab Emirates (UAE) has experienced a significant shift in its economic landscape. Between 2000 and 2012, the UAE's gross domestic product (GDP) grew at an annual rate exceeding 10%. Following these growth efforts, the government shifted its focus towards building a more diversified economy and

developing advanced transportation infrastructure. This economic expansion has led to significant improvements in living standards for both the local and expatriate populations, driven by the creation of numerous employment opportunities.

While worker productivity has increased, recent growth has been largely fueled by capital and labor accumulation, highlighting that wealth accumulation and employment have been the primary drivers of economic development. The global financial crisis of 2009 had a notable impact on the UAE's economy, delaying several large-scale real estate projects and causing the country's GDP to decline by 2.4% that year. Despite this setback, the UAE economy demonstrated remarkable resilience, rebounding with a 2.8% growth rate in 2010. The ability to recover from the 2009 recession and continue progressing was due to the strength and diversity of its economic sectors.

With a recovery in the country's major industries, such as construction and real estate development, the United Arab Emirates' gross domestic product (GDP) grew by 3.3 % in 2011 over the previous year. In the years that followed, the economy is projected to have expanded at a rate of 4 % year on year in 2012, which would be the most significant increase in GDP for the Emirate since 2008 and the most significant rate of growth for the Emirate since 2007 The UAE's outstanding success in international commerce has been one of the primary drivers of the country's fast economic development and transition into a modern economy.

In recent years, the United Arab Emirates has established itself as one of the world's most dynamic economies. In recent years, the United Arab Emirates has emerged as a major port of entry and departure for the Middle East and North Africa region. This has occurred due to the country's strategic location, the government's efforts to build state-of-the-art infrastructure, and the implementation of favourable foreign trade regulations.

2.5   Knowledge Sharing

One of the chief and common processes in different structures introduced for knowledge management is knowledge sharing (Kmieciak, 2021). Knowledge sharing as a complex but value-adding activity in knowledge management is the fundamental of many organisational strategies. One of the main objectives of managers in SMEs using knowledge management in organisations is improving knowledge sharing among individuals within the organisation. Efficient knowledge sharing among organisation's members leads to the reduction of costs in knowledge production and is a guarantee for the sharing of best working practices within the organisation and makes the organisation able to solve its problems. Sharing knowledge means the exchange and transfer of experience within several organisational units.

According to Zhao et al. (2020), knowledge sharing is defined as "the exchange of knowledge among organizational units for current and future benefits." Knowledge sharing occurs at various levels within organizations, both formally and informally, and can take place either within or between different units. This process involves two primary forms of knowledge transfer: tacit and explicit knowledge sharing (Anser et al., 2020).

Rao Jada et al. (2019) describe knowledge sharing as the process by which employees disseminate their knowledge and information across the organization. This allows individuals to exchange knowledge reciprocally and collaboratively, creating new knowledge. In modern economics, knowledge is viewed as a strategic factor in achieving a sustainable competitive advantage. However, merely possessing knowledge assets does not generate power; true power comes from sharing what you know (Kmieciak, 2021). Sharing knowledge both within and outside the organization lays the foundation for generating new, value-adding knowledge assets (Kim and Park, 2017).

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Knowledge sharing stands as a pivotal component in the knowledge management structures of organizations, playing a crucial role in enhancing organizational strategies, particularly within SMEs. It involves the intricate yet invaluable activity of exchanging and transferring knowledge across various organizational units, encompassing both tacit and explicit knowledge forms (Anser et al., 2020; Zhao et al., 2020). This exchange is not confined to the internal workings of an organization but extends to interactions with external entities, fostering a broader ecosystem of knowledge creation and dissemination.

In SMEs, where resources are often more limited compared to larger enterprises, knowledge sharing becomes a strategic tool to leverage internal and external intellectual assets effectively. It aids in reducing the costs associated with knowledge creation, ensures the propagation of best practices, and equips the organization with enhanced problem-solving capabilities. The process of knowledge sharing allows employees to disseminate and assimilate knowledge seamlessly, facilitating a culture of continuous learning and innovation (Rao Jada et al., 2019).

In the context of the UAE, where SMEs constitute a significant segment of the economy, fostering a culture of knowledge sharing can serve as a catalyst for innovation, driving SMEs towards achieving a sustainable competitive edge. The exchange of knowledge within these organizations can spur creative solutions, enhance operational efficiencies, and contribute to the overall growth and resilience of the SME sector in the dynamic economic landscape of the UAE. Moreover, in an era where information and knowledge are paramount, the ability of SMEs to manage and share knowledge effectively is directly correlated with their capacity to adapt, innovate, and thrive. Therefore, understanding the mechanisms and impacts of knowledge sharing within SMEs is essential for delineating strategies that support

knowledge-driven growth and competitiveness, particularly in the rapidly evolving business environment of the UAE

2.6   SMEs Innovation

Schumpeter (1934) was the first to describe innovation in a scientific, conceptual way. In fact, Schumpeter (1934) attempted to understand the factors affecting the economic growth of countries, and Schumpeter (1934) discovered the critical and significant role of innovation in organizations' growth. Innovation is the abandonment of old patterns and is among the chief features of a creative mind. Nowadays, innovation is the main key to innovative work behavior and long-term success in innovative work behavior because SMEs that enjoy high innovation capacity will be able to respond to environmental challenges faster and better than non-innovative SMEs, and this enhances innovative work behavior (Eidizadeh et al, 2017).

In the present innovative work environment, everything changes, but the only thing that remains constant is the phenomenon of change. Rapid changes in technology in various industries and, as a result, shorter product and service life cycles, as well as the intensity of innovation, are the most effective factors that result in a significant increase in the adoption of innovative work behavior (Afsar et al., 2021). SMEs with more innovation, which allows them to achieve better innovative work behaviors, will fare better in changing environments (Božič and Dimovski, 2019b).

It is no surprise that innovation is currently regarded as a key factor in the sustainable competitiveness of SMEs (Akram et al., 2020). Many authors view innovation as the foundation of today's competitive economy. Several experts argue that only SMEs that prioritize innovation and cultivate innovative work behaviors will be able to survive (Lee A. et al., 2020). Innovation enables SMEs to navigate the turbulence and uncertainty of external

environments, making it a crucial driver of long-term success, particularly in dynamic and competitive markets.

To survive in an ever-changing and uncertain environment, SMEs must adapt to increasing complexity and rapid change. In these situations, SMEs with a strong capacity for innovation can respond to environmental challenges more quickly and take better advantage of new products and market opportunities than their non-innovative counterparts. Those SMEs that foster innovation and achieve greater innovative work behaviors are more likely to succeed in adapting to changing conditions (Montani and Staglianò, 2021). As such, innovation remains a central factor in ensuring sustainable competition for SMEs (Carnevale and Hatak, 2020).

Product innovation in SMEs involves the development of new or significantly improved goods or services that meet specific customer needs or open up new markets. Service innovation, on the other hand, refers to introducing new or improved services, enhancing customer experiences, and creating value in ways competitors do not. System and process innovations focus on enhancing internal operations, increasing efficiency, and reducing costs, thereby enabling SMEs to deliver products and services more effectively.

Technological innovation is particularly crucial, as it empowers SMEs to leverage emerging technologies to improve products, services, and operational processes, thereby staying ahead in the market. These innovations allow SMEs to respond swiftly to environmental challenges, seize new opportunities, and maintain relevance and competitiveness in their respective industries (Eidizadeh et al., 2017; Afsar et al., 2021).

In the UAE, where SMEs play a pivotal role in the economy, fostering a culture of innovation is essential for sustainable growth and development. The dynamic and competitive landscape necessitates that SMEs not only adapt to change but also proactively drive

innovation to create new value, meet evolving customer demands, and navigate the complexities of the global market. Embracing innovation enables UAE's SMEs to differentiate themselves, capitalize on new opportunities, and achieve long-term success in an increasingly uncertain and fast-changing environment (Božič and Dimovski, 2019b; Montani and Staglianò, 2021; Carnevale and Hatak, 2020).

2.7   Innovative Work Behavior

Organizational innovativeness stems from individual innovativeness (Hughes et al., 2018; Spanuth and Wald, 2017). As a result, there is significant interest in innovative work behavior as a key contributor to organizational success (Kmieciak, 2021). Innovative work behavior is defined as the intentional creation and application of new ideas or innovations—such as new products or processes—within the workplace to enhance individual, group, or organizational knowledge sharing and innovation. This definition shows that innovative work behavior is closely related to other concepts in the literature, including employee innovativeness, innovative job knowledge sharing, and on-the-job innovation (Spanuth and Wald, 2017).

Innovative work behavior is a complex concept, encompassing various activities such as idea exploration, generation, promotion, and implementation (Kmieciak, 2021; Spanuth and Wald, 2017). Consequently, it is regarded as a one-dimensional (Hughes et al., 2018), two-dimensional, or even four-dimensional construct (Spanuth and Wald, 2017).

Idea generation is defined as a creative behavior aimed at searching for and generating new, original approaches and solutions to problems, including new working methods and techniques. Idea realization refers to implementing new ideas in the form of new products or processes in an organization. Kmieciak. (2021) noted that the distinction between idea generation and idea realization has reasoning in a different etiology. Idea generation depends on individual characteristics (an individual's creativity, self-confidence,

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job knowledge and job demands) than group and organizational characteristics. In contrast, idea realization, as a social process, affects other employees. Its success depends on the other's approval, engagement and support. Simple innovations are usually introduced by individual employees, but more complex ones need cooperation, and various knowledge inputs and competences. Innovation is perceived as a multi-stage process, with the general agreement that idea generation is followed by idea realization (Hughes et al., 2018; Spanuth and Wald, 2017).

Innovative work behavior (IWB) is a critical component in fostering organizational innovation, reflecting the extent to which individuals engage in the intentional introduction and application of new ideas, processes, or products within their work roles. It is a multifaceted construct that encapsulates various stages of innovation, from idea generation to implementation, influencing individual, team, and organizational performance. IWB involves not only generating novel and useful ideas but also realizing these ideas through successful implementation, thus contributing to organizational innovation and adaptability (Hughes et al., 2018; Spanuth and Wald, 2017).

Idea generation is the initial phase where employees conceive new and original solutions or approaches to challenges, driven by their creativity, knowledge, and the demands of their roles. Following this, idea promotion involves advocating for these new concepts, garnering support and resources for their development. The subsequent stage, idea realization, transforms these concepts into tangible innovations within the organization, a process that often requires collaboration and endorsement from various stakeholders.

The relevance of IWB in SMEs, particularly in the UAE, is profound. In a dynamic and competitive environment, SMEs' ability to innovate and adapt is crucial for their survival and growth. Employees' engagement in innovative behaviors can lead to the development of

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unique products, services, and processes, enhancing the SMEs' competitive edge and contributing to the nation's economic diversification efforts. Encouraging and nurturing a culture that supports IWB can significantly impact SMEs' innovative outputs, driving organizational success and resilience.

2.8   Business Intelligence System and Innovative Work Behavior

The phrase "business intelligence" is one of the most frequently searched for terms on the internet. It continues to be a source of discussion in both the industrial and academic sectors (Elbashir et al., 2022). In the context of an organisation, the word refers to a collection of technologies that gather and analyse data to enhance the flow of work and decision-making inside the organisation (Carvalho et al., 2022). A business's ability to make better strategic choices may be improved by the process of gathering, cleansing, and integrating data from many sources and then presenting the findings (Binzafrah and Taleedi, 2022). Several studies have been published on the impact of business intelligence system on the Innovative of organisations, and a significant amount of research has been done in this area. Several studies have shown that businesses may benefit from business intelligence system because it contains the key components that assist them in improving both their knowledge sharing and innovation and their ability to respond to change throughout time, according to (Yablonsky, 2021). To manage both strategic and tactical business operations, business intelligence system technologies have primarily been used them. Businesses have relied on business intelligence system (BIS) for many years to monitor, analyse, report on, and improve the knowledge sharing and innovation of their operations over an extended period (Talaoui and Kohtamäki, 2021).

Enterprise Business Intelligence Systems (BI) are technologies that organizations can utilize to enhance the innovation of their business operations. BI helps corporate managers and decision-makers make accurate, timely, and relevant decisions, which benefits

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the organization. Ultimately, this leads to improved productivity and profitability (Stylos et al., 2021). Nuseir (2021) highlights that BI enhances business innovation by boosting operational efficiency, resulting in increased profits. Besides providing easy access to information, BI empowers suppliers, partners, and employees to evaluate and share this information with other individuals and organizations, further contributing to organizational success.

The fact that scholars have addressed the BIS idea in a variety of ways, although it is not a new concept, is shown by the fact that a variety of definitions can be found in the literature (S. Li et al., 2021). In this study, business intelligence system (BIS) is defined as a managerial tool that consists of a collection of applications, technologies, and processes that have been implemented across organisations to assist business users in addressing challenges and opportunities, monitoring operations, and making better decisions (Köseoglu et al., 2021). By gathering, analysing, and reporting on internal and external data, business intelligence systems (BIS) assist decision-makers in making informed decisions. It is possible to influence business intelligence system via several disciplines; some are more concerned with technical elements of BI, while others are more concerned with the search and integration of information (search and integration of information) (Ghaida, 2018). The degree to which business intelligence system implementation has taken place in an organisation may be assessed by considering the organisation's level of business intelligence system maturity.

According to Han et al. (2021), the maturity level of an organization "reflects the capabilities of a particular class of objects and application domain" that the organization possesses. Falcão et al. (2021) argue that the advantages realized from a business intelligence system (BIS) are closely linked to the maturity of its implementation. Pejic Bach et al. (2018) report that although the number of BIS maturity models has grown over time, the models themselves and their usage have remained largely unchanged. These are typically generic

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BIS maturity models that can be applied to any organization, regardless of its size or sector. They help assess the level of BIS adoption and create a roadmap for future development.

To assist practitioners in effectively implementing BIS projects and achieving the desired level of maturity, maturity models have been designed to guide organizations toward success (Cavallo et al., 2021). Generally, these models differentiate between four and six stages of growth, with each stage evaluated based on key characteristics such as IT integration, data quality, output quality, and measurement. A review of numerous studies on BIS maturity models identified several frequently cited aspects. Strategic alignment and vision, management sponsorship and support, organizational culture and change management, and people skills were key factors examined. Additionally, resources, technology, and the overall quality of the data obtained were also important considerations (Yiu et al., 2020).

According to the BIS maturity model, costs, organisational structures, process orientation, people, and strategy are all issues that are seldom addressed in the context of business intelligence system implementations (Wamba-Taguimdje et al., 2020). Because it covers organisational factors that are critical to the success of BIS projects, it was determined that the business intelligence system maturity model would be used for this study (Pejic Bach et al., 2017, 2018). According to the Dinter Business intelligence system maturity model, it is built on a three-dimensional structure (functionality, technology, and organisational maturity), which is further divided into categories with associated components (for example, design objects) (Suša Vugec et al., 2020).

Additionally, in addition to being capable of dealing with all of the major business intelligence system design issues, the model also provides a unique perspective on the maturity level of BI systems, which is one of its most useful characteristics. The organisational

aspects encompass factors such as the company's structure, processes, and profitability. Aspects such as a company's strategy and positioning are also considered, all of which are linked to whether or not the model aligns with the business process management concept (Rane et al., 2020). The relationship between business intelligence system maturity and operational Innovative has been the subject of some investigation. When (Nyanga et al., 2020) investigated the causes and effects of business intelligence system deployment across Malaysian manufacturing, they discovered that BIS adoption is positively linked to firm knowledge sharing and innovation on both the financial and nonfinancial fronts.

Many other writers such as (Eriksson et al., 2020; Freyn and Farley, 2020; Iskhakova and Ott, 2020; Lim and Teoh, 2020) have reached similar results while considering other significant factors. Following the research results performed by Chen and Nath (2018), it has been shown that business intelligence system maturity has a favourable effect on total business intelligence system achievement. According to the study, larger companies, as opposed to small and medium-sized businesses, have a higher level of business intelligence system maturity and success. To provide an example, according to the results of Pejic Bach and colleagues (2018), "top-performing" companies have higher levels of "BIS maturity" than lower-performing enterprises. Those specific organisational culture traits are linked with higher levels of BIS maturity.

The integration of Business Intelligence Systems (BIS) within organizations significantly influences innovative work behavior (IWB), driving the transformation of data into actionable insights that propel organizational innovation. BIS empowers organizations to harness data effectively, supporting the decision-making process, and fostering an environment conducive to innovation. The maturity of an organization's BIS plays a pivotal role in determining its capacity to support innovative work behaviors. A mature BIS framework ensures that data is not only collected and analyzed efficiently but is also aligned with the

organization's strategic goals, fostering a culture where innovation is nurtured and valued (Elbashir et al., 2022; Binzafrah and Taleedi, 2022).

In the context of SMEs, particularly within the UAE, the implementation and maturation of BIS can significantly enhance innovative capabilities by providing insights that inform product development, process improvement, and service innovation. As SMEs navigate the complexities of the modern business landscape, the ability to rapidly adapt and innovate becomes crucial. BIS facilitates this by enabling a deeper understanding of market trends, customer preferences, and internal processes, thereby guiding SMEs toward innovation-driven growth (Carvalho et al., 2022).

The strategic alignment and vision, management sponsorship and support, organizational culture, and change management are critical components that influence the effectiveness of BIS in promoting IWB. These factors ensure that the insights generated by BIS are not only relevant but also actionable, driving the organization toward innovative practices and outcomes. By aligning BIS with the organization's strategic objectives, fostering a culture that supports data-driven decision-making, and investing in the necessary skills and technologies, SMEs can enhance their innovative work behaviors, leading to sustained competitive advantage and growth (Yablonsky, 2021; Talaoui and Kohtamäki, 2021).

2.9   The Impact of Business Intelligence System on Innovative Work Behavior

The influence of Business Intelligence Systems (BIS) on innovative work behavior (IWB) in organizations, particularly SMEs, is profound and multifaceted. BIS enables organizations to harness vast amounts of data, transforming it into actionable insights that can drive innovation at every level. By providing comprehensive, real-time information, BIS empowers employees to engage in innovative behaviors, encouraging the exploration of new ideas, processes, and products (Elbashir et al., 2022; Binzafrah and Taleedi, 2022). In the

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context of SMEs, where agility and adaptability are key to success, the integration of BIS can significantly enhance innovative work behaviors. BIS facilitates a culture of data-driven decision-making, where employees feel empowered to suggest and implement innovative solutions to challenges. This can lead to the development of new products, the optimization of processes, and the introduction of novel business models, all of which contribute to the organization's competitive edge and growth (Yablonsky, 2021; Talaoui and Kohtamäki, 2021).

Moreover, the strategic alignment of BIS with the organization's goals ensures that innovation is not just sporadic but a consistent and integral part of the organizational culture. This alignment helps in identifying areas where innovation can significantly impact business outcomes, guiding investment in innovative projects, and measuring the success of these initiatives. By fostering an environment where innovative work behaviors are recognized and rewarded, BIS can significantly influence the overall innovation capacity of SMEs (Nuseir, 2021; Carvalho et al., 2022).

According to David Loshin, business intelligence is a process that uses powerful computers to transform data into information, information into knowledge, and knowledge into strategic plans, helping organizations stay competitive (Z. Li et al., 2019). Negas describes business intelligence systems as computer systems that handle data collection and storage. These systems manage knowledge by using analytical tools to provide decision-makers with relevant information, thereby enhancing competitive advantage. They offer organizations timely and accurate information, as well as models that aid decision-making. Additionally, they accelerate response times to external variables, allowing for faster decision-making when it matters most.

Olszak and Ziemba explain that business intelligence systems (BIS) are among the most sophisticated information technologies available today, closely integrated with customer relationship management (CRM) and enterprise resource planning (ERP) systems, which serve as internal data sources. BIS encompasses a set of concepts, methods, and processes aimed at improving decision-making and supporting organizational strategies. The tasks of BIS include data discovery, integration, warehousing, and analytical processing. According to Azvine, BIS is used to gather, retrieve, and interpret data, converting it into actionable information that helps businesses operate more effectively. Similarly, Wayne Eckerson views BIS as systems that transform data into valuable information and, eventually, into products that benefit the firm (Z. Li et al., 2019).

In today's complex business environment—characterized by globalization and constantly shifting customer demands—organizations need to work smarter to gain a competitive advantage. Rather than merely responding to crises, organizations must collaborate with intelligent systems to control data and develop integrated, valuable strategies. Business intelligence solutions enable firms to respond quickly to meet customer expectations, allowing them to achieve their objectives and strategies more effectively (Hermawati et al., 2019).

Business intelligence, in general, may be described as both a process and a product at the same time: a collection of techniques used to gather knowledge about the organization and a collection of data used to forecast rivals', suppliers', and consumers' behavior Business intelligence is fundamentally an integrated set of operations, activities, and analytical tools utilised in business. Its article is information, and its outputs are knowledge and intelligence. Business intelligence is neither information technology nor information technology applications in business. In the sense that business intelligence is more than just a management

philosophy or technology to support business (Hellström and Ramberg, 2019), it is the structure and methodology of the management framework, which sets objectives, formulates clear visions, and operated in accordance with the plans, programmers, and targeted standards at the level of the internal environment, and enables the Organization of competitive intelligence at the level of the external environment (Hellström and Ramberg, 2019).

Business intelligence is the use of technology to precisely gather the information that is of high quality in the work itself, highly reliable, and accessible from a variety of sources. Once this information is gathered, experience is applied to improve the quality of decisions made using this information. Business intelligence, according to research, is a collection of tools, processes, and software that gather heterogeneous data from various sources (internal and external), clean the data, and store it in a warehouse. This data is then analyzed by tools to turn the information into knowledge, which is used in the decision-making process at all levels of management within the organization (Chung, 2019).

All of the markets in which insurance companies operate are highly complex and competitive, which has resulted in the emergence of numerous challenges, which must be faced and overcome, and the analysis and understanding of the competitive dimension-related aspects, which have become crucial for the company's survival and continuation in these markets (Ratia et al., 2018). One of the competitive intelligence tools and methods that insurers can use is, which identifies the sources of such information for the purpose of an analysis of the competitors. If organizations want to improve their competitive positions, they must adopt methods and tools to collect detailed information about competitors in an orderly manner, identify the sources of such information, and then formulate strategies to respond to competition practices by organizations (Upadhyay et al., 2023).

Business intelligence is a comprehensive set of actions, processes, and analytical tools used in business; its core tools are data and information, and its outputs are knowledge

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and intelligence. Business intelligence is neither information technology nor a technical application (Shiau et al., 2023). Business intelligence enables firms to comprehend data and forecast how future events will affect them (Qaffas et al., 2023). By gathering data on the activities of Goods marketing, sales organization, and customer behavior, it can finish the analysis of the data. These data (where data collection is ongoing and constantly updated) are then stored and organized in a way that makes reference and processing easy. Finally, business intelligence technology is used to get detailed and impressive results, making the business more effective and efficient. accurately informs corporate groups to help and facilitate decision-making that enables finding opportunities and anticipating threats (Kulkov, 2023). Decision-makers today need detailed and accurate information, which is provided by business intelligence structure, allowing them to use advanced tools for data analysis, business intelligence applications take great care to process and utilize timely data from many organizations, in particular, have a lot of data (Hoang and Bui, 2023).

Business intelligence systems influence the flexibility of the organization's architecture to make the decision-making process more responsive to changes in the ocean and the bound and more quickly, effectively, and accurately supported by tools and techniques to enable the resolution of sound decision-making time (Hamidinava et al., 2023), and guaranteed to improve competitive advantage, by tracking all factors affecting it, and all associated parties, analyzing, and reporting on all relevant data (Deb et al., 2023).

The use of business intelligence applications and processes helps to understand and use information, the basis of work to turn data into information and then into knowledge, with the need for a link between them, says Muhmmad Nofal in 2014. The data and information that enables the discovery of knowledge through innovation incubator where continuously clarifies the customer's requirements and access by competitors while providing services and products as quickly as possible (Caruso et al., 2023).

2.10   Theoretical Framework

The aim of theoretical review is to provide a preliminary theoretical framework based on the business intelligence system theories was established by a number of famous financial economist and researchers in the second half of the nineteenth century. A concise summary of business intelligence system in theoretical perspective and preliminary framework are constructed in this study.

The theoretical framework for this study is underpinned by two pivotal theories: Greiner's Evolution and Revolution as Organizations Grow (1972) and the Technology, Organization, and Environment (TOE) Framework. Each theory complements the other, providing a multifaceted lens through which to examine the complex relationships among Business Intelligence Systems (BIS), knowledge sharing, SME innovation, and innovative work behavior in the context of UAE-based SMEs.

Greiner's seminal work presents an organizational life-cycle model that identifies distinct phases of growth, each marked by a period of evolution and a revolutionary period of organizational change (Greiner, 1972). The theory postulates that as organizations grow, they experience sequential changes that require different management approaches and strategies. Within the context of this study, Greiner's theory is utilized to understand how SMEs at different stages of their life-cycle might interact differently with BIS. The evolutionary and revolutionary changes may impact both the ability to adapt new technologies like BIS and the subsequent influence on innovative work behavior.

Moreover, the Greiner model's focus on the internal managerial challenges that evolve over time can offer insights into how the organizational environment affects knowledge sharing and SME innovation. These variables act as the mediators in the study and are crucial for understanding the impact of BIS on innovative work behavior (Greiner, 1972). The TOE framework aims to understand the adoption and implementation of new

technologies within organizations (Tornatzky and Fleischer, 1990). It categorizes the factors affecting technology adoption into three distinct domains: technological, organizational, and environmental. This framework complements Greiner's theory by focusing on the broader ecosystems in which SMEs operate.

In the present study, the TOE framework guides the examination of how various technological, organizational, and environmental factors may influence the adoption of BIS within SMEs and how that, in turn, affects innovative work behavior. For instance, the technological factors like the data integration and information content quality of BIS systems may influence their adoption, which in turn may affect knowledge sharing and innovation (Tornatzky and Fleischer, 1990). The integration of Greiner's life-cycle model and the TOE framework provides a comprehensive theoretical foundation for this study. While Greiner's model offers a nuanced understanding of the internal organizational dynamics, the TOE framework expands the scope to include external factors. Together, these theories help to understand not just how BIS is adopted and implemented but also how it interacts with variables like knowledge sharing and SME innovation to influence innovative work behavior.

By synthesizing Greiner's organizational life-cycle theory and the TOE framework, this study aims to offer a more holistic understanding of the various factors that impact the adoption of BIS in SMEs and how these systems influence innovative work behavior through the mediating roles of knowledge sharing and SME innovation.

2.10.1 Evolutionary Theory

The evolution of this theory, which derived from the principle of evolution in biology, was clearly traced by Greiner (1972). The principle of non-linearity has contributed to

the concept of evolution and applications in companies and to the essence of organisational development.

Ghoshal, Hahn and Moran (2002) suggest that there are different variables that could restrict the growth of an organisation. There are different external factors that restrict a company's growth. In expansion plans, internal factors restrict the organisation, information assimilation and management and maintenance of such repositories could limit development. This research clearly states that a company's growth is constrained by the resources that are available to the company. Penrose (1995) argued that even though large corporations continue to control and manipulate the markets, small companies have their own advantages and uniqueness to prevail in the market.

Larger firms exist under the higher price margins they have already set and developed, and in these baskets and range of operations, smaller firms continue to extend. These small and medium-sized companies that still have their grip in business operations can be favoured by quick entry and established processes.

Davidsson, Delmar and Wilund (2006) demonstrate that the organic and integrated development of SMEs continues. Larger businesses continue to expand through acquisitions. Although the scale and scale of growth could be felt to be lower than that of larger companies, SME growth would be consistent and guaranteed. Due to different factors, the growth in SMEs is characterised and the different approaches and opinions of research scholars are provided below:

Table 2.1: Different growth strategies that SMEs exhibit

Authors	Classification of type of growth and Implications
O'Farrell and Hitchens (1988)	Growth is faster, assured Satisfying growth Failures are there despite attempts for growth and development or progress
Storey (1994)	Failed attempts survival with no new job creation
Mariussen and Wheelock (1997)	Rejection of growth Ambivalent approach towards growth Eager and enthusiastic on growth
McMahon (2001)	Life style oriented business Capped growth
Massey et al. (2006)	Maturity and declining growth Emerging on growth curve Capped growth

The table above shows the different growth strategies that SMEs exhibit. There are many complex and varying factors that are due to the mechanism of growth in SMEs. Because of the non-committal existence and lack of intention of SME owners, all these kinds of innovations happen. Davidsson et al. (2006) empirically conducted a survey on 55 companies and identified the predominant relationship between SME growth and entrepreneurship. They discovered that the two variables are related to each other and they both influence each other. The study also confirmed the relationship prevailing in accessing possibilities and resources that directly affect the growth of the business.

Penrose (1995) said the growth of the business depends on the increase in the dimension of multiple variables such as properties, output and contributions. Since the growth of such variables beyond proportion and limits could change over time, it implies that measuring growth to a greater degree is not straightforward and confounding.

Feindt, Jeffcoate and Chgappell (2002) refer to the variables attributable to the company's progress as success factors influencing SMEs. Experience, knowledge management

practises, customer orientation, efficiency, creativity and flexibility and employee management are the success factors which can be attributed to growth.

Perren (1999) found that SME owners must have continuous engagement with growth aim and orientation that would lead to growth. The owner must also have the skill set and expertise, the ability to manage capital and determine business potential, and the provision of the goods and services required. Ghoshal et al. (2002) provided the theory of the resource-based business and found that in the company there are several variables such as technical skills, assets and capabilities and routines that contribute to organisational growth and sustained growth.

2.10.2 Technology, Organization and Environment Framework

The Technology-Organization-Environment (TOE) Framework is a theoretical model widely used to study technology adoption and innovation in organizations. It suggests that three main contexts—Technology, Organization, and Environment—affect a firm's decision to adopt and implement new technology. Researchers clearly indicate that technologically innovative companies outperform their competitors in productivity, knowledge sharing and innovation and output. It is identified as an important factor for superior knowledge sharing and innovation and competency of organizations. It is having three different stages identified as initiation, adoption and implementation.

During the first stage technological innovation process and procedures are initiated, adopted and implemented. These technological innovation timing could be planned or incremental. The motivating factor which enables innovation could be market-oriented factor, customer-oriented factors or demand oriented factors which foster this process. The innovation process could be modifications in product, process or any aspect in the whole range of

activities of an organization and small modifications could provide Innovative work behavior.

The process of innovation and its relativity with regard to technology, organization and environment and how these factors enable innovations would be analyzed. The historical ways and means, stages of innovation and how these innovative factors enable the process as researched, analyzed, empirically proven by researchers, academicians and professionals. Gutierrez et al. (2015) has examined, evaluated and concluded that implementation of cloud computing in UK companies involve various factors like competitive pressure, technological readiness, trading partner pressures affect Technology – organization and environment framework which has direct influence on technology adoption process.

Yuvaraj, (2016) has found the factors which influence consumer adoption intentions with regard to cloud computing in US and China. The acceptance of individual variables was established in this study. Perceived Local Information System and perceived ease of use was established in this study which had been influenced by Technology organization environment factors.

Gangwar et al. (2015) integrated TAM and TOE framework for this study and found that TOE factors functioned as external variables. They used TOE factors in their study as external variables and concluded that environmental variables tend to have direct impact on the knowledge sharing and innovation of cloud computing and its efficiency.
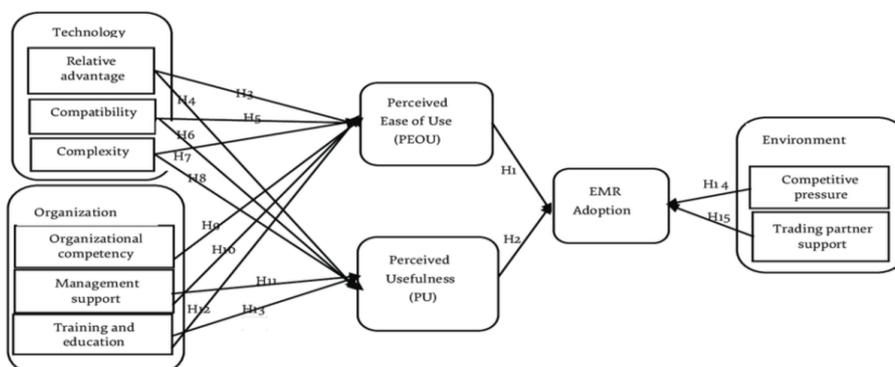
Figure 2.2: Integrated TAM and TOE framework

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Senyo et al. (2016) provided insights in to cloud computing adoption across different industries in developing countries. They investigated the relationship through the lens of TOE framework. The study revealed that only six factors influenced the relationship with six major factors like: Process Mining, security concern, top management support, technological readiness, competitive pressure and trading partner challenges are addressed in this modified framework. This has provided new impetus in to the whole understanding and nature of importance of TOE framework in cloud computing.

Wamba and Carter (2014) conducted a quantitative study to find out the social media adoption. The study was conducted to assess the impact of organizational, managerial and environmental characteristics of SME utilization of Facebook Page. The study was conducted with a survey of 453 SMEs. The study utilized hierarchical logistical regression. The study concluded that technology plays an important role in social media adoption and it has positive effects.

This framework has varied applications across various industries all over the world. This coordination of factors is essential for managerial business decision and management. All these theories provide better understanding of Technology its role and application in business situations. All these theories enhance value and provide better adaptability to various business challenges. With these knowledge repositories, knowledge enhancement is assured as it also ensures productivity and knowledge sharing and innovation.

2.11   Literature of Research Dimensions

This section delves into a comprehensive review and analysis of the key components that form the foundation of this study. This section is designed to provide an in-depth examination of the primary research dimensions, drawing from a wide array of scholarly works and empirical studies that contribute to our understanding of these concepts. By

exploring the literature associated with each dimension, it aim to establish a robust theoretical basis that informs the research methodology and guides the analysis of data. This section ensures that the research is grounded in well-established theories and findings, providing clarity and depth to the study's underlying assumptions and research questions.

2.11.1 Business Intelligence System Dimensions

- Data integration

In SMEs, data integration plays a crucial role in consolidating data from various sources such as sales, customer interactions, and supply chain operations, allowing for comprehensive analysis and better strategic decision-making. For example, an SME can integrate data from its CRM and ERP systems to get a holistic view of customer behavior and operational efficiency, aiding in targeted marketing and optimized resource allocation.

The capacity to convert various types of data into a format that the data analysis platform can read and analyze is known as "data integration capabilities" (Wang and Byrd, 2017).

Acquisition, translation, and storage—the three primary data integration functions in BDA systems—can make data uniform, transparent, easily available, and interoperable for analysis (Ledro et al., 2022). A high degree of data integration enables healthcare businesses to employ extract-transform-load (ELT) technologies to intelligently aggregate data, such as clinical data, billing/insurance data, pharmaceutical RandD data, and patient behavior data and gives users a thorough picture of these data (Wang et al., 2018b).

Hsu and Griese (2018) propose that healthcare organizations have centralized data put in independent virtual databases connecting all data silos for inspection by medical professionals as needed in order to make better use of healthcare data. Users should be able to track and collect data produced by devices worn by specific patients in real-time or very

close to it thanks to data integration powered by BDA systems. This will make it possible to gather location, event, and physiological data, as well as time stamps, from each patient using a device. As a result, data integration capabilities are seen as one of the most important BDA competencies in the healthcare industry since they assist healthcare services in value-adding ways.

- Analytical capabilities

Analytical capabilities in SMEs refer to the ability to analyze integrated data to uncover insights that can drive business growth and operational efficiency. For instance, SMEs can leverage analytics to identify sales trends, optimize inventory levels, and improve customer service, thereby enhancing their competitive edge in the market.

In order to fulfill the numerous demands of users and other stakeholders, analytical competence refers to the capacity to drive choices and actions via the wide use of data and a variety of analytical methodologies based on the specific mechanisms utilized for analytics (Ji and Tia, 2022). The use of analytical tools that can assist fundamental clinical operations and procedures is crucial in healthcare as a way to improve care quality (Elbashir et al., 2022).

Users of healthcare analytical systems may extract patterns of treatment and relationships from vast databases of medical information, giving them a broader perspective for evidence-based clinical practice. Such analysis can enable a better balance between capacity and cost by revealing previously undetected patient trends associated with hospital readmissions. For instance, data analytic systems frequently employ the efficient analytical method known as descriptive analytics (Carvalho et al., 2022). This approach gives users in a hospital environment the ability to comprehend prior patient behaviors and how these behaviors may affect outcomes based on the data recorded in their database. Most

significantly, being able to analyze patient preferences aids medical facilities in appreciating the value of taking part in clinical trials and in discovering new markets.

As a result, data analysis may improve the effectiveness of healthcare delivery, which is why it consider analytical skills as a crucial component of data analytic capabilities.

- Information content quality

In the context of SMEs, information content quality ensures that the data is accurate, relevant, and timely, which is vital for making informed business decisions. For instance, high-quality sales data allows SMEs to accurately forecast demand and adjust their production or service provision accordingly.

The maturity of the BIS is correlated with the quality of the information access and the information content. There is a learning curve that occurs when organizations first adopt systems until the BIS's quality improves (Binzafrah and Taleedi, 2022). When content problems are fixed to give users the information they require and accessibility problems are fixed as part of the maturity process, the BIS is improved. Information value to the user and if expectations were satisfied are two criteria for determining the quality of information material (Yablonsky, 2021).

The extent, accuracy, clarity, completeness, consistency, and comprehensiveness of the information are all examples of information content quality. The ease and timeliness with which information may be retrieved for use in the decision-making process are what is meant by the term "information access quality" (Yablonsky, 2021). This involves determining if the information's degree of processing and speed of delivery satiated the user's requirements. This study model has also based on Huber's (1990) conceptual framework, which illustrated the pathways leading from the availability of modern information technologies to their application.

Talaoui and Kohtamäki (2021) information quality framework serves as the theoretical framework for this study and provides the foundation for both information content quality and information access quality. Information quality is determined by relevant information, sound information, an optimized procedure, and dependable infrastructure (Stylos et al., 2021). Information content quality for this study combined reliable and pertinent information. Information access quality was created by combining a dependable infrastructure and an optimized procedure.

Information Access Quality: This dimension ensures that the right people in the SME have access to the necessary information at the right time. For example, granting sales teams access to real-time inventory data can improve their ability to commit to customer requests and manage expectations effectively.

- Use of information in business processes

The manager's efforts toward using the information to minimize uncertainty, plan and build plans, respond to events, and make adjustments as a consequence of the information are all considered to be using the information in management decision-making (Nuseir, 2021). According to Huber's (1990) idea, new information might be created and reconfigured with a larger and more portable store capacity thanks to the impacts of enhanced information technology. Since BISs let users explore enormous amounts of information from a variety of angles without requiring sophisticated programming knowledge, they may be regarded as advanced information technologies.

Huber (1990) asserted that managers would have more alternatives in the decision-making process if modern information technology were applied, resulting in decisions of higher quality (S. Li et al., 2021). DeLone and McLean's (2003) model for information system success also synthesized earlier research studies and demonstrated how system

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quality and information quality influenced system utilization and user satisfaction, which in turn produced net advantages for the organization.

This dimension involves leveraging Business Intelligence (BI) to improve decision-making across various business functions within an SME. By utilizing BI insights, SMEs can streamline their supply chains, optimize pricing strategies, and enhance customer engagement, leading to more efficient and effective business operations

- Analytical decision-making culture

In order for an organisation to use analytics to produce economic value, organisational culture is crucial (Köseoglu et al., 2021). Organizational culture is referred to as a set of shared values, beliefs, conventions, and principles that define proper behaviour in a variety of contexts and serve as a framework for organisational behaviour (Han et al., 2021). According to numerous studies, organisational culture is a significant barrier to the widespread application of fact-based decision-making (Falcão et al., 2021); changing an organization's decision-making process from intuitive thinking and personal experience to "the facts," facilitated by data analytic, is a difficult task (Cavallo et al., 2021).

This idea is described as an information-oriented culture by (Yiu et al., 2020), where corporate leaders have a keen awareness of information and information management when they make choices or develop business strategies.

A data-driven culture, as defined by Wamba-Taguimdje et al. (2020), refers to "a pattern of behaviors and practices by a group of individuals who believe that possessing, interpreting, and applying specific types of data and information is essential for their organization's success" (Suša Vugec et al., 2020). Research suggests that an enterprise's core business processes should form the basis of an evidence-based decision-making culture, as this type of culture encourages companies to measure, test, and analyze quantitative data (Rane et al., 2020).

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According to Nyanga et al. (2020), the quality of information provided by business intelligence systems can be positively influenced by an organization's analytical decision-making culture. Lim and Teoh (2020) suggest that building an evidence-based decision-making culture within an organization should ensure that all decision-makers use performance metrics from a single, reliable source, receive near-real-time feedback, articulate and update business rules as needed, and regularly receive high-quality coaching. In healthcare, organizations that combine real-time data with an evidence-based decision-making culture will be better equipped to make accurate diagnoses, improve treatment decisions, and provide more reliable patient care.

Fostering an analytical decision-making culture means making decisions based on data-driven insights rather than intuition. For SMEs, this involves training employees to use BI tools and interpret data effectively. It also encourages data-informed discussions and decisions at all levels of the organization, ensuring that the company consistently applies insights to achieve better outcomes.

2.11.2 Knowledge Sharing Dimensions

- Knowledge donating and knowledge collecting

The management literature includes extensive discussions on the concept of knowledge sharing, which is a critical step in knowledge management before the knowledge is utilized. Knowledge sharing is considered a behavior whether a process or activity through which individuals exchange information, skills, and expertise (Mirzaee and Ghaffari, 2018). Within organizations, this exchange involves both implicit and explicit knowledge, fostering the creation of new knowledge, expanding organizational knowledge, and benefiting the organization as a whole. Specifically, knowledge sharing enhances individual creativity

(Kim and Park, 2017) and drives innovation at the organizational level (Michna, 2018; Pittino et al., 2018).

Knowledge donation and knowledge collection are two distinct active processes (or actions) in knowledge sharing. Knowledge donation (disseminating or bringing) is the act of imparting one's own intellectual capital to others, whereas knowledge collection (gaining or getting) refers to asking others for their intellectual capital in order to acquire what they know (Eriksson et al., 2020).

It's important to distinguish between attitudes and actions related to information sharing. While behaviors are often seen as the outward manifestations of attitudes, information-sharing practices are heavily influenced by one's attitude or willingness to share knowledge (Carson et al., 2020). Willingness reflects a person's eagerness to make their intellectual resources available to others. Those who are open to sharing their expertise are typically motivated by the group's best interests and the expectation of reciprocity, where they anticipate that others will do the same. Calof (2020) differentiates between willingness and eagerness to share, with the latter defined as a strong internal motivation to offer expertise without expecting compensation. Individuals who are motivated to share are often driven by the advantages of peer recognition and an enhanced reputation (Ahmadi et al., 2020).

What factors influence both knowledge donating and knowledge collecting? This is a crucial question for firms, as knowledge sharing has the potential to enhance company performance (Ratia et al., 2019). These factors can be personal, institutional, or technical in nature (Razmerita et al., 2016). In general, information and communication technology (ICT) plays a direct or indirect role in facilitating the exchange of knowledge (Mirzaee and Ghaffari, 2018). Knowledge sharing is also supported by an appropriate organizational climate and culture (Priporas, 2019), which includes a supportive

management environment (Z. Li et al., 2019), effective incentive programs (Hellström and Ramberg, 2019), and employees' affective commitment to the company (Hermawati et al., 2019).

2.11.3 SMEs Innovation Dimensions

The section on SMEs innovation dimensions should provide a detailed examination of the various aspects that constitute innovation within small and medium-sized enterprises. Innovation in SMEs is multifaceted, encompassing product innovation, process innovation, marketing innovation, and organizational innovation. Each of these dimensions contributes uniquely to the SMEs' overall innovative capability and competitive edge.

Product innovation refers to the development of new products or significant improvements in the technical specifications, components, or materials of existing products. This dimension is crucial for SMEs as it directly contributes to their market differentiation and ability to meet customer needs effectively.

Process innovation involves the implementation of new or significantly improved production or delivery methods. This can include changes in techniques, equipment, or software, aimed at improving efficiency, reducing costs, or enhancing quality.

Marketing innovation covers the development of new marketing strategies that involve significant changes in product design or packaging, product placement, product promotion, or pricing. For SMEs, this can be a key driver in opening new markets or increasing market share in existing ones.

Organizational innovation involves introducing new organizational methods in the business practices, workplace organization, or external relations of the enterprise. This dimension is vital for SMEs as it can enhance their ability to adapt and respond to market changes and internal challenges.

In the context of this study, it's crucial to differentiate between SMEs' innovation and innovative work behavior (IWB), as they are distinct constructs. While SMEs' innovation focuses on the enterprise's outputs and processes, IWB refers to the individual employees' behaviors that contribute to the organization's innovation. Hence, IWB should be discussed as a separate dependent variable, not as a dimension of SMEs' innovation.

2.11.4 Innovative Work Behavior Dimensions

Individual innovation drives organizational innovation (Hughes et al., 2018; Spanuth and Wald, 2017). As a result, creative work behavior is highly valued as a key factor in corporate success (Chung, 2019). Ratia et al. (2018) define innovative work behaviors as the intentional development and implementation of new concepts or innovations such as new services or processes in the workplace, with the goal of enhancing the performance of individuals, groups, or the organization as a whole. This definition connects innovative work behavior to other related concepts in the literature, such as employee creativity, innovative job performance, and on-the-job innovation (Spanuth and Wald, 2017). Innovative work behavior is a complex construct that encompasses various actions, including idea generation, promotion, and execution (Spanuth and Wald, 2017). Consequently, innovative work behavior is considered a one-dimensional (Michailova and Ott, 2018), two-dimensional (Upadhyay et al., 2023), or even four-dimensional construct (Spanuth and Wald, 2017).

The two elements of IWB that are the subject of this study are idea creation and idea realisation. The process of coming up with new, innovative ways and answers to issues,

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including fresh working methods and procedures, is known as idea generation. Idea realisation is the process of putting new concepts into practice inside an organisation by way of new goods or procedures. According to (Shiau et al., 2023), the difference between idea genesis and concept manifestation has a different origin. Idea creation is more influenced by personal traits (such as inventiveness, self-assurance, understanding of one's profession, and job needs) than by group and organisational traits. Idea realisation, on the other hand, has an impact on other staff members as a social process. The other's acceptance, involvement, and support are necessary for it to succeed. Simple inventions are often brought by lone workers, while more sophisticated breakthroughs require collaboration as well as a variety of knowledge inputs and competencies (Qaffas et al., 2023). Most people agree that idea creation comes after concept realisation in the multi-stage process of innovation (Spanuth and Wald, 2017).

Innovative work behavior (IWB) is typically considered at the individual or group level within an organization and involves behaviors where employees introduce new ideas, products, processes, or procedures. This personal initiative can indeed lead to organizational innovation, where the cumulative effect of individual innovations contributes to broader, organization-wide changes.

2.12 Conceptual Framework

The opportunity to share knowledge is fostered by an appropriate workload and an open climate (Afsar et al., 2021). These factors are also crucial for employees to engage in innovation. Research shows that a high workload limits employees' ability to innovate, particularly in generating new ideas (Azevedo and Shane, 2019; Popovič et al., 2019). Since innovation requires the recombination and translation of complex, often tacit, knowledge, employees need time to develop new ideas and manage their implementation within the

organization. Additionally, high workloads create stress (Božič and Dimovski, 2019b), and as Ain et al. (2019) note, employees may transition from "mindful work," which enhances creativity, to "relentlessly mindful work," which can actually diminish it (p. 472).

High workloads also create environments that discourage empdiminishbehaviors, which are critical for innovation. In contrast, research highlights that innovation thrives in work environments where extra-role initiatives are not just tolerated but actively supported (Akram et al., 2020). Employees in open and proactive climates are more likely to engage in innovative work behaviors (IWBs) because they reflect more on the quality of their knowledge, are more aware of external opportunities, and feel safer experimenting with new ideas. This supportive environment leads to better innovative work behavior, as illustrated in Figure 2.3.
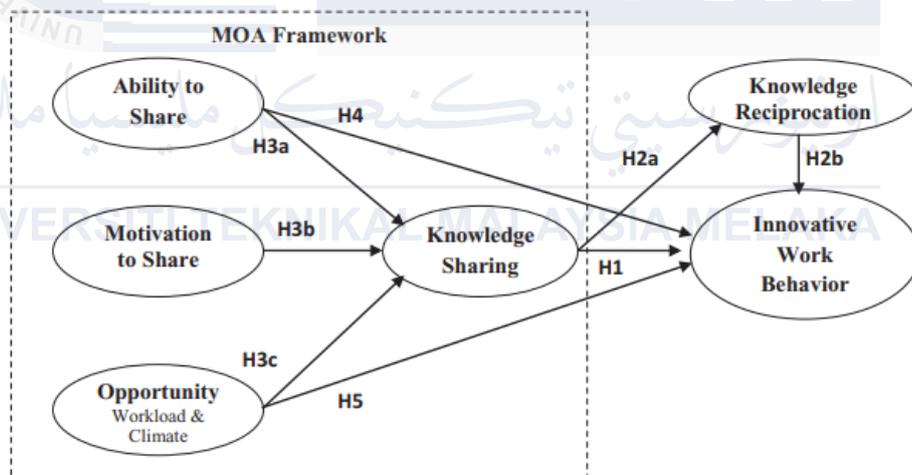
Figure 2.3: Knowledge sharing and innovative work behavior model
Source: (Radaelli et al., 2014)

Business Intelligence System (BIS) capabilities play a strategic role for firms, with decision-making considered a critical success factor in strategic management. Over the past decades, various prominent theories, frameworks, and models have shaped the field of technology adoption. These include the Technology Acceptance Model (Davis, 1989; Davis

et al., 1989), the Theory of Planned Behavior (Ajzen, 1991), the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003), Diffusion of Innovations (DOI) (Rogers, 1995), and the Technology-Organization-Environment (TOE) framework (Tornatzky and Fleischer, 1990). Among these, only the DOI theory and TOE framework are recognized as the most influential models for technology adoption at the firm level (Oliveira and Martins, 2011). As such, they are frequently used as theoretical foundations for other firm-level studies and theories (Chong et al., 2009). To gain a comprehensive understanding of the technology adoption environment, it is important to combine various adoption models and relevant concepts (Oliveira and Martins, 2011).

Deriving from the TOE framework and developed in the setting of IT adoption in SMEs, the Iacovou et al. (1995) model represents a good example of upgrading a prominent theoretical foundation for the purpose of a specific research context. The TOE framework encompasses three contexts that influence a firm's adoption of innovation: technology, organization, and environment (Feldman et al., 2016; Tornatzky and Fleischer, 1990). The technology context consists of the availability and characteristics of technology. It refers to all technologies relevant to the firm (internal or external). Next, the organization context denotes the firm's characteristics, such as formal and informal linking structures, communication processes, size, and slack. Finally, the environment context relates to the opportunities for and limitations of innovations, including the industry characteristics and market structure, technology support infrastructure, government regulation, and other actors' endeavors that may have an influence on the adoption (Tornatzky and Fleischer, 1990; Ahmadi et al., 2017; Lin, 2014).

The TOE framework has been viewed as aligned with other explanations of innovation adoption rather than offering a competing explanation to them. Tension between the TOE framework and other theories has been seen as slight, and this tension has, at this

point, to be resolved by allowing the TOE framework to subsume competing ideas, rather than respond to them. For instance, it has been noted that the TOE framework is consistent with the theory of the DOI (Rogers, 1995).
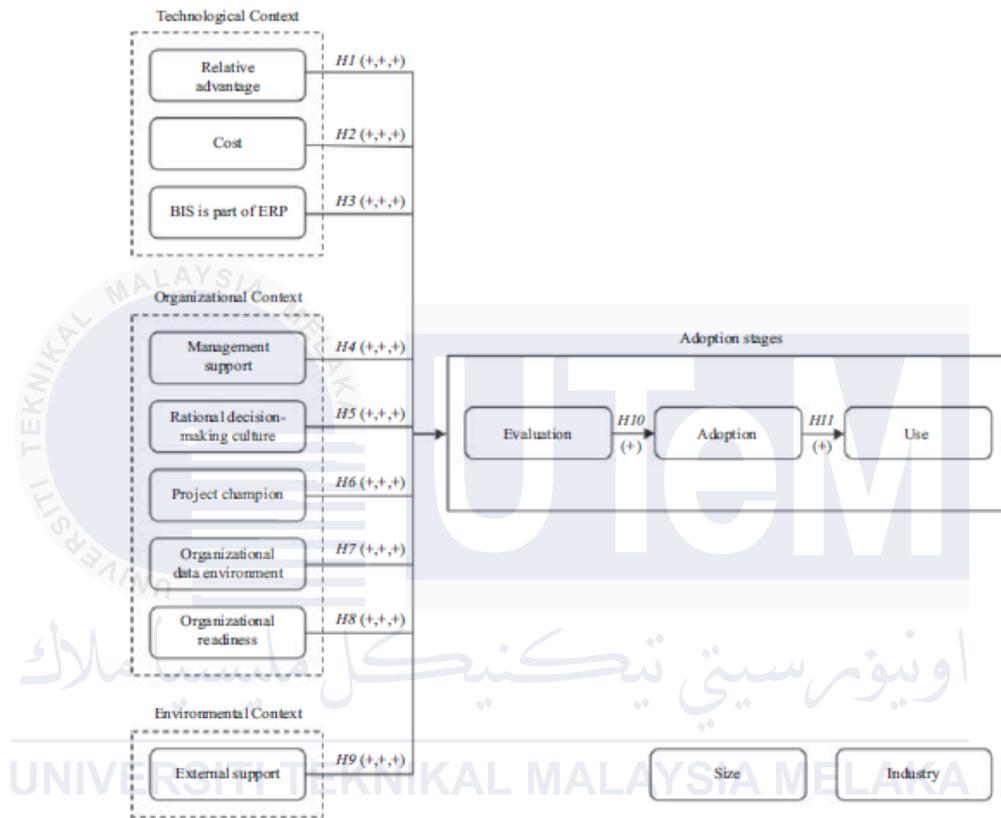
Figure 2.4: Business intelligence system adoption stages model
Source: (Puklavec et al., 2018)

According to Bandura (1995), "innovations demand heavy investment of effort over a long period with uncertain results" (p. 13). Hence, it is important to consider the implications of leadership on innovative work-behavior over multiple moments in time (Lorinkova et al., 2013; Lee A. et al., 2020). The demand for more sophisticated research designs becomes especially prominent in the light of the COVID-19 pandemic, as influences of leadership choices in response to the crisis (Stoker et al., 2019) are being unveiled at this very moment (Bajaba et al., 2021). The benefits of empowering leadership and directive leadership for employee performance may especially become clear in the long-term,

depending on the employees' growth in their competencies and responsibility (Lorinkova et al., 2013).

The direct relationship of empowering leadership with innovative work-behavior does not only stem from more autonomy, trust and involvement, but also from leaders who are sharing knowledge, meaningfulness and providing confidence in the employees' capabilities to be innovative in the light new work situation (Ahearne et al., 2005; Martin et al., 2013; Montani and Staglianò, 2021). These latter two attributes of empowering leadership might have been especially important for innovative work-behavior in the earlier phases of the COVID-19 pandemic when employees might have been more unsure how to respond to the new work situation and rely more on their leaders' knowledge and support (Carnevale and Hatak, 2020).

However, as the COVID-19 measures were prolonged and intensified, employees experiencing empowering leadership may have become more self-confident and proactive (Coun et al., 2021) in adapting to the new way of working, as well as in their roles and responsibilities toward innovation (Lorinkova et al., 2013; Cheong et al., 2019). Consequently, while they may still perceive empowering leadership, they might increasingly rely less on their leaders for support in finding meaning in their work, especially as it relates to the (new) organizational direction (Ahearne et al., 2005). This shift may result in more independent displays of innovative work behavior compared to the earlier phases of the pandemic.

At the same time, the indirect relationship between empowering leadership and innovative work-behavior via work-related flow may have become stronger as employees have grown more competent and confident with taking responsibilities in the light of new strategic goals, perhaps as a result of longer exposure to empowering leadership while working from home (Lorinkova et al., 2013; Cheong et al., 2019). In a similar vein,

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employees that experience empowering leadership in the second phase of the COVID-pandemic may also have had the time to shape their role to better fit with their intrinsic motivation, enhancing their work-related flow (Bakker and Van Woerkom, 2017). This may imply that they will feel more able and motivated to take the opportunity to pursue challenges, such as displaying innovative work-behavior (Scott and Bruce, 1994; Bandura, 1995).
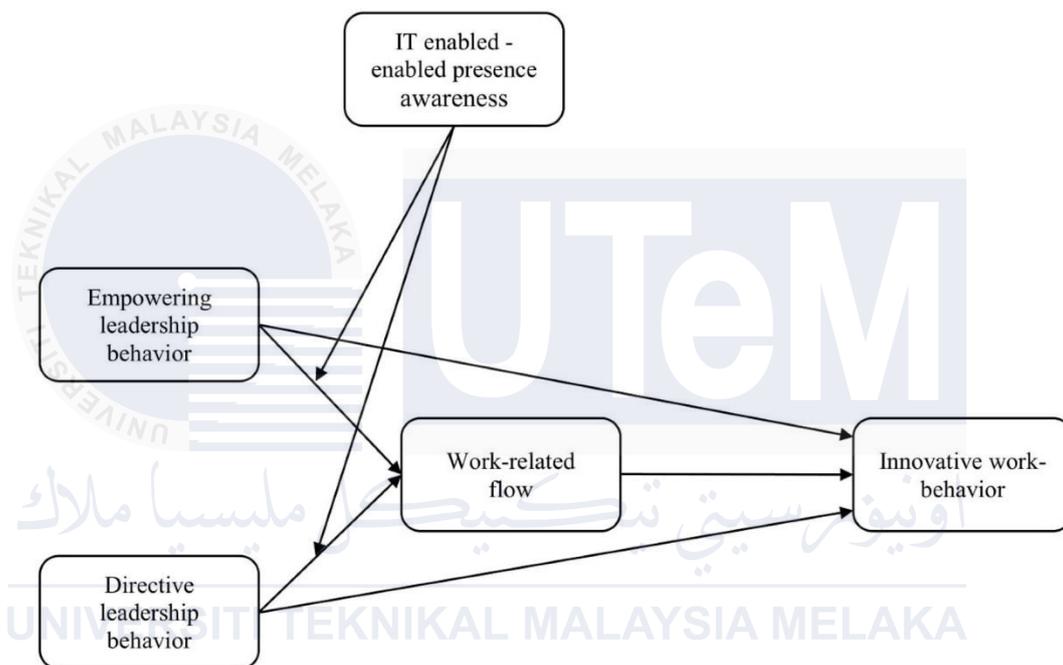
Figure 2.5: IT enabled leadership and innovative work behavior model

Source: (Coun et al., 2021)

Employee innovation in the workplace is a foundation of any high-performance organization (Javed et al., 2019). This is apparent as the base of a knowledge economy where intangible assets are commodities that play an ever more significant role in the organization, such as abilities to enhance competitiveness by "doing more with less" (Khan et al., 2020). Innovative behavior can be defined as "intentional generation, promotion, and realization of new ideas within a work role, group, or organization" (Božič and Dimovski, 2019a). Organizations realized the importance of employees' creativity as an intangible asset that provides the best ideas to remain competitive, regardless of task responsibility or level in the

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organizational hierarchy. Employees view firsthand opportunities for change and improvements in the work process and procedures because they directly interact with customers. Thus, innovative employee behavior and the process that motivates such behavior is an area of critical importance in our field (Caseiro and Coelho, 2019).

However, although many types of research have been conducted on innovative behavior, there is a paucity of studies focusing on understanding the process that leads to it, while the current study fills this gap. Riaz et al. (2018) emphasized thriving at work and organizational support for innovation. Second, explain the relationship between thriving and innovative behavior. Finally, highlight the important role of thriving in the promotion of innovative behavior considering contextual and social influences of the organization. The conceptual model represented by Riaz et al. (2018) in Figure 2.6.
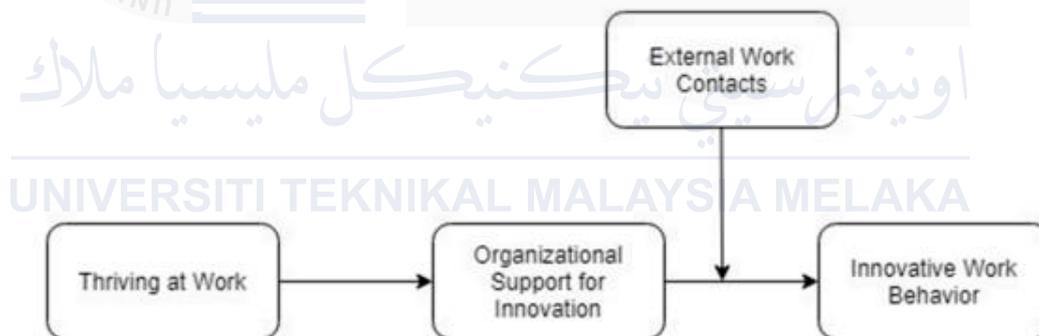
Figure 2.6: Organizational innovation and innovative work behavior model

Source: (Riaz et al., 2018)

Innovative work behavior refers to "the intentionally conducted initiation and application of new ideas, processes, and procedures within working roles, groups, and organizations" (Wu and Wu, 2019). It includes idea generation, idea promotion and idea realization. Individual innovation begins with generating a novel, practical, and useful idea, after which the idea is promoted to obtain support and sponsorship. Building coalitions is an

important stage of the process of innovation as it helps people find supporters that provide the resources and capabilities essential to idea promotion. Finally, the idea is represented by a model or prototype that can be applied in the daily work activities of individuals or those of entire unitsof an organization (Lecat et al., 2018).

Cultural intelligence reflects an individual's knowledge of norms, practices, and traditions from other cultures, contributing to a deeper understanding of the differences and similarities between their own culture and others (Arain et al., 2020). It represents a person's interest in comprehending specific cultural traits and their ability to adapt to verbal and nonverbal behaviors from different cultures. Cultural intelligence raises awareness of cultural differences, offering individuals new perspectives, ideas, concepts, and frameworks (Asurakkody and Shin, 2018), which enhances their creative potential and capacity for innovation. It also builds confidence in interacting with people from diverse cultural backgrounds, fostering high-quality relationships with peers, supervisors, and experts. Through these interactions, individuals gain fresh perspectives and generate better ideas, leading to improved innovative work behavior, as illustrated in Figure 2.5.

When employees have high cultural intelligence, they are less likely to engage in social categorization (Asurakkody and Shin, 2018). This reduction enhances social exchanges between culturally diverse colleagues, stimulating individual creativity. Innovative behavior is not merely a product of isolated personal thinking but also emerges from social interactions (Puklavec et al., 2018). Frequent communication and interaction with others provide a broader perspective, drawing from more diverse information (Lee et al., 2019). This dynamic inspires employees to share knowledge, reach common understanding, and integrate both convergent and divergent thinking to propose novel and useful ideas. Cultural intelligence enables individuals to better understand how others think and behave, which is essential for building harmonious interpersonal relationships.
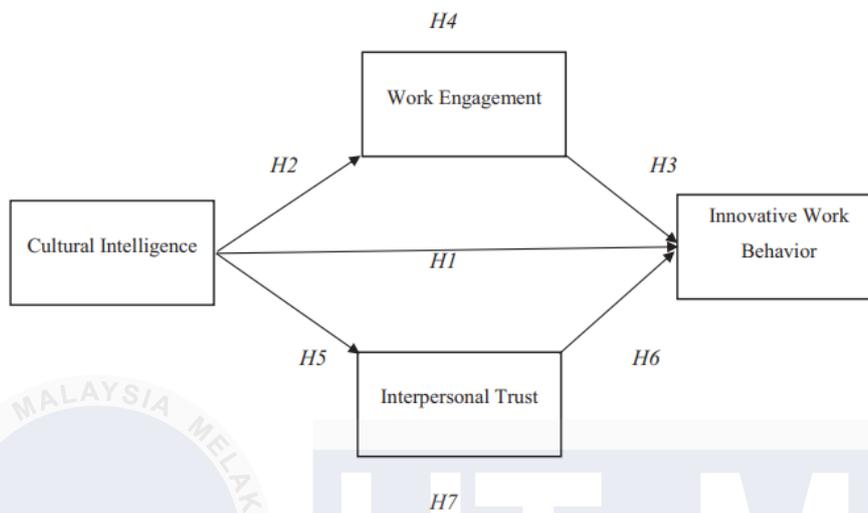
Figure 2.7: Cultural intelligence and innovative work behavior model

Source: (Afsar et al., 2021)

Based on the previous models discussed previously, BIS is considered as one of the most resources of the organization, which enable the management to gain higher level of innovation. This is attributed to the advantages provided by the BIS, which provides useful reports of intra-industry comprehensiveness, inter-industry analysis reports, BIS formality, and perceived usefulness. These factors improve the business and market information that based the management decision making, which in return, contributes to improve the overall innovation of the firm. Hence, this interrelationship illustrated in figure 2.8, which represents the conceptual framework of this study.

Based on theoretical background, the research model is developed (see Figure 2.8). As it is observed, BIS as an independent variable, knowledge sharing and SMEs innovation as mediating variables, and IWB as dependent variable are considered in this framework. Hence, it would lead to generate higher level of innovative work behavior.
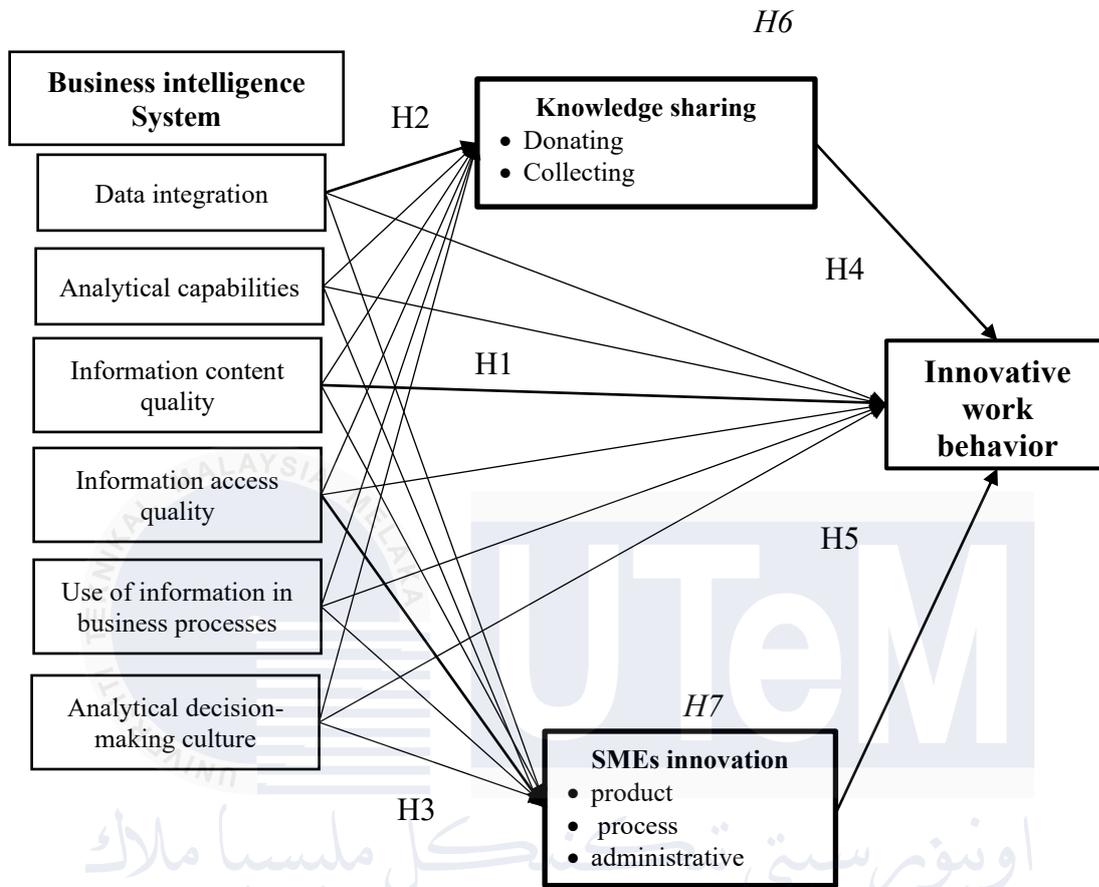
Figure 2.8: Research Framework for this Study

2.13 Research Hypotheses

2.13.1 Business Intelligence System, Knowledge Sharing, SMEs Innovation, and Innovative Work Behaviour

Business intelligence system (BIS) as a new approach in SMEs architecture is defined based on the speed in information analysis to take accurate and intelligent business decisions in the minimum possible time that includes a collection of functional and analytical programs. Referring to operational and analytical databases, BIS deals with decision making for intelligent business activities (Eidizadeh et al, 2017). BIS is a business framework, including different processes, instruments, and technologies that is designed to move from

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data to information and from information to knowledge and adds value to the organisation. Using the obtained knowledge, organizations' managers can make better decisions and do business activities more efficiently with the aid of designing practical plans for the organisation (Kulkov, 2023). The real value of business intelligence system is when one can easily manage SMEs processes and apply new business rules by the decisions drawn from the results of business intelligence. This will be simply possible through business process management system (Hoang and Bui, 2023).

According to Eidizadeh et al. (2017), business intelligence systems (BIS) positively impact knowledge improvement. An effective BIS enhances and promotes knowledge sharing while refining the mental models of decision-makers. BIS goes beyond merely sharing policies or databases; it also involves leveraging employees' expertise and facilitating knowledge exchange. Hamidinava et al. (2023) argue that BIS serves as an effective enabler of knowledge sharing within organizations. Furthermore, BIS has several positive effects on SMEs (Eidizadeh et al., 2017). It helps firms store, analyze, and retrieve large amounts of information, including insights about competitors, customers, and new technologies, which can be used to develop new products or improve processes. As a result, BIS significantly contributes to increasing innovation within the firm.

Although in the strategic management literature has been emphasized on the concept of business intelligence system as a critical competitive tool. However, the effect of business intelligence system on the firms' IWB has not been well researched (Deb et al., 2023). BIS is very useful in gaining information about competitive environment especially in market forces, public policy, new technology and competitors, and valuable to predict the future environment in which a company will operate (Eidizadeh et al, 2017). Business intelligence system allow companies to build specific skills among workers to promote many facets of innovation and, as a result, establish and sustain Innovative work behaviors. This theoretical

discussion and debate, along with the cur-rent empirical proof, leads to the three hypotheses, therefore, would be:

H1. Business intelligence system affect innovative work behavior

H1a: Data integration affect innovative work behavior significantly

H1b: Analytical capabilities affect innovative work behavior significantly

H1c: Information content quality affect innovative work behavior significantly

H1d: Information access quality affect innovative work behavior significantly

H1e: Use of information in business processes affect innovative work behavior significantly

H1f: Analytical decision-making culture affect innovative work behavior significantly

H2. Business intelligence system affect knowledge sharing

H2a: Data integration affect knowledge sharing significantly

H2b: Analytical capabilities affect knowledge sharing significantly

H2c: Information content quality affect knowledge sharing significantly

H2d: Information access quality affect knowledge sharing significantly

H2e: Use of information in business processes affect knowledge sharing significantly

H2f: Analytical decision-making culture affect knowledge sharing significantly

H3. Business intelligence system affect SMEs innovation.

H3a: Data integration affect SMEs innovation significantly

H3b: Analytical capabilities affect SMEs innovation significantly

H3c: Information content quality affect SMEs innovation significantly

H3d: Information access quality affect SMEs innovation significantly

H3e: Use of information in business processes affect SMEs innovation significantly

H3f: Analytical decision-making culture affect SMEs innovation significantly

2.13.2 Knowledge Sharing and Innovative Work Behavior

One of the chief and common processes in different structures introduced for knowledge management is knowledge sharing (Kmieciak, 2021). Knowledge sharing as a complex but value adding activity in knowledge management is the fundamental of many SMEs strategies (Zhao et al., 2020). One of the main objectives of managers in using knowledge management in SMEs is improving knowledge sharing among individuals within the organisation. Efficient knowledge sharing among organization's members leads to the reduction of costs in knowledge production and is a guarantee for the sharing of best working practices within the organisation and makes the organisation able to solve its problems. Sharing knowledge means the exchange and transfer of experience within several SMEs units.

The literature review confirms that knowledge sharing is an important process influencing the improvement of innovativeness both at the organizational level (cf. Michna, 2018; Zhao et al., 2020) and at the individual level (cf. Anseret al., 2020; Kim and Park, 2017; Kmieciak, 2021; Rao Jada et al., 2019). This importance is due to the fact that knowledge plays an important role in creating innovation. Expert knowledge, including knowledge about past solutions and events, can be the basis and inspiration for new solutions. By sharing knowledge with colleagues, the knowledge base of other employees is increased and the chance for the emergence of innovative ideas increases. As noted by Radaelli et al. (2014), "idea generation is a process of knowledge creation that requires recombining internal and external knowledge into new forms"(p. 401). The implementation of ideas cannot usually be accomplished by a single person, but requires cooperation and the knowledge, skills and perspectives of various employees, resulting in a synergy effect (Rao Jada et al., 2019). The ability to accumulate knowledge is important for creating new solutions. For example, the knowledge about clients and their needs gathered by the marketing department is passed to the research and development department, where, in

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addition to technical knowledge, it is the basis for the development of new products. From the point of view of cognitive psychology, the effective absorption of new knowledge requires its cognitive restructuring or elaboration by the learner (Michna, 2018). Sharing knowledge triggers these processes, because the recipient of the knowledge has to connect and integrate the new knowledge with his or her current knowledge. As a result, knowledge sharing can cause reflection on current knowledge, its verification, and its reinterpretation. As Zhao et al. (2020) claimed, the knowledge recombination and re-elaboration embedded in knowledge sharing stimulate idea generation and application. Research conducted in Poland among team members confirmed that tacit knowledge sharing has a positive influence on team creativity (Kucharska and Kowalczyk, 2018). Knowledge sharing can also benefit the innovative behavior of knowledge receivers.

The recipient collects knowledge gained by other people, including their experience and proven and useful solutions and practices. Through the learning process, the recipient of the knowledge combines the knowledge gained from others with his or her own knowledge, which leads to the reinterpretation of the knowledge, updates and even the questioning and rejection of obsolete knowledge. Consequently, the acquired knowledge stimulates the creativity and innovative behavior of the recipient of the knowledge (Caruso et al., 2023). Research conducted among managers and staff of 148 retail units in China showed that the highest level of employees' innovative behavior was achieved when there was a balance between knowledge outflow from the business unit and knowledge inflow into the business unit (Lai et al., 2016). These considerations lead to the following hypotheses:

H4. Knowledge sharing affects innovative work behavior significantlly.

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2.13.3 SMEs Innovation and Innovative Work Behavior

To sustain innovation, SMEs are encouraged to build a strong foundation for innovation, which may involve changes to the organization's operations to foster an appropriate culture and guide SMEs through periods of change. An innovation-driven environment within SMEs can encourage employees to maintain a high quality of work, promoting the development of new products and processes (Eidizadeh et al., 2017). Additionally, fostering innovation emphasizes the importance of empowering employees and encouraging them to be creative, developing skills that result in new goods and services. It is not surprising that today, innovation is regarded as a key factor in sustaining organizational competitiveness (Arora and Sharma, 2023). As a result, many scholars view innovation as the foundation of today's competitive economy. Several experts argue that only those SMEs that focus on innovation by cultivating innovative work behavior can achieve long-term success (Eidizadeh et al., 2017). According to Tsuchimoto and Kajikawa (2022), one key source of innovative work behavior is innovation itself. Therefore, the following hypothesis is proposed.

H5. SMEs innovation affects innovative work behavior significantlly.

2.13.4 Mediation Effect of Knowledge Sharing and SMEs Innovation

Business Intelligence (BI) systems help organizations create, capture, and share essential knowledge (Nobari et al., 2022). Additionally, they enable organizations to gain insights about competitors, customers, and new technologies, fostering organizational innovation. Consequently, knowledge sharing (Eidizadeh et al., 2017) and innovation (Hill et al., 2015) can enhance SMEs' competitiveness. Therefore, the following hypothesis is proposed:

H6. Knowledge sharing act as mediator in the relationship between business intelligence system and innovative work behavior.

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H6a: Knowledge sharing mediates the relationship between data integration and innovative work behavior significantly

H6b: Knowledge sharing mediates the relationship between analytical capabilities and innovative work behavior significantly

H6c: Knowledge sharing mediates the relationship between information content quality and innovative work behavior significantly

H6d: Knowledge sharing mediates the relationship between information access quality and innovative work behavior significantly

H6e: Knowledge sharing mediates the relationship between use of information in business processes and innovative work behavior significantly

H6f: Knowledge sharing mediates the relationship between analytical decision-making culture and innovative work behavior significantly

H7. SMEs innovation act as mediator in the relationship between business intelligence system and innovative work behavior.

H7a: SMEs innovation mediates the relationship between data integration and innovative work behavior significantly

H7b: SMEs innovation mediates the relationship between analytical capabilities and innovative work behavior significantly

H7c: SMEs innovation mediates the relationship between information content quality and innovative work behavior significantly

H7d: SMEs innovation mediates the relationship between information access quality and innovative work behavior significantly

H7e: SMEs innovation mediates the relationship between use of information in business processes and innovative work behavior significantly

H7f: SMEs innovation mediates the relationship between analytical decision-making culture and innovative work behavior significantly

Finally, Economic diversification and long-term growth are anticipated to be pushed forward in the United Arab Emirates by small and medium-sized enterprises (SMEs). Meanwhile, the United Arab Emirates has established one of the most competitive SME ecosystems in the world. According to the research findings, the United Arab Emirates is developing as a country with explicit knowledge of innovation and a favourable attitude toward it. The GE Global Innovation Barometer is the first of its kind. According to the World Bank, the United Arab Emirates is one of the nations whose revenues and profits produced by collaborative innovation activities have grown in the last few years. Nine out of ten jobs come from small and medium-sized enterprises (SMEs) in the UAE. Boosting entrepreneurship and the private sector is now a strategic step for the UAE economy (Mohammad Shafiee, 2022). The UAE has high levels of youth unemployment. Business intelligence system (BIS) is an efficient and powerful instrument that increases organisations' competitiveness and knowledge sharing and innovation. BIS is used for reporting, online analysis, processing and management, data mining and business knowledge sharing and innovation management in business situations.

The World Economic Forum says companies depend on it to accomplish continuous process improvement. BIS is often referred to as a 'lifetime' for its length and complexity. Business intelligence system (BIS) is essential for supporting decision-making inside and outside of business processes. Many organisations underestimate the potential of BIS to help them make more efficient decisions, says Ghaida.

Research shows that technologically innovative companies outperform their competitors in productivity. The framework clearly explains the connections and associations which are between technology, organization and environment. Researchers, academicians and professionals have examined the process of technological innovation (Ledro et al., 2022). The historical ways and means, stages of innovation and how these innovative factors enable the process as researched, analyzed, empirically proven by researchers, academics and professionals in different countries. Researchers found that technology plays an important role in social media adoption. A conceptual framework is a visual representation of what the research anticipates to discover throughout the study. It identifies the critical variables to the study and shows how they may be related to one another.

2.14 Summary

This section discusses the available literature in the second chapter of the study and is ideal for analysis. The previous work found in this chapter on small and medium-sized enterprises (SMEs) in the UAE, and meanings of the term for this study, a previous study on BIS, innovation, KM,. Besides, it includes evaluations of the hypotheses related to BIS activities and discusses the theoretical structure suggested for this research.

CHAPTER 3

RESEARCH METHODOLOGY

3.1   Introduction

This chapter explains the technique that was utilised throughout this study to achieve the research objectives in order to attain those aims. The research design used to examine the determinants of business intelligence system tools and data gathering is addressed in this chapter, which is followed by the sampling design method, sample size, research instrument development and analysis, among other things.

3.2 Research Union Model

The Research Onion Model is a layered framework that guides researchers through the research design process, ensuring coherence and alignment at each stage. Starting with philosophies, such as positivism or interpretivism, researchers establish their foundational worldview, influencing the approach to knowledge and understanding. Moving inward, they select an approach to theory development—either deductive (testing theory) or inductive (building theory from data).

The model then focuses on strategies like experiments, surveys, or case studies, each tailored to different research objectives. Researchers next make choices between mono-method, multi-method, or mixed-methods, providing flexibility in data collection and analysis. The time horizon layer determines whether the study will be cross-sectional (at a single point in time) or longitudinal (over an extended period). Finally, the core layer involves specific techniques and procedures for data gathering and analysis, ensuring they

align with previous decisions. This structured approach helps researchers design studies systematically, fostering a clear, logical, and methodologically sound research process.
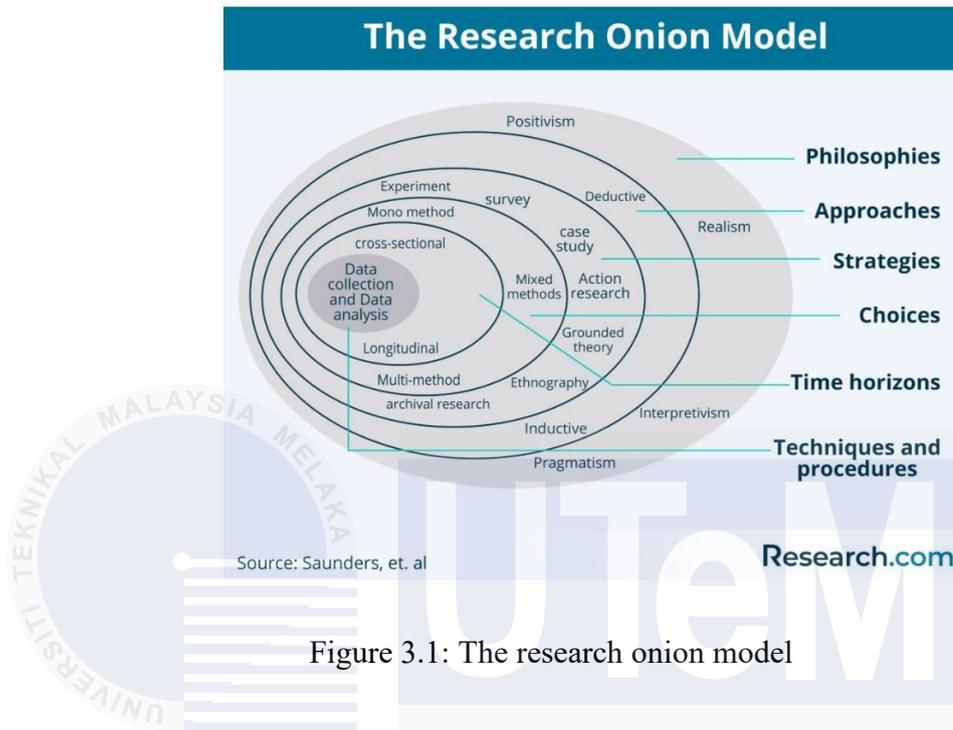
Figure 3.1: The research onion model

3.3   Research Paradigm

A research paradigm, according to Kuhn, is a collection of generally held beliefs and understandings about the problems that must be recognised and resolved that are communicated among researchers (1962). The epistemological, ontological, and methodological assumptions behind a research paradigm are discussed in detail below. Guba and Lincoln (1994) assert that ontology provides the foundation for reality, explaining what and how reality arises. The term "epistemology" refers to both the process of acquiring knowledge and the relationship between the researcher and the recognised item. By contrast, Zikmund (2003) said that methodology determines how and what will be examined throughout an inquiry.

According to Maxwell and Delaney(2017), the positivist paradigm was chosen for this quantitative study because it is based on numerical and quantifiable data gathered through survey sample size, which are more trustworthy and generalizable to other distinct

groups. As a result, the positivist paradigm lends itself well to the needs and character of this study among SMEs. The main goal of this study is to get a better knowledge of the variables that influence the use of business intelligence system technologies in pursuit of Business intelligence system and Innovative work behavior.

Additionally, it encompasses epistemology, which is concerned with elucidating various occurrences, such as how it know what it know and other related issues, in order to aid in their understanding. Additionally, it addresses axiology, the belief that what it believe to be true or to seem to be true is really false. When these methods are employed, all of these issues are seen as paradigms, phenomena, and representations, respectively. This paradigm choice has implications for the entire design and organisation of the research. These are the main paradigms that will be discussed in this part, and the most appropriate one for this study will be chosen.

According to Myers (2013), the bulk of previous information systems research has followed a positivist research paradigm, which is centred on testing hypotheses and gaining a better understanding of phenomena. (This paradigm maintains that the scientific method is capable of producing both truth and objective reality.) Quantitative researchers provide the concepts and ideas they employ to identify the variables of interest in combination with the study's application of those concepts and ideas. The issue statement, at its most basic level, specifies the variables that will be investigated, as well as their connection.

Kawulich and Chilisa (2015) show in their research that, since the study incorporates hypothesis testing based on existing literature, the positivist paradigm is recognised as the most relevant and acceptable paradigm for this investigation. This is because it creates a system in which the analysis's result is determined by the data gathered. This will be a survey study that will concentrate only on the data analysis results. The techniques that will be utilised are chosen with the objective of minimising unjustifiable biases and errors.

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The constructivist/interpretivist paradigm is defined as follows by Kawulich and Chilisa (2015): These two concepts revolve on the concept of seeing the world through the perspective of others. Interpretivist researchers believe that the object of study should mirror the researcher's premise in order to get a deeper understanding of human experiences. Numerous authors (Mertens, 2009; Kawulich and Chilisa, 2015) assert that the research problems inherent in this method may not be apparent at the outset but often emerge as the investigation progresses. Creswell (2003) notes that this type of research is subjective in nature, with most questions remaining open-ended. The fact-finding techniques employed are descriptive and non-directional, selected based on the research methodology, the characteristics of the respondents, and the subject under study. These resources often include visual aids such as interviews, personal and official documents, observations, photographs, drawings, artifacts, and informal conversations.

This paradigm is not optimal for this study since the research is objective, which contradicts the depiction of the paradigm. The variables and questions are derived from prior research and organisational structures. The transformational/emancipatory paradigm is characterised by critical social science research, participatory action research, and feminist perspectives, which all aim to emancipate and alter society. Therefore, paradigms are established patterns of ideas and behaviours that govern inquiry within a field by offering lenses, frameworks, and procedures for doing research (Weaver and Olson, 2006). A paradigm, as defined by Taylor et al. (2007), is a wide view or perspective on something. Additionally, Rossman and Rallis (2011) defined a paradigm as a commonly held view of reality. Indeed, these scholars have divided paradigms into four distinct categories: positivism, post-positivism, critical theory, and constructivism.

Lincoln and Guba (1985) argue that positivism requires social and natural sciences to lead to explanation and prediction using the hypothetic-deductive method, which should

be empirically clarified by remaining faithful to the vast amount of data collected. In general, positivism paradigms are related with quantitative research, which involves hypothesis testing (Rossman and Rallis, 2011). Similarly, Ponterotto (2005) explains that positivism's primary aim is to provide an explanation that enables prediction and control of events. The positivists accept the experimental technique, in which causal connections between variables are modelled through statistical analysis of quantitative data (Open Learn, 2015).

Out of annoyance with positivism, post positivism developed, advocating the perspective that life's circumstances are uncontrollable. It places a premium on theory falsification, in contrast to positivism, which is centred on theory verification (Lincoln et al, 2011). In essence, post positivism is used to test theory, as opposed to positivism, which creates theory (Williset et al, 2007).

Habermas (1978) pioneered the critical theory technique, which rationalises social science analysis by integrating historical reality with social prejudice and beliefs. His speculations encompass technological, practical, and emancipatory concerns. A technical interest is manipulating the physical environment in order to generate empirical and analytical knowledge. Additionally, practical interests are inextricably linked to situational meaning, which inspires hermeneutic and historical knowledge. On the other hand, emancipating interest is defined as development and progress that results in crucial knowledge.

On the other side, constructivism, also known as interpretivism, adheres to a relativist perspective that aspires to numerous, perceivable, and equally legitimate realities (Schwandt, 1994). Constructivism, intriguingly, asserts that individuals build their own understanding and knowledge of the universe via experience (Denzin and Lincoln, 2000). Additionally, the researcher and reality are inextricably linked, since global knowledge is made up of lived experiences. Additionally, the aim of truth or research is to reconcile experiences with

justifiable knowledge (Sandberg and Joolingen, 2004). By examining all of these techniques, it is possible to determine that positivism is the most appropriate and relevant research paradigm. Due to the fact that positivism paradigms are related with quantitative research, which requires hypothesis testing (Rossman and Rallis, 2011), this research focused only on the positivism paradigm.

3.4   Research Approach

To conduct quantitative analysis using the method described here, it is critical to use common questions as a tool and options for obligatory answers in the sample format questionnaire to answer questions from a community of respondents. According to Bogdan and Biklen (1998), the aim of quantitative research is to establish a link between the variables studied, observable statistical results, and the data research process. According to Hair et al. (2007), quantitative research techniques are more closely associated with descriptive research designs than with exploratory research methods. The term "research techniques" refers to a particular strategy and approach to a problem that must be thoroughly studied, analysed, and explored with great caution. It directs the investigation in the appropriate direction. When used throughout the research process, it imparts clarity and a feeling of purpose to the proceedings. The methodology section will describe the kind of research that will be conducted and the technique that will be used. All relevant information regarding the study, as well as the direction and technique to be used, would be clearly described.

Research may be conducted using a variety of techniques, including exploratory, conclusive, descriptive, or case studies; labouratory experiments; and before-and-after studies. There are many techniques for performing the investigation. This methodological precision guarantees that the whole research process is clear and accessible throughout. It contains information on the techniques and processes that will be utilised to accomplish the

study's objectives. Additionally, Karen Spens and Gyongyi Kovacs (2006) provide a detailed definition of the research process as a method that entails the successful use of empirical and scientific reasoning. It may be used in a variety of ways in order to solve a variety of problems and concerns that arise throughout the research process. All of these techniques, tactics, and processes would add to the efficacy of knowledge production and information management. Significant advances in the frontiers of knowledge generated via research are included throughout the process, enhancing the value of existing knowledge. Forest Grover (2015) addresses the scientific research process and technique, which includes a variety of ways for performing various types of investigations. In its purest form, research aims to improve and expand the body of knowledge in the field of study being conducted. He goes on to explain that scientific research is made up of three main components: Spens and Kovács (2006, p. 305) noted that there are two more ways for enhancing and retaining information.

By and large, a deductive approach is suitable for testing hypotheses derived from established ideas (Creswell, 2011). When a researcher wishes to comprehend a topic or phenomenon but is unsure of the variables to examine, he or she uses the deductive approach. Additionally, when established theories are unable to adequately describe the phenomenon and issue due to a lack of sufficient literature to build a theoretical model, a qualitative approach may be utilised. The quantitative approach focuses on the connections between variables rather than on their explanation. Researchers conduct quantitative studies mainly to gather data and analyse them statistically in order to understand the relationship between variables. As a result of the research's objective of determining the business intelligence system in the growth of the SME sector in the UAE, a deductive approach is utilised in this study. A few critical features must be discovered by the researcher when using a deductive approach. If a causal relationship exists between variables, the researcher should formulate

a hypothesis to test the relationship using a deductive approach. Instruments may be used to quantify these variables, and numerical data can be evaluated statistically. The final report will include an introduction, a review of the literature, a discussion of the theory, a method section, and a summary of the results (Creswell, 2008; Creswell, 2009). To test a hypothesis's particular relationship, quantitative data must be gathered to analyse the relationship, and then the conclusion may be generalised to the population by selecting a sufficiently large sample size that reflects the whole population (Saunders et al., 2009).

3.5 Research Strategy

3.5.1 Research Design Process

Research design refers to the overall strategy that integrates the various components of the study in a coherent and logical way, ensuring the research problem is effectively addressed. There are three primary kinds of research design: descriptive, exploratory, and experimental. The present study initially employs a descriptive design, which is suitable for systematically observing and documenting phenomena of interest using scientific methods, making it more reliable than casual observation (Bhattacherjee, 2012). A descriptive study is chosen to establish, characterize, and comprehend the features of the variables included in this study, facilitating systematic thought and suggesting avenues for future investigation (Sekaran and Bougie, 2013).

However, the study does not solely rely on a descriptive approach; it also incorporates a causal research design to investigate the relationships between variables. This approach is essential for testing hypotheses and understanding the cause-and-effect relationships between the independent and dependent variables (Sekaran and Bougie, 2013). By utilizing causal research, the study aims to identify not only the characteristics of the

variables but also how they interact and influence each other within the context of UAE SMEs.

The term "research design" in this context refers to the framework or structure of the study, specifying the research method, sampling methodology, sample size, measurement methods, and data analysis procedures (Emory and Cooper, 1991). The study's design aligns closely with its objectives, ensuring that the examination and unit of analysis are appropriate for addressing the research questions (Cavana et al., 2001; Neuman, 2011). As Easterby-Smith et al. (1991) highlight, aligning the research design with research objectives is critical when planning data collection to achieve the research goals effectively.

In this study, the quantitative research method is employed to gather primary data through a survey questionnaire. This approach is chosen because it allows for systematic investigation and statistical analysis of the relationships among variables, contributing to a deeper understanding of the study's hypotheses.

The research process began with defining the research problem, objectives, and questions, followed by developing research hypotheses based on the theoretical background. The study then selected a quantitative approach to collect primary data from SME stakeholders using a survey questionnaire, gathering data from 500 respondents, including SME business owners, senior management, shareholders, and managers. The collected data were analyzed using SPSS and SmartPLS programs, which facilitated a comprehensive analysis of the intricate relationships among the studied variables.

The initial phase of the research involved establishing the research problem, objectives, and questions. This foundation guided the development of research hypotheses, which were tested using a quantitative approach. The survey questionnaire was employed to gather data from a representative sample of the SME sector, ensuring the results are generalizable and relevant to the study's aims. The choice of SPSS and SmartPLS for data

analysis allowed for rigorous testing of the proposed hypotheses, providing insights into both the descriptive and causal relationships within the data.

This approach ensures that the research design is robust and well-suited to address the study's objectives, combining descriptive and causal research methods to provide a comprehensive understanding of the variables and their interactions within the context of UAE SMEs. The following figure 3.1 shows the flowchart of the current study.

```
┌─────────────────────────────────────────┐
│              Research design              │
└─────────────────────────────────────────┘
                     │
                     ▼
┌─────────────────────────────────────────────────────┐
│ Research Instrument                                   │
│                                                       │
│ **Sectio 1:** Respondent's profile                   │
│ **Sectio 2:** Data integration                       │
│ **Sectio 3:** Analytical capabilities                │
│ **Sectio 4:** Information content quality            │
│ **Sectio 5:** Information access quality             │
│ **Sectio 6:** Use of information in business processes│
│ **Sectio 7:** Analytical decision-making culture     │
│ **Sectio 8:** Knowledge Sharing Donating             │
│ **Sectio 9:** Knowledge Sharing Collecting           │
│ **Sectio 10:** Innovation Product                    │
│ **Sectio 11:** Innovation Process                    │
│ **Sectio 12:** Innovation Administrative             │
│ **Sectio 13:** Innovative work behavior              │
└─────────────────────────────────────────────────────┘
                     │
                     ▼
┌─────────────────────────────────────────────────────┐
│   -   Population:  SME business owners, senior        │
│       management, shareholders, and managers in       │
│                       UAE.                             │
│                                                       │
│       -   Samples Number: 500 sample.                 │
└─────────────────────────────────────────────────────┘
                     │
                     ▼
┌─────────────────────────────────────────────────────┐
│           -   Primary data source                     │
│       -   Technique: Random sample                    │
└─────────────────────────────────────────────────────┘
                     │
                     ▼
┌─────────────────────────────────────────────────────┐
│      Quantitative data analysis Interpretation        │
└─────────────────────────────────────────────────────┘
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Figure 3.2: Research design

3.5.2 Type of Data

A data source may be expressly primary or secondary, depending on the study topic under examination. Primary data is information that was collected during a researcher's first study and is not publicly accessible. It is firsthand information derived from the researcher's study (Kothari, 2004). Secondary data, on the other hand, is readily accessible in journals, newspapers, annual reports, and through internet searches. Primary data research techniques include interviews, questionnaires, focus groups, and observations (Sekaran and Bougie, 2016).

At the start of a research study, the researcher must carefully choose the kind of data that will be used in the study. According to Kothari (2004), researchers must first choose the method for data collecting before continuing to the next stage. Primary data may be considered the most appropriate technique for doing quantitative measurements and surveys (Sekaran, 2000; Kothari, 2004; Sekaran and Bougie, 2009). Indeed, this kind of data is referred to as raw data due to the fact that it is being gathered for the first time (Kothari, 2004). Additionally, by using primary data, the researcher is able to quantify all aspects, including subjective and objective means. Thus, primary data is used to quantify the phenomenon of selection criteria (Davis and Cosenza, 1988).

Given that this research used a deductive approach with quantitative analysis in addition to the survey method, primary data appeared to be the most suitable option for this research.The primary data collecting method is a self-administered survey questionnaire customised for this study.

3.5.3 Research Method

This section provides a brief explanation for the design of the current study. Business intelligence systems have progressed significantly in recent years, owing to advancements

in related disciplines and advances in the area. The method is critical in understanding the true research of a phenomenon. The research method is divided into two categories: quantitative and qualitative. The quantitative approach is based on positivism and is primarily concerned with experimental and non-experimental design methods such as surveys (Creswell, 2009). However, with a qualitative approach, data are gathered via in-depth interviews, group interviews, focus groups, and participant observation. Qualitative research employs five distinct kinds of methods: ethnography, grounded theory, case studies, phenomenological studies, and narrative studies (Creswell, 2009; Sekaran and Bougie, 2014).

Lo et al. (2020) describe research design as the study's blueprint that demonstrates how, when and where the data is collected and analyzed. The purpose of research design is to make sure the methods and techniques applied for the research process and data collection, effectively address the research objectives. Research design consists of study type (descriptive, non-experimental, experimental, review, correlational), reasoning approach (inductive or deductive), study grouping (panel, cross-sectional, cross-sequential, longitudinal, etc.), research objectives and hypotheses, data collection technique (qualitative or quantitative), data type (primary or secondary), statistical analysis strategy (Creswell and Creswell, 2017).

This study examines the inter-relationship between business intillegence system, knowledge sharing, SMEs innovation, and innovative work behaviour among the UAE SMEs. It also explores the possibility that knowledge sharing, SMEs innovation indirectly affects innovative work behaviour through the mediation role. Hence, the research approach for the current study is correlational, deductive, and quantitative. It is correlational as it investigates the relationship between business intillegence system, knowledge sharing, SMEs innovation, and innovative work behaviour. This also follows the deductive approach as the

proposed hypotheses of this study are derived from the relative theories that evoulationary theory, and TOE framework.

Quantitative research investigates the relationship between two or more variables through analyzing a set of numeric and measurable data. The benefit of this method is the data can be categorized, ranked based on a particular order, measured and demonstrated as graphs or tables (Appelbaum et al., 2018). Therefore, based on the explanation provided above, it is obvious that this study employs a quantitative approach since it encompasses all the mentioned characteristics of a quantitative research. The choice of quantitative research suitable for this study, as it relies on numerical data, which is suitable to be analysed by the quantitative choice. Based on Collis and Hussey (2013), a deductive research designs initiates with reviewing the literature and continues by developing the conceptual and theoretical structure that is tested by empirical observation. However, if the theory is developed from empirical observation, it would be considered an inductive study. Thus, it can be concluded that the current study is based on a deductive reasoning. Moreover, Saunders and Lewis (2012) state that the research is a methodology approach that investigates research questions that have not previously been studied in depth. Therefore, this study also an exploratory study, as this study stands on searching on the previous literature on what factors that lead to the project performance.

Bryant and Peck (2007) state that quantitative data will be collected through a survey questionnaire in order to test a set of hypotheses that will be used to produce conclusions about the effect of intelligence business tools and business intelligence systems on innovative work behavior. As a result, it is determined that a quantitative method is suitable for this study. Additionally, according to Kothari (2004), quantitative research results are often used to gather primary data for statistical analysis in order to accomplish the study's objectives.

As previously said, quantitative research's primary benefit is its efficiency, as it enables researchers to gather the whole questionnaire in a short period of time and participants to quickly explain the survey questionnaire (Sapsford, 2007). As a consequence, the researcher has the chance to explain the topic of the research, to encourage participants to give honest answers free of personal prejudice, and even to provide valuable insight into the subject. In contrast to other research methods such as personal interviews and focus groups, questionnaires are more methodologically sound and time-efficient in ensuring the primary data collection process is completed (Kothari, 2004). To sum up, quantitative research is used because it is straightforward, easy, and does not require a high degree of skill to gather data. As a result, this study's data will be more accurate and objective.

The quantitative method is mainly concerned with quantitative (numerical) data, while the qualitative method is concerned with qualitative data collected via qualitative designs (Dharmarathne, 2014). However, Boutellier et al. (2013) suggested that non-qualitative data such as beliefs and attitudes may be quantified via the use of the Likert scale, a measuring scale. In comparison to the qualitative method, quantitative research is more objective.

According to Sekaran and Bougie (2014), the causal relationship between variables should be described as a causal relationship rather than as cause or effect, with the cause being the independent variable and the direction of the effect (dependent variable) being either positive or negative. Additionally, the current study used a quantitative research method. Zikmund et al. (2010) said that quantitative researchers build a model based on current research and then test it via data collection. Thus, the theoretical foundation for the present study was developed via a review of the available literature. Following that, the data are examined to determine the associations between the variables using descriptive and

inferential statistics. Thus, the quantitative method is more suitable since this study involves testing hypotheses rather than developing a theory.

3.6   Sampling Design

In this study, the sampling design is crucial to obtaining relevant and reliable data from the target population, which consists of small and medium-sized enterprises (SMEs) in the UAE that utilize Business Intelligence Systems (BIS). Although generalization to the broader population of all SMEs in the UAE is not the primary goal, the study aims to provide deep insights and understanding of BIS usage within the selected SMEs. To achieve this, a non-probability judgmental sampling technique is employed, focusing on selecting SMEs that are actively engaging with BIS.

This approach allows the study to gather in-depth and meaningful data from respondents who have firsthand experience with BIS, ensuring that the findings are relevant and can inform on the specific dynamics of BIS impact on SME innovation and performance. By concentrating on SMEs with varying degrees of BIS adoption, the study seeks to uncover patterns, relationships, and impacts that are specific to this context, contributing valuable knowledge to the field.

3.6.1   Study Population

Understanding the study population is crucial for ensuring the validity of the research findings. The population for this study comprises SMEs in the UAE, specifically those actively utilizing Business Intelligence Systems (BIS). The classification of SMEswhether small or mediumis based on the UAE's standard definitions, considering factors such as the number of employees, annual revenue, and the nature of their business or industry. To provide a comprehensive understanding, the study will specify the sectors or

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industries these SMEs belong to, offering insights into how the nature of their business influences their use of BIS. Additionally, the study will examine the extent to which these SMEs utilize BIS, exploring whether the systems are employed uniformly or if variations exist in terms of usage intensity and application across different businesses. The focus on SMEs using BIS aims to determine how these systems impact various operational aspects, particularly innovative work behavior. By identifying SMEs that are active BIS users, the study seeks to uncover the key determinants of successful BIS integration in their business processes and how this integration fosters a culture of innovation within these enterprises.

3.6.2   Unit of Analysis

The unit of analysis in this study is centered on individuals within small and medium-sized enterprises (SMEs) in the UAE that actively engage with Business Intelligence Systems (BIS). This research specifically targets business owners, senior management, shareholders, and managers responsible for Innovative Work Behavior and Market Intelligence within these SMEs. By categorizing SMEs based on their size and industry type, the study aims to gain a deep understanding of BIS usage across various sectors and assess how this influences their innovative work behavior and decision-making processes, particularly in financial matters such as evaluating the comparative advantage of debt or equity. The inclusion criteria for participants focus on their involvement with BIS, ensuring the study's alignment with its core objectives to explore the relationship between BIS adoption and innovation in UAE's SME context. Consequently, individuals in these roles serve as the primary unit of analysis, as their insights and experiences provide valuable data on the extent and impact of BIS usage within their organizations.

3.6.3 Sampling Frame

The sampling frame is a set of items to which samples are explicitly taken from the population (Sekaran and Bougie, 2016). The sampling structures for this research include business owners, managers, and shareholders in SME sectors. The term "business owner" refers to a person who starts and operates a business with limited resources and exposure to business risks on a small scale. On the other hand, the Innovative work behavior Manager is the primary individual employed by the SME's owner to oversee and manage the financial position, investment activities, treasury, risk management, long-term financial plans, and planning by understanding all facets of the business in order to ensure the business's growth and profitability. This study suggests and demonstrates that SME business owners, senior management, shareholders, and managers of Innovative work behavior are actively involved in the decision-making process regarding their company's Business intelligence system and Innovative work behavior.

3.6.4 Sampling Technique

The sampling technique's nature is shown throughout the topic of test instrument construction. It relates to the initial target population, the research unit, the sampling design, the sampling frame and technique specified, as well as the sample size determined by the sampling method used. Purposeful sampling, also known as judgmental sampling, is defined by the gathering of data from certain groups (Tongco, 2007). The people that can offer the necessary information and contextual views in this study are SME business owners, senior management, shareholders, and managers of Innovative work behavior. Additionally, Bernard (2002) and Lewis and Sheppard (2006) said that purposeful samples are clearly defined based on their experience, firm size, management level of corporate Innovative work behavior, business industry, and financial awareness among the UAE SME population. As a

result, the sample characteristics and phenomena examined in this study are highly informed by the subjects' initial identification and selection.

Purposive sampling is used to guarantee that the population is more representative than random sampling by filtering out extraneous factors throughout the sample selection process (Ilker et al., 2016). Additionally, with an extensive study of business intelligence system tools among UAE SMEs, purposive sampling produces more accurate, less biassed, and relevant research results. In other words, since each individual's background of education, skill, knowledge, and experience is unique, simple random sampling is not feasible in this study. Purposive sampling was chosen since it is very effective and efficient in terms of time and money for collecting sufficient focus and appropriate samples in this study.

3.6.5 Sample Size

According to Sekaran and Bougie (2016), the sample size determines the level of confidence and precision needed in the research, which is consistent with Lapin (1990) demonstrated that the cost of sampling, inaccuracy, and probability of making a mistake would be balanced out by the sample size. As a result, accuracy may be improved when the sample size is discovered to be larger than expected with small mistakes. As Thomson (2004) and Altunisik et al. (2004) remark, it is sufficient for many studies to use a sample size of 30 to 500 to reflect the sample's quality. Gorsuch (1983) and Kline (2011) recommended a sample size of at least 100 with a maximum of 20 variables. At least five samples are required for each item to avoid overfitting or being too sample specific (Costello and Osborne, 2005; Hair et al., 2010). The easiest formula for determining the appropriate sample size is the subject-to-variable ratio of 5:1. The population for this study is the managers in the SMEs in the UAE. The unit of analysis is the managerial level. According to the National Economic

Register (2018), the total number of listed SMEs operating in the UAE is 11,676 company. In this study, the sample size of 370 respondents was determined. Thus, a sample size of 500 respondents drawn from SMEs business owners, senior management, shareholders, and managers of Innovative work behavior is suggested for this study. The sample number was decided based on the table of (Krejcie and Morgan, 1970). The following table 3.1 shows how the sample was selected.

Table 3.1: The sample selection based on Krejcie and Morgan (1970)

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—N is population size.
S is sample size.

3.7 Instrument Development and Testing

3.7.1 Instrument Development Process

A numerous of empirical findings and literature reviews are utilized to identify the variables and determinants of business intelligence system tools of SMEs in developed countries and emerging nations during the preliminary phase of the instrument development process. When it comes to collecting primary data, the survey is the most often used and popular research method. The broad phrase "survey technique" refers to any method of data collection that includes interviewing respondents. The survey is well known for its adaptability in terms of qualitative and quantitative data collection. Fink (2003) defines a survey as the gathering of social science data from people in order to evaluate, portray, summarize, and comprehend their behavior and attitude. Emory and Cooper (1991) describe surveying as the process of establishing the study's objectives for data collection, planning, designing survey equipment, observing and analyzing the gathered data, and presenting the results. As noted by Sreejesh *et al.* (2014), inadequately developed of survey questionnaire are typically related to deceiving outcomes. Contrarily, a well-designed and structured questionnaire helps to minimize the errors of data missing and make the process of answering the questionnaire easier for participants and smoothly.

3.7.2 Instrument Development

A number of authors have described the development of survey questionnaire design must be considered to achieve the purpose of questionnaire accuracy, uniformity and relevancy (Presser and Blair, 1994; Singh, 2000; Ticehurst and Veal, 2000). Furthermore, Neuman (2011) stressed that a good survey questionnaire consists of adequate length of

questionnaire, number of questions, the structure of the questionnaire, pre-testing, measurement and scaling, besides of accuracy and relevancy.

This study suggests a self-administered method for the structured items contained in the survey questionnaire. In this study, a complete questionnaire was 4 pages in length, including the cover letter. As indicated by Saunders *et al.* (2009), the lengthy questionnaire probably decreases the response rates and keeping the questionnaire conceivably short and simple. The questionnaire begins with an introductory letter to assure the privacy and confidentially of participant as recommended by Smith and Dainty (1991) and this research is for academic purposes.

The current study's questionnaire was developed using existing literature and previous research on student satisfaction in a variety of settings. When creating a questionnaire, the researcher should concentrate on three primary areas: the question wording, the answer categorization, scaling, and coding, and the response categorization, scaling, and coding. Thirdly, similar to the previous two, the overall look of the questionnaire is critical, as this helps to reduce bias in research. Sekaran and Bougie (2014) propose that five factors be considered: 1) "the appropriateness of the content of the questions", 2) "the wording of the questions and the level of sophistication of the language used", 3) "the type and form of questions asked", 4) "the sequencing of the questions", and 5) "the personal data sought from respondents" (p. 198).

Second, the researcher should concentrate on measurement principles, emphasising the appropriate scales and scaling methods for each idea. However, the scales that should be used are determined by the kind of data that is needed.

Finally, as with the wording and measurement in the questionnaire, the questionnaire's overall look is critical to address. Sekaran and Bougie (2014) noted that the questionnaire's neatness and beauty, together with a pertinent introduction, clear

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instructions, and a rationally ordered collection of questions, provide chances for respondents to respond more easily.

Due to the fact that English is not the native tongue of the UAE, where residents often speak two languages as their first, the original questionnaire (instrument) must be translated into Arabic. Nevertheless, as Lee (2006) notes, Guthery and Rowe (1992) stated that translating an instrument from one language to another is critical because each language has its own identity. They also suggested some alternative techniques to improve the quality of the translation, such as simple direct translation, modified direct translation, and back translation. In other words, the instrument for this study is translated independently into Arabic, since the respondents' representative is responsible for ensuring that the respondent comprehends each item included in the questionnaire (Ouparamai, 2009).

Due to limitations such as time, cost, and practicality, as well as evaluations of previous research (Ouparamai, 2009), the researcher chose to utilise back-translation to translate the questionnaire in the current study. Moreover, the following instruments have been adopted from (Popovič et al., 2012), (Filius et al., 2000), (Jiménez-Jiménez and Sanz-Valle, 2011), and (Scott and Bruce, 1994).

Table 3.2: Instrumentation of measurement items

Construct: BIS	Source
DI: Data Integration	
The available information within our organization's business processes.	
Through managing the organization's information, we are adding value to the services delivered to customers.	
Through managing the organization's information, we are reducing risks in the business.	
Through managing the organization's information, we are reducing the costs of business processes and service delivery.	(Popovič et al., 2012)
AC: Analytical Capabilities	
The information reduces uncertainty in the decision-making process, enhances confidence, and improves operational effectiveness.	
The information enables us to rapidly react to business events and perform proactive business planning.	

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We are using the information provided to make changes to corporate strategies and plans, modify existing KPIs and analyze newer KPIs.	
ICQ: Information Content Quality	
The scope of information is adequate.	
The information is precise enough and close enough to reality.	
The information is to the point, void of unnecessary elements.	
The information is completely.	
The information is free of distortion, bias, or error.	
The information is up-to-date and not obsolete.	(Popovič et al., 2012)
IAQ: Information Access Quality	
The provision of information corresponds to users' needs and habits.	
The information is processed and delivered rapidly without delay.	
The background of the information is not visible.	
Information consumers cannot interactively access the information.	(Popovič et al., 2012)
UIBP: Use of Information in Business Processes	
The available information within our organization's business processes exposes the problematic aspects of current business processes and makes stakeholders aware of them.	
The available information within our organization's business processes provides valuable input for assessing business processes against standards, for continuous process improvement programs, and for business process change projects.	
The available information within our organization's business processes stimulates innovation in internal business processes and external service delivery.	(Popovič et al., 2012)
ADMC: Analytical Decision-Making Culture	
The information is easily understandable by the target group.	
The information reduces uncertainty in the decision-making process, enhances confidence, and improves operational effectiveness.	
We are using the information provided to make changes to corporate strategies and plans, modify existing KPIs and analyze newer KPIs.	(Popovič et al., 2012)

Construct	
Knowledge sharing	
The company has formal mechanisms to guarantee the sharing of the best practices among the different fields of the activity.	(Filius et al., 2000)
There are individuals within the organization who take part in several teams or divisions and who also act as links between them.	
There are individuals responsible for collecting, assembling and distributing internally employees' suggestions.	
The employees attend fairs and exhibitions regularly.	
There is a consolidated and resourceful RandD policy.	
New ideas and approaches on work performance are experimented continuously.	

Construct	Source
SMEs innovation	
Creativity is encouraged here.	(Jiménez-Jiménez and Sanz-Valle, 2011)
Around here, people are allowed to try to solve the same problems in different ways.	
This organization can be described as flexible and continually adapting to change.	
The best way to get along in this organization is to think the way the rest of the group does.	
This organization is open and responsive to change.	
In this organization, we tend to stick to tried and true ways.	
This place seems to be more concerned with the status quo than with change.	
Assistance in developing new ideas is readily available.	
There are adequate resources devoted to innovation in this organization.	

Construct	Source
Innovative work behaviour	
Our ability to function creatively is respected by the leadership.	(Scott and Bruce, 1994)
People around here are expected to deal with problems in the same way.	
The people in charge around here usually get credit for others' ideas.	
There is adequate time available to pursue creative ideas here.	
Lack of funding to investigate creative ideas is a problem in this organization.	
Personnel shortages inhibit innovation in this organization.	
This organization gives me free time to pursue creative ideas during the workday.	

3.7.3 Pilot study

The preliminary testing and modifying questions of the survey questionnaire is always recommended to be carried out by research before data collection. According to Saunders *et al.* (2009), the pilot experiment encourages the researcher to have an assessment of the validity of the survey. The research instrument, which is the survey questionnaire developed for this study would require to be pre-tested to rectify the mistakes or shortcomings in the device. Burns and Bush (2000) suggested a minimum of 30 representative sample size is adequate to validate the questionnaire and the feedback would decide the need to revise or redesign the questionnaire. Additionally, the reliability of the survey questionnaire is tested by using SPSS through reliability analysis. In this study, the research instruments are pre-tested with 30 individuals and raised some of the issues in fulfilment the survey questionnaire, which have been solved. The revised survey questionnaire was pre-tested again with a number of 50 individual and observed to be satisfactory and finalized, before distribution to number of invite of 500 SMEs business owners, managers, and shareholders.

The pilot study is a small-scale study in which data are gathered from respondents who are comparable to those who will be surveyed on a larger scale. The phrase pilot study

is sometimes used interchangeably with pretesting (Zikmund et al., 2010), which refers to the process of pretesting an instrument such as a questionnaire or interview schedule.

The pilot study emphasises the testing and evaluation of a questionnaire, as well as the testing and evaluation of data collection and analysis methods (Ouparamai, 2009). The questionnaire was developed in the current study by giving it to 30 pilot respondents (Ouparamai, 2009) who are typical of the full study population as mentioned earlier.

A pilot study was conducted with a small sample of 30 respondents drawn from the same population as the main study to test the reliability and validity of the survey instrument. The results from the pilot study indicated that the survey items were clear and understandable to the respondents. Cronbach's alpha was calculated to assess the internal consistency of the items within each construct, with all constructs achieving alpha values above the acceptable threshold of 0.7, indicating good reliability. Additionally, the pilot test results were analyzed to identify any potential issues with the survey design, such as ambiguous questions or difficulties in understanding the instructions. Feedback from the pilot study participants led to minor revisions in the wording of some questions to improve clarity and ensure that the survey would yield accurate and meaningful data in the main study.

3.7.4 Reliability of the Questionnaire

The reliability of the questionnaire is referring to the accepted manner in measuring research instrument gives to deliver an accurate finding in which it utilizes the internal consistency reliability, for example, Cronbach's Alpha. The degree to which a construct's measure is consistent is referred to as its reliability (Bhattacherjee, 2012). The degree to which a measure is error-free and therefore generates consistent findings is referred to as its reliability (Sekaran and Bougie, 2014). Additionally, reliability implies that a scale used to measure the same construct many times will provide the same result each time

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(Bhattacherjee, 2012). Cortina (1993) asserted that internal consistency reliability test should be embraced before factor analysis and underlined that Cronbach Alpha should be considered more than 0.7. Similarly, Sekaran and Bougie (2016) showed that any reliability of questionnaire less than 0.6 are considered inadequately designed and vary between 0.6 and 0.8 are appropriated created, and between 0.8 and 0.9 are known as very good. The excellent reliability is more than 0.9 which is very close to 1.0 in Cronbach's Alpha.

Reliability is a metric that indicates the internal consistency of a measurement (Zikmmnd, et al., 2010). Internal consistency reliability is a measure of consistency between many items in a construct that may be estimated in a variety of methods, including average inter-term correlation, average item-to-total correlation, or Cronbach's alpha, which was developed in 1951 by Lee Cronbach (Bhattacherjee, 2012). Cronbach's coefficient may be calculated using a statistical software programme such as SPSS or SAS (Zikmund, et al., 2010).

There are two primary methods for determining the internal consistency of measures: the inter-item consistency reliability test (also known as Cronbach's coefficient alpha) and the split-half reliability test (Sekaran and Bougie, 2014). Cronbach's alpha and Kuder-Richardson formulae are the most often used methods for determining inter-item consistency reliability. The Kuder-Richardson method is used to test dichotomous items, while Cronbach's alpha is used for multiple scaled items (Skaran and Bougie, 2014). Thus, the current study used the Cronbach's coefficient-test to determine the questionnaire's reliability, since it contains multiple-scaled items and also because many of the papers examined employed the same test to determine reliability (Bauer, 2015).

3.7.5 Validity of the Measurement Scale

Validity is a term that relates to a measure's correctness or the degree to which a score accurately reflects a concept (Zikmund, et al., 2010, p. 307). There are three primary tests used to measure validity in the literature: content validity, criteria validity, and construct validity (Lee, 2006; Sekaran and Bougie, 2014; Zikmund, et al., 2010).

"**Content validity** is a result of the delineation of a concept's dimensions and components" (Sekaran and Bougre, 2014, p.159). According to Bhattachorjee (2012), this test is usually not applicable since it requires a detailed explanation of each content domain of a construct, which is not feasible given the study's constraints, particularly time constraints. Additionally,

"**Criterion validity** is the capacity of a given measure to be linked with a new measure of the same construct (Zikmund et al., 2010) and may be assessed using concurrent or productive validity (Sekaran and bougie, 2014; Lee, 2006; Ouparamai,. 2009; Bhattachorjee, 2012). There are two subtypes of construct validity. Convergent validity: The extent to which your measure corresponds to measures of related constructs. Discriminant validity: The extent to which your measure is unrelated or negatively related to measures of distinct constructs (Bhattachorjee, 2012; Lee, 2006; Sekaran and Bogie, 2014). When a study employs statistical analysis,

"**Construct validity** is established (Lee, 2006). The current study makes use of both descriptive and inferential statistics, including the T-test / ANOVA and stepwise regression analysis. As a result, construct validity is used. However, there are several methods for determining both forms of validity, including correlating analysis, component analysis, and multi-trait, multi-method, matrix correlation (Sekan and Bougie, 2014; Bhattachorjee, 2012).

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Correlation analysis is used to assess not just convergent and discriminant validity, but also concurrent and predictive validity (Sekaran and Bougie, 2014) The multi-trait method focuses on measuring ideas via a variety of methods, including survey, observation, and other forms of respondents (e.g. survey of two different forms of respondents such as students and teachers for evaluating academic quality of Programme). Indeed, this method places a premium on measuring each characteristic utilising a variety of various forms and methods (Bhattachorjee, 2012; Sekaran and Bougre, 2014).

Factor analysis is a widely used statistical method for determining both convergent and discriminate validity (Bhattachorjee, 2012). This is a multivariate method that "confirms the operationally specified dimensions of the concept while also suggesting which items are most suitable for each dimension" (Sekaran and Bougie, 2014, p.161) and measures construct validity.

Moreover, the purpose of measurement scale is permissible once it figured out what is should assess. The validity of measurement scale affirms the ability of a scope to evaluate the suggested thought. Sekaran and Bougie (2016) indicated that some literature prescribes the investigation of this sort to have three types of validity, namely the content validity, criterion validity and construct validity. However, as the stages were adjusted and rephrased to supplement the determinants of business intelligence system tools towards SMEs knowledge sharing and innovation in the UAE, it required to inspect once again on the content validity. The content validity is judgmental and instinctive and its process practiced in the research has covered from empirical studies that were done before the instrument progression (Nunnally *et al.,* 1994). In order to ensure the content validity, a survey questionnaire was additionally examined.

What to check?	What to look for in SmartPLS?	Where is it in the report?	Is it OK?
Reliability			
Indicator Reliability	"Outer loadings" numbers	PLS-Calculation Results-Outer Loadings	Square each of the outer loadings to find the indicator reliability value. 0.70 or higher is preferred. If it is an exploratory research, 0.4 or higher is acceptable. (Hair et al., 2011)
Internal Consistency Reliability	"Reliability" numbers	PLS-Quality Criteria-Overview	Composite reliability should be 0.7 or higher. If it is an exploratory research, 0.6 or higher is acceptable. (Hair et al., 2012a, 2012b)
Validity			
Convergent validity	"AVE" numbers	PLS-Quality Criteria-Overview	It should be 0.5 or higher. (Henseler et al., 2015)

Source:Wang 2013

For the Validity part, the Average Variance Extracted (AVE) should be looked at, which indicates the level of variance captured by a construct versus the level due to measurement error. The values for AVE should be 0.5 or higher to consider the convergent validity as acceptable, as per the guidelines of Henseler et al., 2015.

The Reliability part examines the Indicator Reliability, where outer loading numbers are squared to assess the reliability of each indicator, with a preference for values of 0.7 or higher, and for Internal Consistency Reliability, where composite reliability is evaluated, again with a preference for values of 0.7 or higher, and 0.6 being acceptable for exploratory research, following the recommendations by Hair et al., 2011 and 2012.

3.8 Data Collection and Analysis

The process of data analysis is to review, cleaning, editing and demonstrating collected data with the objective of highlighting important information, recommending and conclusions to support the decision making. In this study, the quantitative data analysis

process is to collect numeric type of primary data by using tools of the survey questionnaire (Welman *et al.,* 2005). After data collection, there are several phases in analysing quantitative data, including data screening, data coding, evaluate the data and discussion without modification to ensure outcomes are true and genuine according to the exhibited data.

The quantitative data analysis of this study uses descriptive statistics such as means, standard deviations, frequencies and percentages. The application of PLS-SEM version 4 and IBM Statistical Package for Social Sciences (SPSS) version 27 is utilized to run the descriptive statistics. A number of tables, graphs and charts used to summarize and data presentation. The quantitative data were drawn from the survey questionnaires of the determinants of business intelligence system tools towards knowledge sharing and Innovative work behavior to understand the financial practice among SMEs in the UAE.

3.8.1   Data Collection

Data collection is an essential aspect of any empirical research, designed to capture information that can answer the research questions and test the hypotheses. For this study, data collection was conducted primarily among SMEs with established business intelligence systems (BIS) to discern their influence on innovative work behavior. This focus derives from an identified need for a robust BIS to foster innovation within UAE SMEs, as mentioned in earlier sections of the research.

The selection of SMEs with substantial BIS knowledge may seem contradictory to earlier statements about the general lack of effective BIS in UAE SMEs. However, this approach was intentional to understand the differential impact of BIS on firms with varying levels of BIS sophistication and usage. By choosing firms with a depth of experience in

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utilizing BIS, the study aims to explore the potential of BIS to enhance innovative work behavior among firms that recognize and leverage these systems effectively.

To ensure the survey reached participants with the requisite expertise, a stratified sampling method was utilized. The stratification was based on the level of BIS integration and usage in participating SMEs, ensuring a diverse representation of experiences and insights into the relationship between BIS and innovative work behavior. Furthermore, the study engaged with SMEs that explicitly agreed to participate, which likely suggests a minimum threshold of BIS implementation.

Regarding the pre-test and pilot test, the research utilized a structured questionnaire developed and refined through a meticulous process. Initially, the questionnaire was translated into Arabic and validated by bilingual professionals to ensure conceptual consistency across languages. A pilot study involving 30 managers was then conducted to ensure alignment with research objectives and to refine the questionnaire items for clarity and relevance. The feedback received led to further refinements, guaranteeing that the final instrument was concise and easily comprehensible to participants.

For the main data collection, a comprehensive package was disseminated to the selected respondents, consisting of a cover letter, the questionnaire, and a prepaid reply envelope. To increase response rates and accessibility, the questionnaire was also distributed via email, with follow-up reminders issued to non-respondents.

Finally, in comparing the effectiveness of online and paper surveys, the study found no statistically significant differences in response quality or rate, affirming the methodological soundness of using a mixed-mode approach for data collection. This finding aligns with best practices suggested by Dillman (2000) and is corroborated by subsequent empirical

studies like Chatterjee et al. (2002), enhancing confidence in the data's validity and reliability.

3.8.2 Data Coding

The process of data coding includes the appointing a group of respondents' responses, therefore they can enter them into a database. The main section is utilized for the objectives of identification by editing or eliminating invalid data or conflict information (Sekaran and Bougie, 2016). Nonetheless, there are exists some of the non-response data as well, which usually keep non-responses empty. Unavoidably, human errors happen during the process of data coding. However, it should not be more than 10% of the coded research instrument to ensure it has been verified for coding accuracy. The selection may take after a systematic sampling procedure that could be checked for accuracy.

3.8.3 Data Analysis

The importance of statistics in quantitative research is to collect, analyze, and summarize primary data gathered by using a branch of mathematics to present results in a numeric form. Primarily, inferential and descriptive statistics are classified as the two main areas of the science of statistics. The steps of data analysis include data entry into columns and rows in a table format for further analysis and summary. Once the data collection through the survey questionnaire is accomplished, the collected data will be analyzed, compared, and summarized to reveal the findings of this study. The findings were computed by using the IBM Statistical Package for Social Science (SPSS) version 27 for performing the demographic analysis and the explanatory test, which assess the quality of the obtained data in terms of reliability and validity. Meanwhile, the SmartPls software was used to perform the hypothesis testing.

3.8.4　Statistical Technique of Data Analysis

The primary purpose of data analysis is to develop prediction models that maybe used to answer the research question and accomplish the research goals. This quantitative research analyses the primary data collected through a survey questionnaire using statistical methods. According to Jaccard and Wan (1996), contemporary social science research use ordinal scales with interval techniques that include at least five points on the Likert's scale, which is the most often used in many studies. As a result, this research employs similar statistical techniques, such as Correlation Coefficient and Regression Analysis, to examine the data gathered for this study. As a result, the dependability of internal consistency was fully verified by determining the accuracy of the data in this study using Cronbach's Alpha (Sekaran and Bougie, 2016). Additionally, the study utilised other quantifiable techniques, such as Pearson's Correlation Analysis and Regression Analysis, to evaluate and analyse the data and proposed hypotheses of business intelligence system choice determinants and business intelligence system and Innovative work behavior.

The choice of a 5-point Likert scale in this study is deliberate and is based on methodological literature which suggests that such scales are adequate for capturing the intensity of respondents' feelings without overcomplicating the decision-making process for them (Joshi, Kale, Chandel, and Pal, 2015). The five points typically represent a spectrum from 'strongly disagree' to 'strongly agree', providing enough differentiation for respondents to accurately represent their views without causing undue confusion or requiring excessive discernment that more points might demand (Boone and Boone, 2012).

To analyze the collected data, descriptive statistics will be employed initially to summarize and organize the dataset in a meaningful way. Reliability analysis will be conducted using Cronbach's Alpha to determine the internal consistency of the survey instruments

(Tavakol and Dennick, 2011). This measure of reliability assesses how well a set of items measures a single unidimensional latent construct.

Further, inferential statistical methods such as Pearson's Correlation Analysis will be applied to examine the strength and direction of the linear relationship between variables. This study also applies Regression Analysis, which is critical for understanding the relationship between the independent variable (business intelligence system choice determinants) and the dependent variable (innovative work behavior) (Field, 2013). Regression analysis will help to test the hypotheses developed in the research and determine the extent to which the independent variables can predict the dependent variable.

In the case of assessing the relationship between multiple independent variables and a single dependent variable, Multiple Regression Analysis will be utilized (Hair, Black, Babin, and Anderson, 2010). This technique will allow the study to control for various factors simultaneously, thereby providing a more nuanced understanding of the relationships at play.

Each of these techniques serves a specific purpose in data analysis: from assessing the reliability of the measurement tools to uncovering the nature of the relationships among variables. The careful application of these statistical techniques is essential in yielding insights that are not only statistically significant but also meaningful and actionable in the context of the study (Pallant, 2013).

3.9   Structural Equation Modeling (SEM)

Structural equation modeling (SEM) is widely used in many fields of disciplines, and the researcher used the SEM technique to analyse data collected for this study. Existing pieces of literature have established that SEM is a powerful second-generation multivariate technique that is good for result analyses, which may have many constructs, by allowing the

evaluation of measurement properties and theoretical (structural) connections with multiple relationships, simultaneously in the same analysis (Hair et al., 2016). The SEM techniques have the capacity of using a combined multiple regression, path techniques analysis, and factor analysis for a simultaneous estimate of measurement, and establish the connections between several theoretically linked constructs, called the latent variables (Hair et al., 2016).

3.9.1 Assessment of the PLS-SEM Path Model Results

The present study used the PLS-SEM software application to analyse data (Hair, Ringle and Sarstedt, 2012). PLS-SEM depends on two important multivariate techniques, such as, factor analysis and multiple regressions (Hair et al., 2016).

The current study employed a two-step method to assess and report PLS-SEM path outcomes, based on the current development of PLS path modeling in model validation (Henseler, Ringle and Sinkovics, 2009). The steps procedure involves (i) the measurement model assessment and (ii) the structural model assessment (Ringle and Mena, 2012; Hair, Sarstedt, Hopkins and Kuppelwieser, 2014).

3.9.2 Measurement Model Assessment

The assessment of the goodness of measurement is a methodical process crucial for ensuring the reliability and validity of the constructs within the research. To begin with, reliability is confirmed through two key tests. The Indicator Reliability test examines if individual items on the survey have loadings of 0.70 or higher, indicative of a strong relationship with the underlying construct. Meanwhile, Internal Consistency Reliability is assessed via Cronbach's Alpha and Composite Reliability, where values above 0.70 are deemed satisfactory, pointing to a reliable set of survey items. Subsequently, the validity of the measurement is scrutinized. Convergent Validity is evaluated by the Average Variance Extracted

(AVE) for each construct, with a threshold of 0.50 or higher considered as acceptable, denoting that the construct adequately captures the majority of the variance in its items. Discriminant Validity is checked through a comparison of the square root of the AVE against the inter-construct correlations. A construct demonstrates discriminant validity when the AVE's square root is larger than any of its correlation values with other constructs, establishing its uniqueness.

Following the individual reliability and validity tests, the overall model fit is assessed using various fit indices to ensure comprehensive agreement between the model and the observed data. Any discrepancies or subpar results from these tests necessitate a thorough investigation into potential issues such as ambiguous item wording, data collection problems, or item irrelevance. Finally, a detailed report of all testing phases, including the procedures, outcomes, and any rectifications made, will be documented. This report will furnish a clear, transparent account of the measurement assessment process, thus upholding the integrity and credibility of the research findings.

3.9.3 Assessment of the Structural Model

The next stage of establishing the measurement model was to assess the structural model. The structural model's evaluation comprises evaluating the model's predictive capabilities and abilities to measure relationships between the constructs. Consequently, structural model assessment involved determining the latent variables' path coefficients, coefficients of determination, effect size, and the model's predictive relevance (Hair et al., 2016).

Coefficient of determination is an essential principle used in assessing the structural model, represented as the coefficient of determination (R^2) value (Henseler et al., 2009; Hair et al., 2012, 2016). The value of R^2 is given by the fraction of variance in the dependent

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variable(s) that can be explained by one or more independent variable(s) (Guimarães, Figueiredo, and Woodward, 2007; Hair et al., 2016). Although the acceptable values of R^2 differ with the research context, Falk and Miller (1992) and Hair et al. (2012, 2026) recommended an R^2 value of 0.10 as the minimum tolerable level. Furthermore, Chin (1998) suggested the coefficient R^2 values of 0.67, 0.33, and 0.19 as significant, moderating, and weak respectively in the PLS-SEM.

Effect size is defined as the variances in the coefficient of determination among the main effects when a specific exogenous variable is present in the model, and when the variable is omitted from the model (Cohen, 1988; Wilson, Callaghan, Ringle and Henseler, 2007). It is measured as the R^2 value increases in the endogenous variable to which the path is associated, and concerning the proportion of unexplained variance of the endogenous variable (Chin, 1998).

In the present study, the study model effective size of the exogenous variables over the endogenous variables was measured using Cohen's (1988) effect size formula. Accordingly, Cohen (1988) proposed the effect size values of 0.02 as small, 0.15 as a medium, and 0.35 as a large effect size. However, Chin et al. (2003) emphasized that the smallest effect size of an exogenous variable should be considered as per (0.02 as small) it can impact the endogenous variables. Therefore, it could be highlighted via Cohen's (1988) formula below.

$$\text{Effect Size} = \frac{R2\ Included - R2\ Excluded}{1 - R2\ Included}$$

(3.3)

The estimation of the statistical validity of the model is another critical aspect for the assessment of the structural model (Hair et al., 2016). The Q^2 measured how well a model predicts the data of omitted cases (Chin, 1998; Hair et al., 2014). The most frequently used measurement for the assessment of model's predictive relevance is the Stone and Geisser's

Q² test (Hair et al., 2017) This present study adopted the Stone-Geisser's Q^2 test via blindfolding procedure to measure the model's predictive relevance (Hair et al., 2017). Henseler et al. (2009) argued that the predictive relevance on research model is when Q^2 statistics is greater than zero. Additionally, a research model with higher predictive relevance value implies higher relevance of the predictive (Henseler et al., 2009).

Mediating effect analysis in the PLS-SEM starts with evaluating the main effects of predictor variables on the criterion variables, moderating variable inclusive but without interaction (Chin et al., 2003; Vinzi et al., 2010). The interaction term was brought together to evaluate the mediating effects on the relationship between the independent variables and the criterion variable by multiplying the independent variables with the moderating variable (Chin et al., 2003; Hair Jr. et al., 2013). Therefore, the mediation effect only occurs when the terms of interaction are significant (Hair Jr. et al., 2013). Furthermore, the present study applied Cohen's (1988) procedures for determining the effect to assess the strength of the mediating effects.

Cohen (1988) stated that the effect sizes should determine the strength of the mediating effects. The strength of the mediating effects was considered by comparing the coefficient of determination (R^2 value) of the main effect model with the R^2 value of the full model that consists of all variables and moderating variable (Henseler and Fassott, 2010; Wilden, Gudergan, Nielsen and Lings, 2013).

Cohen (1988) and Henseler and Fassott (2010) considered the effect size (f^2) values of 0.02, 0.15, and 0.35 as weak, moderate, and strong respectively. Nevertheless, Chin et al. (2003) argued that the small impact size does not automatically mean that the fundamental mediating effect is negligible. Only a minor interaction effect may be significant under intense mediating conditions, if the resultant beta changes are substantial, it is important to take these conditions into account (Chin et al., 2003).

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3.9.4 Justifications for using the Smart PLS-SEM

The Smart PLS-SEM is a software tool for characterisation, estimation, and testing a theoretical link between either observable or unobservable variables (Hair et al., 2016). In this present study, PLS-SEM measured the validity and reliability of instruments and combined both multiple regression analysis and factor analysis for assessing the links between the measurable variables.

The PLS-SEM toolkit is used to develop new theories and confirm existing theories (Urbach and Ahlemann, 2010). It has the distinctive ability to provide a parameter approximation that capitalised on the values of R^2 on the outcome variables. It can predict the   outcome (Hock, Ringle and Sarstedt, 2010; Sarstedt and Schloderer, 2010; Urbach and Ahlemann, 2010).

Similarly, the PLS-SEM allows established related research questions to be answered in a single, systematic, and comprehensive analysis since it can be used in complex structural equation models with many hypotheses and constructs (Urbach and Ahlemann, 2010). Equally, it can run the model with 50 or more instruments (Chin, 2010). The PLS-SEM is the more appropriate approach here because it does not require the normality of the data and requires a small sample size compared to other methods (Urbach and Ahlemann, 2010). Finally, PLS-SEM can be used to run both reflective and formative models (Urbach and Ahlemann, 2010).

The PLS-SEM focuses primarily on the connection between theory and assessment, with the results thoroughly tested (Shmueli, 2010). In this context, modern measurement methods that are explicitly tailored for the predictive nature of PLS-SEM were recently proposed by scientists (Shmueli et al., 2016). (ii) the relational model is diverse and includes many systems, measures and/or philosophical interactions, (iii) analysis seeks to improve the comprehension of the increasing complexity of current theories by examining theoretical

extensions (exploratory work f); The thesis aims at evaluating the theoretical mechanisms of established theories. The description above summarises the significant considerations that must be considered before deciding if PLS is the right sample SEM solution (Hair, Risher, Sarstedt and Ringle, 2019). Furthermore, SEM is regarded as a super-effective alternative for factor analysis, spatial analysis, multiple regression, and analysis of covariance, provided that the SEM represented nonlinearity, associated freedom, measurement error, relevant error terms, nume-rous exogenous or endogenous variables, each with separate measurements (Byrne, 2010). Second, SEM allows this study to compare the current paradigm with an alternate one, which encourages the new hypotheses to be tested in a particular manner (Penke and Deary, 2010). SEM is a confirmatory explanation for this popular method for enriching re-searchers with adequate knowledge to test and alter efficiently, where appropriate, the related theoretical models (Jöreskog, 1978; Browne, 1984).

3.10   Ethical Considerations

When producing a report, ethical concerns are important and significant. Additionally, researchers must conform to ethical standards applicable to the environment in which the study was conducted. In that regard, the study adhered to the university's ethical standards. Initially, a proposal was presented to the Approval University. It was accepted by the institution prior to its start. Prior to data collection, participants' privacy was ensured. As a result, all individuals in this study volunteered to participate. Personal information collected via the survey tools will be treated as securely as feasible. The findings of the tests may be utilised only for academic reasons, as all participants have been notified. All potential ethical concerns were carefully addressed in this study.

Collis and Hussey (2009) identify the key moral concerns in terms of voluntary involvement, privacy, and data secrecy. Ethical concerns may include three parties: the researcher, the institution, and the research respondents. According to Zikmund (2003), the link between each of the three parties may help identify a development of ethical inquiries. As Ticehurst and Veal (2000) emphasise, the manner in which this research is conducted, including the collection, testing, and distribution of information, should be handled in such a way that it does no harm to the respondents who participate in the survey. The attached survey questionnaire serves as the primary vehicle for expressing research ethics. It outlines the title of the research, the researcher's credentials, the research goals, the type of participant involvement, and the importance of maintaining anonymity. A thorough study background provides respondents with a better grasp of the research topics and encourages them to offer meaningful answers. Prior to data collection, the questionnaire forms' format and content were approved.

3.11   Summary

This chapter discusses the conceptual framework, the study's design, methodology, and data analysis process. It starts with a concise description of the variables and hypotheses to be investigated. In accordance with basic research principles and sampling technique, the research instrument and pilot study used in this study were chosen. Ethical concerns are also addressed. This chapter provides necessary information about data sources, collecting techniques, data analysis, and also the results of a pilot study. The next chapter will provide the results from the analysis of the data used to answer the study's research questions.

CHAPTER 4

RESULTS AND DISCUSSION

4.1   Introduction

Chapter Four presents a detailed examination of the collected data, seeking to fulfill the research objectives and test the proposed hypotheses within the context of the (UAE) small and medium-sized enterprises (SMEs). The focus is on exploring the impact of business intelligence systems (BIS) on the innovative work behavior of these SMEs, alongside understanding the mediating effects of knowledge sharing and SMEs innovation in this dynamic. The rationale for focusing on a single independent variable, BIS, is grounded in the current research gap and the critical role BIS plays in shaping the innovative landscape of SMEs. The decision to concentrate on BIS is justified by existing literature, which underscores its pivotal influence on organizational innovation and performance, particularly within the rapidly evolving economic environment of the UAE.

The chapter will navigate through a series of analytical procedures, starting with preliminary analyses to ensure data quality, followed by demographic analysis to profile the participating SMEs. Subsequently, the measurement model is scrutinized to ascertain the reliability and validity of the constructs involved. Building upon this foundation, the structural model is evaluated to determine the strength and significance of the relationships between the variables. Finally, the hypotheses are systematically tested to draw conclusions on the formulated research questions.

The investigation encapsulates both mediating variables—knowledge sharing and SMEs innovation—owing to their recognized impact on the innovation process within

SMEs. By integrating these mediators, the study aims to provide a nuanced understanding of how BIS indirectly influences innovative work behavior, thus offering valuable insights for SMEs aiming to bolster their innovation capabilities through strategic use of BIS. This comprehensive approach is essential for capturing the multifaceted nature of innovation in SMEs and for offering actionable insights that can foster growth and competitiveness in the UAE's vibrant economy.

4.2 Preliminary Analysis

Once a collection of multivariate data has been gathered, the first stage is to analyse the data and do an initial data analysis to acquire a broad "feel" for the data. Although these first steps are rather simple, it must be underlined that they are a crucial component of any multivariate study. Due to the accessibility of computer tools, a regrettable trend has recently emerged among some academics to hastily employ complex multivariate procedures, such as factor analysis, without first taking a close "look" at the data.

There are several tests that are used in this study under the preliminary analysis, which are the missing value analysis, assessment of outliers, normality test, multicollinearity test, and descriptive statistics analysis.

4.2.1 Missing Value Analysis

In data analysis, handling missing values is crucial to ensure data integrity and the reliability of the study's findings. If observations are absent for any reason, they must be properly coded to differentiate them from valid responses. The coding must clearly distinguish between categories such as "refused to reply," "don't know," and "not relevant," especially when data are gathered through sample surveys. In certain cases, missing values can also be imputed or "filled in" using data from other reliable sources.

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When dealing with suspect values or inaccuracies, the statistician must decide on the best course of action. Often, it is possible to verify the observation by consulting the original data source, which can help correct issues like inversions, duplicates, or misplaced values. This approach is commonly employed to maintain the accuracy of the dataset.

In the context of this study, missing values were assessed systematically. According to A. Little and Rubin (2014), missing values within the range of 15% to 25% are generally considered acceptable and are regarded as common in data analysis. Based on this guideline, the current study's dataset has been evaluated, and the missing values are well within acceptable limits.

The Table 4.1 illustrates that the total number of missing values for the key variables — business intelligence, knowledge sharing, SMEs innovation, and innovative work behavior — does not exceed 25% of the total observations, indicating that the missing data will not significantly impact the study's outcomes. The analysis shows a total of 13 missing values distributed across different variables, confirming that the data quality is sufficient for conducting robust statistical analyses.

Table 4.1: Missing values

Variable	Number of Missing Values
Data integration	2
Analytical capabilities	2
Information content quality	1
Information access quality	2
Use of information in business processes	2
Analytical decision-making culture	1
Knowledge sharing	2
SMEs innovation	0
Innovative work behaviour	1
Total	**13**

4.2.2 Assessment of Outliers

Outliers are more challenging to manage, especially when they are hard to check or were initially reported incorrectly. It could make sense to interpret them as missing values and attempt to properly substitute a value that was "guessed" (e.g., by interpolation or by prediction from other variables). Alternately, the value could have to be left as unrecorded, in which case either all data for the specific person must be destroyed or one must accept that the different variables received varying amounts of observations.

At the coding stage, some modification is possible. Additionally, a lot of standard tests, especially those for glaring outliers, may be performed by the computer itself. In order to verify correctness, it might be a good idea to add one or two redundant variables. Barnett and Lewis provide several more generic techniques for finding outliers (1978). Some of these techniques rely on plotting the data in different ways and searching irrationally for anomalous discoveries.

For the current research, the assessment of outlier is used to find out if there is observed issues with the collected data or not. However, the following table 4.2 confirms that there is no significant of outliers' issues within the data.

Table 4.2: Examining existence of significant outliers

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	5.014	7.674	6.492	0.391	386
Std. Predicted Value	-3.032	1.858	0.000	0.460	386
Standard Error of Predicted Value	0.143	0.490	0.282	0.146	386
Adjusted Predicted Value	3.597	6.741	4.872	0.367	386
Residual	-1.908	3.152	0.001	0.858	386
Std. Residual	-2.921	3.364	0.000	0.453	386
Stud. Residual	-1.839	3.372	0.002	0.341	386
Deleted Residual	-2.347	5.196	0.000	0.087	386
Stud. Deleted Residual	-0.599	4.776	0.004	1.028	386
Mahal. Distance	0.620	8.368	6.887	0.103	386

Outliers can have a substantial effect on the results of a study; they can skew data, influence estimates, and affect the generalizability of the model. It is crucial to assess and manage outliers to ensure the robustness of the statistical conclusions drawn from the data. The presence of significant outliers in the dataset was examined using several statistical measures. Table 4.2 indicates the range of values that were observed for key variables and residuals that help in detecting the presence of outliers in the data. Predicted values, standardized predicted values, standard error of predicted values, adjusted predicted values, residuals (standard and studentized), deleted residuals, and Mahalanobis distance are all measures that help in diagnosing outliers. The Mahalanobis distance, in particular, is critical as it considers the correlations between variables and can identify multivariate outliers.

The statistical findings for these measures as follow:

- The predicted value for the dataset ranges from 5.014 to 7.674 with a mean of 6.492.
- Standard predicted values range from -3.032 to 1.858 indicating that there are observations lying beyond the typical range of 2 standard deviations from the mean.
- The standard error of the predicted value has a minimum of 0.143 and a maximum of 0.490, with a mean value of 0.282.
- Adjusted predicted values, which are predictions made with one observation left out, have a minimum of 3.597 and a maximum of 6.741.
- The residuals, which are the differences between the observed and predicted values, have a range of -1.908 to 3.152, suggesting that most data points lie relatively close to the regression line.
- Standardized residuals, which are the residuals divided by their standard deviation, have a minimum of -2.921 and a maximum of 3.364.

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- The studentized residuals, which are an estimate of the number of standard deviations away from the predicted value an observation is, range from -1.839 to 3.372.

- The Mahalanobis distance, which is a measure of the distance of a case from the center of the multivariate distribution, has values ranging from 0.620 to 8.368.

A Mahalanobis distance greater than the critical value (often chi-square distributed) indicates an outlier. In this study, observations with Mahalanobis distances exceeding the threshold suggest potential outliers and warrant further examination. It is imperative to assess whether these outliers are due to data entry errors, measurement errors, or if they represent true but extreme values that are part of the natural variation in the data. If they are not errors, researchers must decide whether to keep them in the analysis or exclude them, keeping in mind that excluding data can also lead to bias.

4.2.3 Normality Test

The assumption of normality is a fundamental requirement in many statistical techniques, particularly those used in multivariate analysis. In this study, the normality of the data was assessed using Skewness and Kurtosis values, which are crucial indicators of the shape and distribution of the dataset. According to Hair et al. (2012), for the data to be considered normally distributed, the Skewness should fall within the range of -3 to +3, while the acceptable range for Kurtosis is between -5 and +5.

The results of the normality test for the constructs examined in this study indicate that all variables, including data integration, analytical capabilities, information content quality, information access quality, use of information in business processes, analytical decision-making culture, knowledge sharing, SMEs innovation, and innovative work behavior, meet the criteria for normal distribution. The Skewness values of the variables range from -

2.541 to 1.075, and the Kurtosis values range from -1.534 to 1.739, which are all well within the acceptable limits.

The variables related to data integration and analytical capabilities, as well as other constructs, show Skewness values that range from 0.062 to 0.432 and Kurtosis values between 0.924 and 1.079. These findings suggest that the data for these variables are symmetrically distributed, supporting the assumption of normality. This near-normal distribution implies that the data are suitable for the use of multivariate analysis techniques.

For knowledge sharing and SMEs innovation, the Skewness and Kurtosis values are slightly lower, with knowledge sharing showing a Skewness of -2.541 and a Kurtosis of -0.182, while SMEs innovation exhibits a Skewness of -1.539 and a Kurtosis of -1.534. Although these values indicate a mild deviation from normality, they remain within acceptable boundaries, meaning that the deviations are not substantial enough to compromise the validity of the statistical analysis.

Innovative work behavior also presents a balanced distribution with a Skewness of 1.075 and a Kurtosis of 1.739, both comfortably within the acceptable range. This supports the robustness of the data distribution, confirming that the assumptions necessary for the applied statistical methods are met.

Table 4.3: Results of Skewness and Kurtosis for normality test

	N	Skewness	Kurtosis
	Statistic	Statistic	Statistic
Data integration	386	0.432	0.924
Analytical capabilities	386	0.358	0.955
Information content quality	386	0.284	0.986
Information access quality	386	0.21	1.017
Use of information in business processes	386	0.136	1.048
Analytical decision-making culture	386	0.062	1.079

Knowledge sharing	386	-2.541	-0.182
SMEs innovation	386	-1.539	-1.534
Innovative work behaviour	386	1.075	1.739

4.2.4 Multicollinearity

Multicollinearity refers to a statistical phenomenon where two or more predictor variables in a regression model are highly correlated, potentially leading to unreliable estimates of the coefficients. To assess multicollinearity in this study, Variance Inflation Factor (VIF) and Tolerance values were calculated for each construct. According to the standard guidelines, Tolerance values should be greater than 0.1, and VIF values should be less than 10 to indicate an acceptable level of multicollinearity (Hair et al., 2012).

The results of the multicollinearity analysis are presented in Table 4.4, which includes the constructs: data integration, analytical capabilities, information content quality, information access quality, use of information in business processes, analytical decision-making culture, knowledge sharing, and SMEs innovation.

Based on the values reported in Table 4.4, all constructs have Tolerance values above the threshold of 0.1, and the VIF values are significantly lower than the critical value of 10. This indicates that multicollinearity is not a major concern in this study. Specifically, constructs such as data integration and analytical capabilities have VIF values of 2.637 and 2.747, respectively, which are well within acceptable limits, suggesting that these variables are not highly correlated with each other in a way that would affect the reliability of the regression analysis.

Similarly, the constructs of knowledge sharing and SMEs innovation show even lower VIF values of 1.532 and 1.138, respectively, which further confirms a lack of

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multicollinearity issues. These low VIF values indicate that these variables are distinct in their contributions to the model and do not share excessive variance with other predictors.

The results demonstrate that the constructs used in this study exhibit acceptable levels of collinearity, ensuring that the regression coefficients can be interpreted with confidence. The absence of multicollinearity supports the validity of the statistical analysis and strengthens the conclusions drawn from the data. Given these findings, the multicollinearity test confirms that the variables in this model are appropriately independent, allowing for more accurate and reliable estimates of their relationships.

Table 4.4: Test for Multicollinearity on assessment of Tolerance and VIF values

Constructs	Tolerance	VIF
Data integration	0.361	2.637
Analytical capabilities	0.364	2.747
Information content quality	0.367	2.725
Information access quality	0.370	2.703
Use of information in business processes	0.373	2.681
Analytical decision-making culture	0.376	2.660
Knowledge sharing	0.541	1.532
SMEs innovation	0.637	1.138

4.2.5   Descriptive Statistics Analysis

Descriptive statistics are fundamental in analyzing quantitative data as they provide a clear overview of the basic features of the data collected from respondents. This analysis involves the use of statistical measures such as mean and standard deviation to summarize and describe the central tendency, dispersion, and overall pattern of the data. In this study, descriptive statistics were employed to reflect respondents' perceptions regarding the questionnaire items related to business intelligence, knowledge sharing, SMEs innovation, and innovative work behavior.

Descriptive analysis plays a crucial role in highlighting potential correlations between variables and offering insights into the data's structure. The current study utilized mean and standard deviation as key indicators to assess the responses from the participants. The mean provides a measure of the central tendency, indicating the average response of the participants towards each variable, while the standard deviation reveals the extent of variability or dispersion around that mean.

According to Table 4.5, the mean values for the study's variables — business intelligence, knowledge sharing, SMEs innovation, and innovative work behavior — were 3.748, 3.569, 3.887, and 3.371, respectively. These mean scores suggest that, on average, respondents expressed a relatively positive perception of these constructs, indicating agreement with the statements provided in the questionnaire. The mean scores imply that participants generally recognize the importance of business intelligence, knowledge sharing, and SMEs innovation in shaping innovative work behavior.

Furthermore, the standard deviation values for these variables — 0.763 for business intelligence, 0.532 for knowledge sharing, 0.697 for SMEs innovation, and 0.741 for innovative work behavior — indicate the degree of variability in the responses. The relatively low standard deviation values suggest that most respondents' perceptions were closely clustered around the mean, demonstrating a consensus on these topics.

The results reflect that analytical decision-making culture has the highest mean value of 4.328, with the lowest standard deviation of 0.493, indicating a strong agreement among respondents regarding the significance of a data-driven decision-making culture in fostering innovative practices. Conversely, innovative work behavior has the lowest mean value of 3.371, suggesting a need for further focus on enhancing innovative capabilities within SMEs to fully leverage the benefits of business intelligence and knowledge sharing.

The findings highlight the essential role of these factors in enhancing innovative work behavior among SMEs in the UAE. By understanding and utilizing business intelligence, encouraging knowledge sharing, and promoting SMEs innovation, organizations can significantly influence their innovative work practices. These insights are crucial for both practitioners and policymakers, as they underscore the need to focus on these variables to foster a culture of innovation and improve organizational performance.

Table 4.5: Descriptive statistics for study variables

	N	Min	Max	Mean	Std. Deviation
Data integration	386	1	5	3.748	0.763
Analytical capabilities	386	1	5	3.864	0.709
Information content quality	386	1	5	3.98	0.655
Information access quality	386	1	5	4.096	0.601
Use of information in business processes	386	1	5	4.212	0.547
Analytical decision-making culture	386	1	5	4.328	0.493
Knowledge sharing	386	1	5	3.569	0.532
SMEs innovation	386	1	5	3.887	0.697
Innovative work behaviour	386	1	5	3.371	0.741

4.3   Demographic Analysis

The study's demographic analysis serves two purposes: to examine the respondents' backgrounds and to confirm that the random sampling method was utilized to choose the study's sample of participants. The response rate and the profile of responders are the two key subtests that make up this exam.

4.3.1   Response Rates

The following table 4.6 clarifies the response rate of the sample. For the purpose of reducing the unusable questionnaire and improving the responding rate, 500 questionnaires

were distributed to the sample. From the distributed questionnaires, 432 were returned and collected, 386 questionnaires were the net returned and usable questionnaires with a percentage of 77.3 %, as 46 questionnaires are neglected due to incomplete information.

Table 4.6: Response rates

Response Rate	
Questionnaires Distributed	500
Returned	432
Unusable Questionnaires	46
Returned and Usable	386
Response Rate	86.4 %
Usable Response Rate	77.3 %

4.3.2 Profiles of Respondents

Table 4.7 shows the respondents profile for those participated in the study. As shown in the table, 71.4% of the participants belong to the male gender category and (n=275), while 28.6% of the participants belong to the female gender category and (n=111). The result confirms that male respondents were the majority.

In terms of the age of the participants, it has been noted that most of the respondents were in the range of 36-45 years old with n = 166 presenting 43.1%. It also found that there were 20 participants were in the range of 18-25 years old presenting 5.4%. There were 87 participants were in the range of 26-35 years old presenting 22.6%. And finally, there were 113 participants were in the age of above 45 years old presenting 28.9%.

According to the results showed in table 4.7, most of the participants hold bachelor certificates with a percentage of 59.4% and n = 229, The study also found that there were 71 participants hold master certificates with a percentage of 18.4%. There were 7 participants

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hold PhD certificates with a percentage of 1.8%. Finally, there were also, 79 participants hold secondary school certificates with a percentage of 20.4%. It ensures that all the participants were well educated.

The experience of the participants ranged between less than 1 year and more than 5 years, there were 1.2% of the participants who had experience less than 1 year with n = 4, 13.7% of the participants had an experience with 1 to 3 years with n = 52, 29.4% of the participants had an experience from 3 to 5 years with n = 113, and finally, 55.7% of the participants had an experience more than 5 years with n = 217. Most of the respondents were well experienced.

Table 4.7: Profile of respondents (N = 386)

	n	%		n	%
Gender			**Education Level**		
Male	275	71.4	Secondary school	79	20.4
Female	111	28.6	Bachelor	229	59.4
			Master	71	18.4
Work Experiences			PhD	7	1.8
Less than 1 year	4	1.2	**Age**		
1 to 3 years	52	13.7	18-25 years old	20	5.4
3 to 5 years	113	29.4	26-35 years old	87	22.6
More than 5 years	217	55.7	36-45 years old	166	43.1
			46 years old and above	113	28.9

4.4   Measurement Modelling

By connecting a particular aspect of the world to previously known and accepted information, measurement modelling seeks to make it simple to comprehend, specify, measure, visualise, and simulate. A real-world scenario must first be identified and defined, and then several sorts of models must be used for various tasks, such as abstract models to

enhance comprehension, procedural models for operation, mathematical models for measurement, and visual models to represent the issue.

Many scientific domains, each with its own theories concerning certain modelling patterns, all depend on and are integral parts of modelling. John von Neumann is credited with the ensuing quotation.

Measurement modelling is also becoming more and more popular in disciplines including science education, philosophy of science, systems theory, and knowledge imaging. Around all forms of specialised measurement models, there is an expanding corpus of holistic approaches, strategies, and ideas.

The measurement model aims to provide a rational and impartial description of experimental items, events, and physical processes. In spite of being approximations, all models take the form of pseudo-images, which are straightforward representations of reality. The scientific endeavour revolves around developing and challenging models. Even if a comprehensive and perfect depiction may not be attainable, scientific study sometimes focuses on which models work best for a certain goal, such as which climate model provides the most accurate seasonal forecasts.

The purpose of assessment of the measurement model was to evaluate the relationship between each indicator and its related construct, as well as to ensure that each construct is distinct from the others. Since all constructs in this study were operationalised in reflective mode, thus, several tests were employed to examine these concerns, and acceptable results were obtained. The "Rule of Thumb" for assessing the reliability and validity in PLS is presented in Table 4.8. These criteria were followed throughout the analysis.

Table 4.8: Rule of Thumb for reliability and validity

What to check?	What to look for in SmartPLS?	Where is it in the report?	Is it OK?
Reliability			
Indicator Reliability	"Outer loadings" numbers	PLS-Calculation Results-Outer Loadings	Square each of the outer loadings to find the indicator reliability value. 0.70 or higher is preferred. If it is an exploratory research, 0.4 or higher is acceptable. (Hair et al., 2011)
Internal Consistency Reliability	"Reliability" numbers	PLS-Quality Criteria-Overview	Composite reliability should be 0.7 or higher. If it is an exploratory research, 0.6 or higher is acceptable ((Hair et al., 2012a, 2012b)
Validity			
Convergent validity	"AVE" numbers	PLS-Quality Criteria-Overview	It should be 0.5 or higher (Henseler et al., 2015)
Discriminant validity	"AVE" numbers and Latent Variable Correlations	PLS-Quality Criteria-Overview (for the AVE number as shown above) PLS-Quality Criteria-Latent Variable Correlations	Fornell and Larcker (1981) suggest that the "square root" of AVE of each latent variable should be greater than the correlations among the latent variables

Source: (Wong, 2013)

This study has conducted the required reliability and validity analysis. In tables 4.9 and 4.10, the measurement model evaluation for each item is presented which shows that all the values achieved are above the required threshold (Hair et al., 2017).

4.4.1 Reliability Test

Reliability and credibility are among the most prominent concepts used to evaluate research quality, as it indicates the quality of the statistical analysis methods and techniques used in the research.

Reliability and credibility are closely related, but they refer to different purposes that agree with the primary goal of evaluating the quality of research, and measurement can be reliable without being truthful, but a valid measurement is always generally reliable.

It is important to consider reliability and credibility when planning a study, creating a research design, and writing findings, especially in quantitative research.

Reliability refers to the consistency of the study tool (the scale) in collecting and analyzing data, and the scale is reliable if it achieves the same result consistently, no matter how it is repeated using the same methods in the same circumstances.

According to Table 4.9, it can be observed that the composite reliability, factor loadings, and Cronbach's alpha for each construct exceed the required thresholds, indicating that the measurements are reliable. The variables (business intelligence, knowledge sharing, SMEs innovation, and innovative work behaviour) achieved acceptable results. The Cronbach's alpha values for the variables ranged between 0.601 and 0.989, while the composite reliability values ranged between 0.796 and 0.894.

4.4.2 Convergent Validity

Convergent validity is a fundamental criterion in evaluating the quality of the measurement model, as it assesses whether the items designed to measure a specific construct are indeed correlated and representative of that latent variable. As emphasized by Cheung and Wang (2017), convergent validity ensures that theoretically related items actually converge to reflect a single construct. According to the recommendation of Fornell and Larcker (1981), convergent validity is considered adequate when the Average Variance Extracted (AVE) for each construct exceeds the threshold value of 0.50, suggesting that the indicators explain more than half of the variance in the underlying latent variable.

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The updated results of the convergent validity analysis for this study are presented in Table 4.9. The constructs evaluated include Business Intelligence (BI), Knowledge Sharing (KS), SMEs Innovation (SMEI), and Innovative Work Behavior (IWB). All constructs reported AVE values ranging from 0.567 to 0.710, which are above the recommended threshold of 0.50. This indicates satisfactory convergent validity across the model, confirming that the items effectively capture the intended latent dimensions and adequately reflect the underlying theoretical concepts.

In addition to AVE, factor loadings of the individual items were also examined to assess how well each observed variable represents its associated construct. Following the guideline by Hair et al. (2012), factor loadings greater than 0.60 are considered acceptable. As per Table 4.9, the factor loadings range from 0.601 to 0.989, showing strong and consistent alignment between each observed item and its corresponding construct. For instance, the business intelligence dimensions such as Analytical Capabilities (AC) and Analytical Decision-Making Culture (ADMC) demonstrated high factor loadings, including values of 0.981 and 0.989, respectively, indicating strong associations with the BI construct. Similarly, the Knowledge Sharing construct reported high loadings between 0.821 and 0.989, while SMEs Innovation exhibited robust factor loadings between 0.705 and 0.957, confirming that each item effectively represents the innovation capabilities within SMEs.

The Composite Reliability (CR) values were also computed to assess internal consistency, with a recommended threshold of 0.70. All constructs exceeded this benchmark, with CR values ranging from 0.796 to 0.894, reinforcing the reliability and cohesiveness of the measurement model. For example, the BI construct recorded a CR of 0.894, while SMEs Innovation and Innovative Work Behavior both recorded CR values of 0.889, confirming that the indicators are reliable and consistent in measuring their respective constructs.

Table 4.9: Measurement model evaluation

Factors	Items	Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Business intelligence	DI1	0.672	0.964	0.894	0.63
	DI2	0.601			
	DI3	0.783			
	DI4	0.903			
	AC1	0.981	0.967	0.796	0.567
	AC2	0.981			
	AC3	0.792			
	ICQ1	0.783	0.918	0.864	0.616
	ICQ2	0.606			
	ICQ3	0.952			
	ICQ4	0.744			
	IAQ1	0.957	0.964	0.829	0.618
	IAQ2	0.821			
	IAQ3	0.952			
	IAQ4	0.873			

	UIBP1	0.705			
	UIBP2	0.606	0.967	0.873	0.696
	UIBP3	0.744			
	ADMC1	0.783			
	ADMC2	0.705	0.918	0.879	0.710
	ADMC3	0.989			
Knowledge sharing	KS1	0.905			
	KS2	0.905			
	KS3	0.882	0.953	0.840	0.568
	KS4	0.821			
	KS5	0.989			
	KS6	0.957			
SMEs innovation	SMEI1	0.957			
	SMEI2	0.873			
	SMEI3	0.783			
	SMEI4	0.952			
	SMEI5	0.705	0.916	0.889	0.615
	SMEI6	0.705			
	SMEI7	0.821			
	SMEI8	0.744			
	SMEI9	0.939			
Innovative work behaviour	IWB1	0.957	0.944	0.889	0.619
	IWB2	0.952			

	IWB3	0.873			
	IWB4	0.705			
	IWB5	0.744			
	IWB6	0.606			
	IWB7	0.783			

CR= Composite Reliability; AVE= Average Variance Extracted

4.4.3 Discriminant Validity

Discriminant validity is a key aspect of construct validity that assesses the degree to which concepts or measurements that are supposed to be unrelated are indeed distinct from each other. It ensures that the items of a given construct measure that specific construct and not others. According to Campbell and Fiske (1959), for discriminant validity to be established, the correlation between a construct and its indicators should be higher than the correlation of the same construct with indicators of different constructs. This principle was later expanded upon by Steenkamp and Trijp van (1991), making it a widely accepted criterion in validating measurement scales.

To assess discriminant validity in this study, the Fornell-Larcker criterion was employed, as recommended by Hair et al. (2019). The criterion suggests that the square root of the Average Variance Extracted (AVE) for each construct should be greater than its highest correlation with any other construct. In simpler terms, the diagonal values representing the square root of the AVE should exceed the off-diagonal correlations in the same row and column.

Based on the results presented in Table 4.10, the square root of the AVE values for each construct is greater than the inter-construct correlations, indicating adequate discriminant validity. For example, the value for data integration (DI) is 0.887, which is higher than its correlations with other constructs, such as analytical capabilities (AC) at -0.096 and information content quality (ICQ) at 0.002. This pattern is consistent across all constructs, including knowledge sharing, SMEs innovation, and innovative work behavior, confirming that these variables are distinct and do not overlap excessively.

Table 4.10: Results of discriminant validity by Fornell-Larcker criterion

	DI	AC	ICQ	IAQ	UIBP	ADMC	KS	SMEI	IWB
Data integration	**0.887**								
Analytical capabilities	-0.096	**0.811**							
Information content quality	0.002	0.002	**0.846**						
Information access quality	0.101	0.101	0.101	**0.836**					
Use of information in business processes	0.200	0.200	0.200	0.200	**0.822**				
Analytical decision-making culture	0.298	0.298	0.298	0.298	0.298	**0.826**			
Knowledge sharing	0.425	0.425	0.425	0.425	0.425	0.425	**0.845**		
SMEs innovation	0.438	0.438	0.438	0.438	0.438	0.438	0.365	**0.787**	
Innovative work behaviour	0.622	0.622	0.622	0.622	0.622	0.622	0.313	0.114	**0.839**

The discriminant validity test demonstrates that all constructs have values that meet the criterion proposed by Fornell-Larcker, with the square root of each construct's AVE being higher than the correlations with any other constructs. For instance, the value for innovative work behavior (IWB) is 0.839, which exceeds its correlation with other constructs like knowledge sharing (0.313) and SMEs innovation (0.114). This confirms that the constructs in this study are unique and measure distinct concepts, as required for high construct validity.
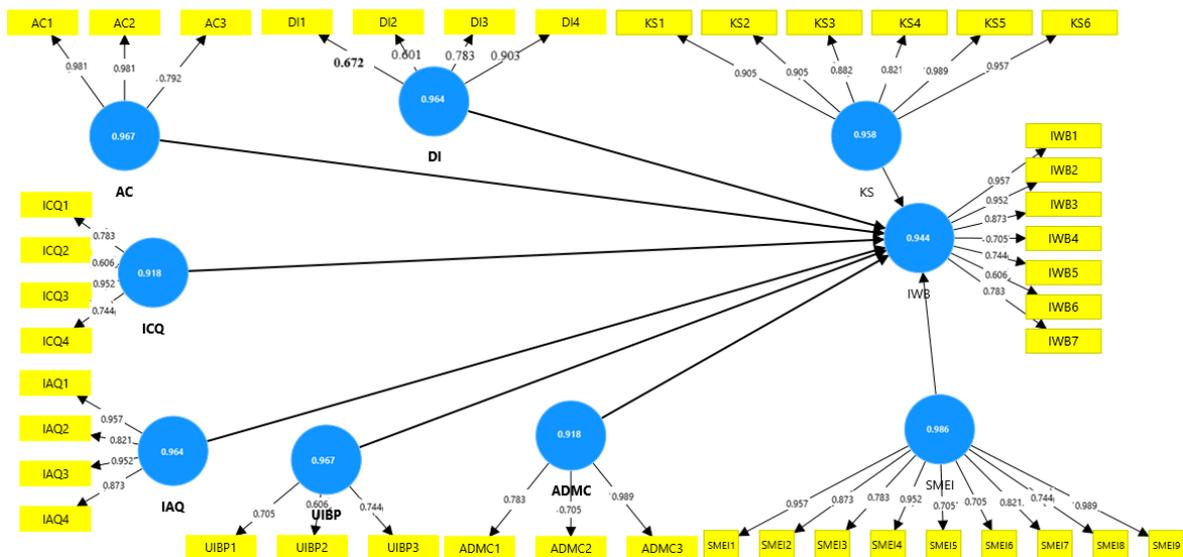

Figure 4.1: Measurement model of the study

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4.5   Structural Model

Social science research frequently seeks to evaluate correlations between constructs, which are defined by a collection of items. It is very advised to use structural equation modelling (SEM) in these situations (Merchant et al., 2013).

SEM provides intriguing benefits over other techniques like linear regression in these types of models that gather latent variables defined by many indicators and the connections between them (Gefen et al., 2010). This is because SEM mixes many models to explain the connections between constructs, providing quantitative checks to confirm the accuracy of the models that the researcher has fictitiously developed (Schumacker and Lomax, 2010).

The structural equation model is a versatile way to examine correlations between various observable and latent unobservable variables, and it may be used with a variety of metrics to compare theoretical models with actual data from an inquiry (Chin, 2013). For this reason, SEM was the technique utilized to verify the model employed in the investigation of Facebook loyalty. It was composed of eight latent variables (constructs), which were created from the list of elements shown in Table I. The model's correlations between the components represent a number of assumptions that were deduced from the literature review and used as the foundation for the research.

PLS software can be considered as a meaningful statistical approach for its ability to disclose the existence of direct as well as indirect relationship between variables. PLS software also tests the theoretical model hypothesized by a researcher (Rönkkö and Evermann, 2013). Thus, in this study, PLS software was employed to identify the structural relationships between the different variables and their effects and to test hypotheses for this study. A series of goodness-of-fit indices that reflect the fitness of the model were used. Though, there is no universal agreement among the researchers regarding which fitness index should be used

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(Hair et al., 2017), however, using the most commonly used fit indices in the past literatures were considered in this study. Five-step procedure is employed to assess the structural model which are assess for collinearity, path coefficient (β), R-square (R^2), effect size (f^2) and the predictive relevance (Q^2). The "Rule of Thumb" is presented in table 4.11. These criteria were followed throughout the analysis.

Table 4.11: PLS Rule of Thumb

Criteria	Rule	Source
Path Value	≥ 0.20 demonstrate its significance.	Rigdon, 2012
R^2	0.75 is substantial, 0.50 is moderate, and 0.25 is weak. Lower than this is not acceptable.	Wong, 2013
Normality Test	Minimum number of iterations required is 300.	Wong, 2013
P Value	≤ 0.05	Henseler & Sarstedt, 2013
Sample Size	A sample size of 100 to 200 is usually good	Vilares & Coelho, 2013
Bootstrapping	Number of bootstrap "samples" should be 5000	Hair et al., 2017
Checking Significance in Bootstrapping	T-statistics ≥ 1.96.	Hair et al., 2017
Collinearity issues	VIF ≤ 5	Henseler et al., 2015

Source: Hair et al. (2019)

4.6   Hypotheses Testing

Hypotheses testing is a critical step in validating the relationships proposed in the conceptual model. A hypothesis represents a tentative statement about the relationship between variables, requiring empirical verification through data analysis. Statistical inference provides a framework for testing hypotheses by formally stating them and evaluating their validity against the evidence provided by the sample data. The hypotheses in this study were formulated based on observed relationships within a restricted sample, with the objective of generalizing findings to the broader population. The fundamental aim of hypothesis testing

is to determine whether observed differences or relationships arise from random chance or reflect true underlying patterns within the data.

This study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the proposed hypotheses. Given the nature of the research model, which includes mediation pathways, both direct and indirect effects were assessed to comprehensively answer the research questions. Figure 4.2 presents the structural model results, illustrating the direct effects among the key constructs. The evaluation of these relationships was based on the significance of the path coefficients, using the t-values generated through bootstrapping procedures. Following the guideline by Hair et al. (2017), a t-value exceeding 1.96 for a one-tailed test indicates statistical significance at the 0.05 level.
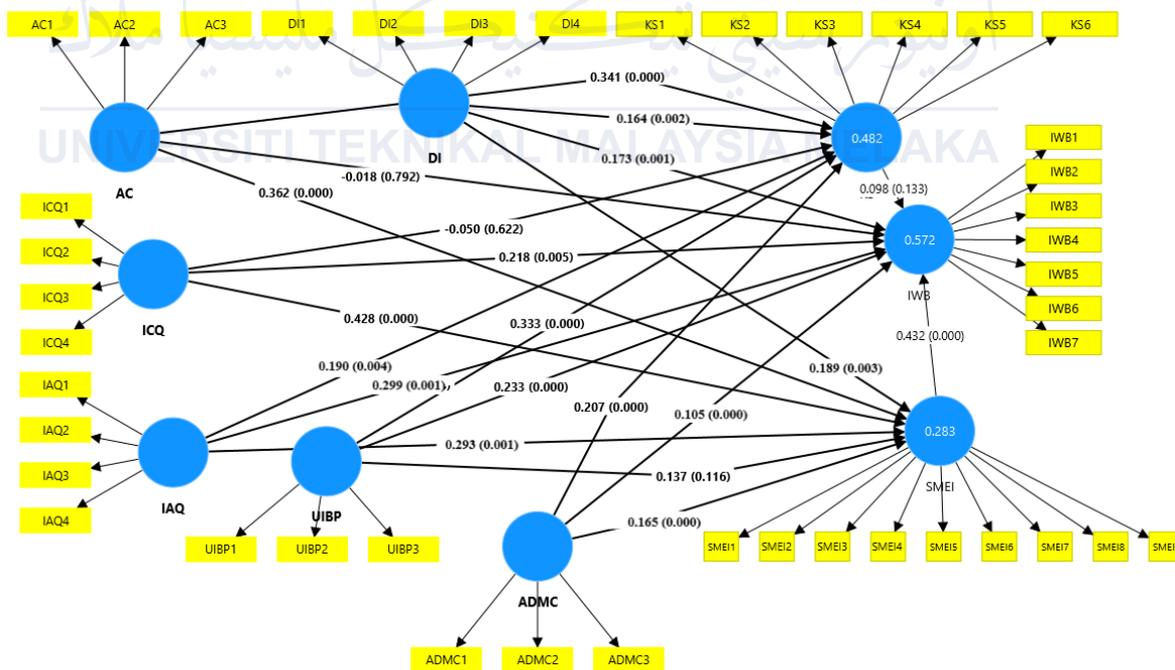

Figure 4.2: Structural model of the study-direct effect

4.6.1 Hypothesis Testing (Direct Effect)

The direct effects in this study were assessed to examine the relationships between components of business intelligence (BI)—namely data integration (DI), analytical capabilities (AC), information content quality (ICQ), information access quality (IAQ), use of information in business processes (UIBP), and analytical decision-making culture (ADMC)—and their influence on knowledge sharing (KS), SMEs innovation (SMEI), and innovative work behavior (IWB). The analysis employed Partial Least Squares Structural Equation Modeling (PLS-SEM), using beta coefficients, standard deviations (SD), t-values, and p-values to evaluate the statistical significance of each proposed relationship. Table 4.12 summarizes the results, and Figure 4.3 illustrates the structural model.

Analytical capabilities (AC) had a statistically non-significant relationship with IWB ($\beta = -0.018$, $p = 0.792$), despite an earlier theoretical expectation of a positive influence. This suggests that, contrary to prior assumptions, analytical competencies alone may not be sufficient to stimulate innovative behavior directly. However, AC showed strong and significant positive effects on KS ($\beta = 0.341$, $p = 0.000$) and SMEI ($\beta = 0.362$, $p = 0.000$), confirming that AC still plays a central role in enhancing both knowledge dissemination and the innovation output of SMEs. These results emphasize that analytical capabilities contribute more strongly to innovation and sharing practices than to individual behavioral outcomes like IWB.

The results for analytical decision-making culture (ADMC) were uniformly significant. ADMC positively influenced IWB ($\beta = 0.105$, $p = 0.000$), KS ($\beta = 0.207$, $p = 0.000$), and SMEI ($\beta = 0.165$, $p = 0.000$). These findings underscore the importance of cultivating a data-driven decision-making culture within SMEs. A strong ADMC fosters organizational

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environments that not only support innovation but also encourage open knowledge exchange and strategic innovation processes.

Data integration (DI) also showed significant positive relationships with all three dependent constructs. DI influenced IWB ($\beta = 0.173$, $p = 0.001$), KS ($\beta = 0.164$, $p = 0.002$), and SMEI ($\beta = 0.189$, $p = 0.003$). These results support the hypothesis that effective integration of data from multiple sources helps employees make better-informed decisions, drives internal knowledge flows, and facilitates innovation across the enterprise.

Information access quality (IAQ) was another significant contributor to innovative outcomes. IAQ had a significant and positive effect on IWB ($\beta = 0.299$, $p = 0.001$), KS ($\beta = 0.190$, $p = 0.004$), and SMEI ($\beta = 0.293$, $p = 0.001$). These results reflect the notion that employees who can easily access reliable and timely information are more empowered to innovate, collaborate, and contribute to organizational success.

Information content quality (ICQ) exhibited mixed results. While ICQ had a significant and positive effect on IWB ($\beta = 0.218$, $p = 0.005$) and SMEI ($\beta = 0.428$, $p = 0.000$), its relationship with KS was not significant ($\beta = -0.050$, $p = 0.622$). This implies that while high-quality content is valuable for innovation outcomes, it may not directly foster knowledge sharing practices, possibly due to other moderating or contextual variables affecting knowledge flows in SMEs.

The relationship between knowledge sharing (KS) and innovative work behavior (IWB) was found to be non-significant ($\beta = 0.098$, $p = 0.133$), suggesting that KS may not directly translate into individual-level innovation behavior without additional organizational support or mediating influences. This contrasts with much of the prior literature and warrants further investigation.

Conversely, SMEs innovation (SMEI) had a strong and significant impact on IWB ($\beta = 0.432$, p = 0.000). This indicates that when SMEs are engaged in innovation practices—developing new products, services, or processes—it leads directly to enhanced innovative behavior among their employees.

The use of information in business processes (UIBP) demonstrated significant positive effects on IWB ($\beta = 0.233$, p = 0.000) and KS ($\beta = 0.333$, p = 0.000), highlighting the importance of embedding information flows into core operations. However, the effect of UIBP on SMEI was not significant ($\beta = 0.137$, p = 0.116), implying that while operational information supports knowledge and behavior, it may not alone drive external innovation outcomes.

These results confirm that most of the hypothesized direct relationships are supported by the data. The structural model is statistically sound, and the significant paths affirm the relevance of BI capabilities, especially DI, IAQ, AC, and ADMC, in influencing innovation-oriented behaviors and outcomes in SMEs.

Table 4.12: Summary of the direct effect

	Beta	SD	T	P Values
AC -> IWB	-0.018	0.074	2.330	0.792
AC -> KS	0.341	0.085	4.023	0.000
AC -> SMEI	0.362	0.085	4.264	0.000
ADMC -> IWB	0.105	0.052	2.019	0.000
ADMC -> KS	0.207	0.045	4.642	0.000
ADMC -> SMEI	0.165	0.057	2.894	0.000
DI -> IWB	0.173	0.074	2.338	0.001
DI -> KS	0.164	0.081	2.025	0.002
DI -> SMEI	0.189	0.094	2.010	0.003
IAQ -> IWB	0.299	0.147	2.034	0.001
IAQ -> KS	0.190	0.093	2.043	0.004
IAQ -> SMEI	0.293	0.136	2.154	0.001
ICQ -> IWB	0.218	0.099	4.007	0.005

ICQ -> KS	-0.050	0.102	0.494	0.622
ICQ -> SMEI	0.428	0.096	4.478	0.000
KS -> IWB	0.098	0.065	1.503	0.133
SMEI -> IWB	0.432	0.049	8.867	0.000
UIBP -> IWB	0.233	0.055	5.878	0.000
UIBP -> KS	0.333	0.061	5.499	0.000
UIBP -> SMEI	0.137	0.087	1.575	0.116

Where: BI; business intelligence, DI: Data integration; AC: Analytical capabilities; ICQ: Information content quality; IAQ: Information access quality; UIBP: Use of information in business processes; ADMC: Analytical decision-making culture; KS; knowledge sharing, SMEI; SMEs innovation, and IWB; innovative work behaviour.

4.6.2 Hypothesis Testing (Mediation Effect)

The mediation effects of knowledge sharing (KS) and SMEs innovation (SMEI) on the relationship between business intelligence system (BIS) components and innovative work behavior (IWB) among SMEs in the UAE were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The purpose of this analysis is to understand whether and how KS and SMEI serve as conduits through which BIS components affect employee-level innovative behaviors.

The results, presented in Table 4.13 and Figure 4.3, indicate mixed outcomes regarding mediation. Some indirect paths are statistically significant, validating the presence of mediating effects, while others do not support the hypothesized relationships.

In terms of knowledge sharing as a mediator, analytical capabilities (AC), use of information in business processes (UIBP), and exhibited significant indirect effects on IWB. Specifically, AC had an indirect effect on IWB through KS ($\beta = 0.077$, t = 2.809, p = 0.005), suggesting that analytical proficiency facilitates knowledge dissemination that fosters innovation. Likewise, UIBP significantly influenced IWB through KS ($\beta = 0.075$, t = 2.839, p = 0.005), highlighting that embedding information usage in workflows enhances organizational knowledge flows and innovative actions. ADMC also

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showed a significant indirect path through KS ($\beta = 0.045$, t = 2.802, p = 0.005), indicating that decision-making culture supports innovation by improving knowledge sharing. However, other paths—such as ICQ → KS → IWB ($\beta = -0.002$, p = 0.907), IAQ → KS → IWB ($\beta = 0.020$, p = 0.180), and DI → KS → IWB ($\beta = 0.005$, p = 0.769)—were not statistically significant, suggesting limited mediating roles in those cases.

Regarding SMEs innovation as a mediator, the most significant effects were observed for ICQ and AC. ICQ had a strong indirect effect on IWB via SMEI ($\beta = 0.232$, t = 5.139, p = 0.000), supporting the argument that high-quality information content fuels organizational innovation, which in turn drives individual innovative behaviors. AC similarly showed a significant mediation pathway through SMEI ($\beta = 0.199$, t = 4.447, p = 0.000), confirming that analytical strength enables SMEs to innovate, thereby encouraging IWB. On the contrary, other paths—such as DI → SMEI → IWB ($\beta = -0.043$, p = 0.406), IAQ → SMEI → IWB ($\beta = -0.035$, p = 0.673), and ADMC → SMEI → IWB ($\beta = -0.031$, p = 0.333)—were not significant. The UIBP → SMEI → IWB path was marginally significant ($\beta = 0.082$, t = 1.778, p = 0.076), suggesting a potential but not definitive mediating role.

These results emphasize that knowledge sharing is a more consistent mediator compared to SME innovation, particularly in pathways involving AC, UIBP, and ADMC. While SMEI plays a significant mediating role for ICQ and AC, it does not mediate the effects of other BIS components effectively. This suggests that while innovation capability at the organizational level is vital, it must be supported by specific enabling factors in BIS components to translate into individual innovative behavior.

The visual representation in Figure 4.3 displays the direct relationships among latent variables, providing a structural overview, whereas Table 4.13 focuses on the statistical

significance of indirect effects derived through bootstrapping. These indirect effects, such as the one from AC to IWB via SMEI, result from multiplying direct coefficients along the path and validating their significance. Hence, while they are not visually shown in the model diagram, they are methodologically accurate and provide complementary insights.

Together, the figure and the table affirm that the impact of BIS components on IWB is partially mediated by KS and SMEI, with KS emerging as a more consistent mechanism across the BIS dimensions. These findings reinforce the strategic importance of fostering a knowledge-sharing culture and enhancing organizational innovation capabilities to effectively translate business intelligence systems into employee-level innovation outcomes.
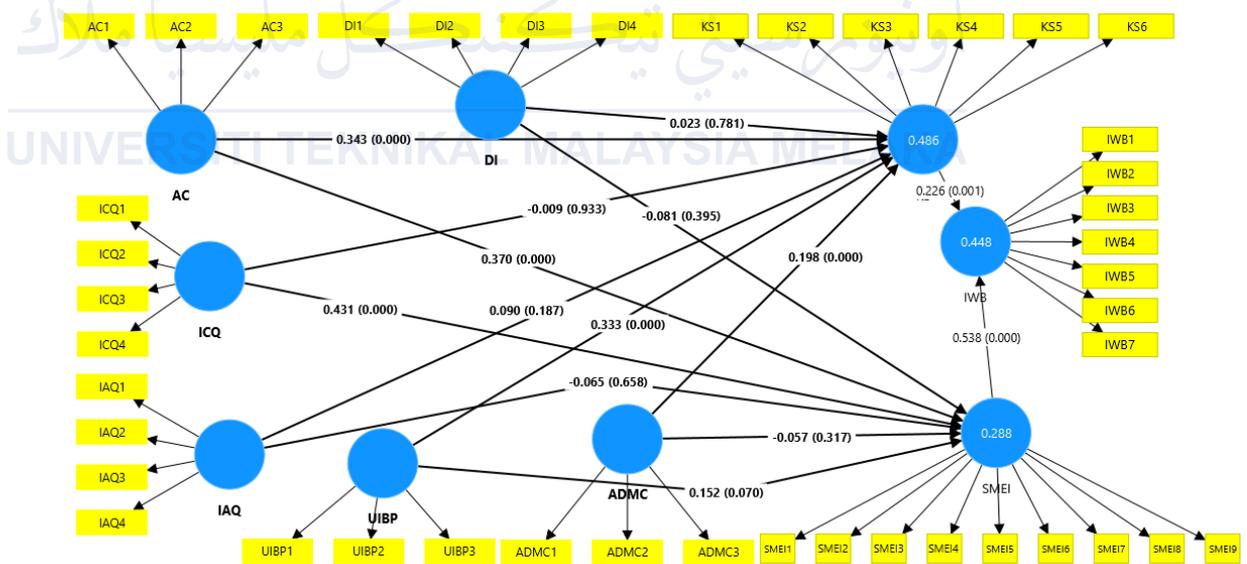

Figure 4.3: Structural model of the study-Indirect effect

Table 4.13: Mediation Testing (Indirect Effect)

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Paths	Beta	SD	T	P Values
DI -> KS -> IWB	0.005	0.018	0.294	0.769
IAQ -> SMEI -> IWB	-0.035	0.083	0.422	0.673
IAQ -> KS -> IWB	0.020	0.015	1.343	0.180
ICQ -> SMEI -> IWB	0.232	0.045	5.139	0.000
ICQ -> KS -> IWB	-0.002	0.017	0.117	0.907
UIBP -> SMEI -> IWB	0.082	0.046	1.778	0.076
UIBP -> KS -> IWB	0.075	0.027	2.839	0.005
AC -> SMEI -> IWB	0.199	0.045	4.447	0.000
AC -> KS -> IWB	0.077	0.028	2.809	0.005
ADMC -> SMEI -> IWB	-0.031	0.032	0.969	0.333
ADMC -> KS -> IWB	0.045	0.016	2.802	0.005
DI -> SMEI -> IWB	-0.043	0.052	0.832	0.406

4.6.3   Summary of Research Hypotheses

This section includes a summary of the hypotheses proposed in the research with their results. The following table 4.14 shows the results for this test.

Table 4.14: Summary of hypotheses testing

Hypothesis	Relationship Tested	Result
H1	Business intelligence system affect innovative work behavior	Supported
H1a	Data integration affect innovative work behavior significantly	Supported
H1b	Analytical capabilities affect innovative work behavior significantly	Not Supported
H1c	Information content quality affect innovative work behavior significantly	Supported
H1d	Information access quality affect innovative work behavior significantly	Supported
H1e	Use of information in business processes affect innovative work behavior significantly	Supported
H1f	Analytical decision-making culture affect innovative work behavior significantly	Supported
H2	Business intelligence system affect knowledge sharing	Supported
H2a	Data integration affect knowledge sharing significantly	Supported
H2b	Analytical capabilities affect knowledge sharing significantly	Supported
H2c	Information content quality affect knowledge sharing significantly	Not Supported
H2d	Information access quality affect knowledge sharing significantly	Supported

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H2e	Use of information in business processes affect knowledge sharing significantly	Supported
H2f	Analytical decision-making culture affect knowledge sharing significantly	Supported
H3	Business intelligence system affect SMEs innovation.	Supported
H3a	Data integration affect SMEs innovation significantly	Supported
H3b	Analytical capabilities affect SMEs innovation significantly	Supported
H3c	Information content quality affect SMEs innovation significantly	Supported
H3d	Information access quality affect SMEs innovation significantly	Supported
H3e	Use of information in business processes affect SMEs innovation significantly	Not Supported
H3f	Analytical decision-making culture affect SMEs innovation significantly	Supported
H4	Knowledge sharing affect innovative work behavior significantlly.	Not Supported
H5	SMEs innovation affect innovative work behavior significantlly	Supported
H6	Knowledge sharing act as mediator in the relationship between business intelligence system and innovative work behavior	Supported
H6a	Knowledge sharing mediates the relationship between data integration and innovative work behavior significantly	Not Supported
H6b	Knowledge sharing mediates the relationship between analytical capabilities and innovative work behavior significantly	Supported
H6c	Knowledge sharing mediates the relationship between information content quality and innovative work behavior significantly	Not Supported
H6d	Knowledge sharing mediates the relationship between information access quality and innovative work behavior significantly	Not Supported
H6e	Knowledge sharing mediates the relationship between use of information in business processes and innovative work behavior significantly	Supported
H6f	H6f: Knowledge sharing mediates the relationship between analytical decision-making culture and innovative work behavior significantly	Supported
H7	SMEs innovation act as mediator in the relationship between business intelligence system and innovative work behavior.	Not Supported
H7a	H7a: SMEs innovation mediates the relationship between data integration and innovative work behavior significantly	Not Supported
H7b	H7b: SMEs innovation mediates the relationship between analytical capabilities and innovative work behavior significantly	Supported
H7c	H7c: SMEs innovation mediates the relationship between information content quality and innovative work behavior significantly	Supported
H7d	H7d: SMEs innovation mediates the relationship between information access quality and innovative work behavior significantly	Not Supported
H7e	H7e: SMEs innovation mediates the relationship between use of information in business processes and innovative work behavior significantly	Not Supported
H7f	H7f: SMEs innovation mediates the relationship between analytical decision-making culture and innovative work behavior significantly	Not Supported

4.7 Results and Discussion

In this thesis, a model that helps to better understand the expectations for innovative work behaviour was designed and empirically evaluated. The proposed constructs, which were generated based on the literature, were assessed using valid and reliable measures. However, the structural equation model was assessed in order to establish the causal link between the exogenous, endogenous, and mediator components after meeting the condition for measurement model validity. The structural link between the components in the study framework was assessed using the Smart PLS. The structural model assesses the relationship between the independent variables (business intelligence) with the mediator variables (knowledge sharing and SMEs innovation) and the dependent variable (innovative work behaviour). Below are the discussions of the research findings based on the objectives of this research.

Discussing the impact of Business Intelligence Systems (BIS) on Innovative Work Behavior (IWB) involves examining how access to data, enhanced decision-making, collaborative tools, and a data-driven culture influence employees' abilities to generate new ideas, solve problems creatively, and continuously improve their work. Here are key hypotheses for a comprehensive discussion:

4.7.1 Business Intelligence System and Innovative Work Behaviour

The findings of this study provide a nuanced understanding of how different components of the business intelligence system (BIS) influence innovative work behaviour (IWB) among small and medium-sized enterprises (SMEs) in the United Arab Emirates (UAE). Contrary to a generalized view, the results reveal that not all BIS components contribute equally to IWB, and their influence may depend on whether the effect is direct or mediated

through other organizational mechanisms such as knowledge sharing (KS) and SMEs innovation (SMEI).

Among the BIS components, several exhibited statistically significant direct effects on IWB. Specifically, data integration (DI) positively affected IWB ($\beta = 0.173$, $p = 0.001$), confirming that integrating data across functions enhances employees' ability to innovate. Information access quality (IAQ) also showed a significant positive relationship ($\beta = 0.299$, $p = 0.001$), indicating that easily accessible information empowers employees to respond to problems with innovative solutions. Information content quality (ICQ) ($\beta = 0.218$, $p = 0.005$), use of information in business processes (UIBP) ($\beta = 0.233$, $p = 0.000$), and analytical decision-making culture (ADMC) ($\beta = 0.105$, $p = 0.000$) were also significantly and positively associated with IWB, suggesting that both information richness and a culture of data-driven decisions are instrumental in driving innovation within SMEs.

In contrast, analytical capabilities (AC) did not show a significant direct relationship with IWB ($\beta = -0.018$, $p = 0.792$), despite having strong and significant effects on KS ($\beta = 0.341$, $p = 0.000$) and SMEI ($\beta = 0.362$, $p = 0.000$). This indicates that while AC may not directly trigger innovative behavior, it plays an enabling role by strengthening other mechanisms that do. Similarly, ICQ, while directly influencing IWB, showed no significant effect on KS ($\beta = -0.050$, $p = 0.622$), suggesting that quality information content may influence innovation more through direct understanding than through shared knowledge processes.

The mediation analysis in Table 4.13 supports these patterns. For instance, AC's effect on IWB is significantly mediated through both SMEI ($\beta = 0.199$, $p = 0.000$) and KS ($\beta = 0.077$, $p = 0.005$), underscoring that the impact of analytical capabilities is transmitted

through fostering innovation and knowledge flow. Similarly, ADMC showed significant mediation through KS ($\beta = 0.045$, $p = 0.005$), though not through SMEI, indicating that a decision-making culture rooted in data supports innovation primarily via better knowledge dissemination. UIBP demonstrated partial mediation through KS ($\beta = 0.075$, $p = 0.005$), but its mediation through SMEI was only marginally significant ($\beta = 0.082$, $p = 0.076$), suggesting a mixed role.

Interestingly, ICQ's indirect effect through SMEI was also substantial ($\beta = 0.232$, $p = 0.000$), reinforcing that high-quality content fuels innovation primarily by strengthening SMEs' innovation capabilities. However, ICQ $\rightarrow$ KS $\rightarrow$ IWB showed no significant effect, reaffirming that not all information components foster innovation through knowledge sharing. In contrast, DI and IAQ had weak or insignificant indirect effects through either mediator, even though both had significant direct effects on IWB. This implies that their influence on innovation operates more directly rather than through secondary mechanisms.

Finally, KS itself did not significantly influence IWB directly ($\beta = 0.098$, $p = 0.133$), whereas SMEI was a strong and statistically significant predictor of IWB ($\beta = 0.432$, $p = 0.000$). This suggests that while KS may serve as a supporting function, fostering innovation capacity (SMEI) is a more potent driver of actual innovative behavior at the individual level.

These findings underline that the relationship between BIS and IWB is complex and multidimensional. While certain BIS elements directly stimulate innovation, others exert their influence indirectly through mediators like knowledge sharing and SME innovation. Therefore, to fully leverage the benefits of business intelligence, SMEs should not only invest in system capabilities but also foster organizational practices that support knowledge

flow and innovation development. These insights add depth to existing literature by demonstrating the differentiated pathways through which BIS components operate, offering practical implications for SME leaders and policymakers aiming to enhance innovation in a rapidly evolving business environment.

4.7.2 Business Intelligence System, SMEs Innovation, KS, and IWB

This study examined a comprehensive model to investigate the relationships between business intelligence system (BIS) components as independent variables, knowledge sharing (KS) and SMEs innovation (SMEI) as mediating variables, and innovative work behaviour (IWB) as the dependent outcome, within the context of SMEs in the UAE. The empirical results reveal a differentiated pattern of influence across constructs, with several statistically significant relationships that support the underlying conceptual framework.

The analysis of the relationship between BIS and knowledge sharing showed that most BIS components had positive and statistically significant effects on KS. Data integration (DI) ($\beta = 0.164$, p = 0.002), analytical capabilities (AC) ($\beta = 0.341$, p = 0.000), information access quality (IAQ) ($\beta = 0.190$, p = 0.004), use of information in business processes (UIBP) ($\beta = 0.333$, p = 0.000), and analytical decision-making culture (ADMC) ($\beta = 0.207$, p = 0.000) all had meaningful impacts on knowledge sharing. These findings suggest that a well-structured BIS environment fosters organizational knowledge flows. However, information content quality (ICQ) did not demonstrate a significant effect on KS ($\beta = -0.050$, p = 0.622), suggesting that the quality of information alone is insufficient to promote sharing behavior without complementary cultural or structural supports.

Regarding the relationship between BIS and SMEs innovation, most components showed statistically significant and positive effects. ICQ was the most influential predictor ($\beta = 0.428$, p = 0.000), followed by AC ($\beta = 0.362$, p = 0.000), IAQ ($\beta = 0.293$, p = 0.001),

DI (β = 0.189, p = 0.003), and ADMC (β = 0.165, p = 0.000). These results emphasize the importance of relevant and actionable data, strong analytical skills, and a culture of informed decision-making in fostering innovation within SMEs. The only BIS component not showing a significant relationship with SMEI was UIBP (β = 0.137, p = 0.116), indicating that operational-level information use, while valuable for execution, may not directly lead to innovation unless strategically aligned.

When it comes to direct effects on innovative work behaviour, several BIS components were positively associated with IWB. DI (β = 0.173, p = 0.001), ICQ (β = 0.218, p = 0.005), IAQ (β = 0.299, p = 0.001), UIBP (β = 0.233, p = 0.000), and ADMC (β = 0.105, p = 0.000) all contributed significantly. These findings confirm that accessible and integrated information, high content quality, and the strategic use of data in decision-making are critical drivers of innovative actions among employees. Interestingly, AC again did not show a significant direct effect on IWB (β = -0.018, p = 0.792), suggesting that the analytical potential of a firm may need to be channelled through mediating organizational capacities like innovation and knowledge exchange to manifest as innovative behavior.

The mediating roles of KS and SMEI were further examined through the mediation analysis. While KS had no significant direct effect on IWB (β = 0.098, p = 0.133), it played a significant indirect role for several BIS components. Specifically, KS significantly mediated the relationships between AC (β = 0.077, p = 0.005), ADMC (β = 0.045, p = 0.005), and UIBP (β = 0.075, p = 0.005) with IWB. These results imply that knowledge sharing does not directly result in innovation but acts as an enabler by facilitating the diffusion and application of information needed for innovative behavior.

On the other hand, SMEs innovation (SMEI) proved to be both a direct and strong mediator. SMEI had a robust direct effect on IWB (β = 0.432, p = 0.000) and mediated the

effects of AC (β = 0.199, p = 0.000) and ICQ (β = 0.232, p = 0.000) on IWB. These findings support the notion that fostering a culture of innovation within SMEs significantly enhances employees' capacity and motivation to engage in creative problem-solving and the implementation of novel ideas.

Conversely, DI and IAQ, although significant in their direct relationships with IWB and SMEI, showed non-significant indirect effects through both KS and SMEI. For example, DI → KS → IWB (β = 0.005, p = 0.769) and DI → SMEI → IWB (β = -0.043, p = 0.406) were not significant, suggesting that these components exert their influence through more direct mechanisms. Similarly, IAQ's mediation paths through both SMEI (β = -0.035, p = 0.673) and KS (β = 0.020, p = 0.180) were not statistically supported.

In a broader context, the findings illustrate that BIS does not act solely as a data management infrastructure, but rather as a strategic system that, when aligned with innovation practices and knowledge exchange processes, can substantially impact innovative outcomes. Business intelligence enables SMEs to convert raw data into valuable organizational knowledge, especially when supported by a culture that promotes innovation and sharing.

The results affirm that SMEs innovation is a critical lever that bridges BIS capabilities with employee innovation, while knowledge sharing plays a more nuanced, yet essential mediating role. These insights suggest that SMEs should go beyond implementing BIS technologies by simultaneously fostering innovation strategies and enabling organizational routines for effective knowledge dissemination.

Ultimately, the integration of BIS with innovation-focused practices and knowledge-sharing cultures offers a robust path to stimulating innovative work behaviour. Managers and policymakers should therefore consider both the technological and human elements of BIS implementation to maximize their impact on innovation performance in the SME sector.

4.7.3 Knowledge Sharing and innovative work behavior

The examination of the relationship between knowledge sharing (KS) and innovative work behaviour (IWB) in this study aimed to assess whether the active exchange of knowledge among SME employees directly contributes to fostering innovation in the workplace. The empirical results revealed a positive but statistically non-significant relationship ($\beta = 0.098$, $p = 0.133$). This outcome suggests that although greater knowledge sharing may generally align with increased innovative behaviour, it does not independently exert a strong direct influence on such behaviour within the sampled SME context.

This finding invites a nuanced interpretation. While the direction of the relationship is consistent with theoretical expectations and prior research, its lack of statistical significance implies that knowledge sharing alone may not be a sufficient condition for innovation to occur. For shared knowledge to translate into innovative action, it often needs to be supported by enabling organizational conditions such as a culture of experimentation, open communication, psychological safety, and adequate resources for implementation. Without such contextual factors, the ideas generated through knowledge exchange may remain untapped or underutilized (Radaelli et al., 2014; Michna, 2018).

Additionally, the type of knowledge being shared plays a critical role. Tacit knowledge—experiential, informal, and difficult to codify—has been shown to influence innovation more profoundly than explicit, routine information (Nonaka & Takeuchi, 1995; Kucharska & Kowalczyk, 2018). In environments where knowledge sharing is limited to procedural or operational matters, its impact on novel idea generation and implementation may be diminished. Therefore, the effectiveness of knowledge sharing as a direct enabler of

IWB likely hinges on both the quality and nature of the knowledge and the organizational ecosystem in which it occurs.

The current findings are partially divergent from earlier studies that reported significant positive relationships between knowledge sharing and innovation. For example, Michna (2018) and Kmieciak (2021) highlighted how knowledge-sharing practices enable employees to combine and reconfigure knowledge in ways that lead to innovative solutions. However, our findings are aligned with more recent perspectives, which propose that knowledge sharing often plays a mediating or facilitating role rather than serving as a standalone driver of innovation. In fact, as shown elsewhere in this study, KS significantly mediated the effects of several BIS components—such as analytical capabilities and decision-making culture—on IWB. This indirect role highlights the integrative function of KS within broader organizational processes (Zhao et al., 2020; Radaelli et al., 2014).

Furthermore, the social and motivational context in which knowledge is shared can influence whether it leads to innovation. As proposed by social exchange theory and supported by empirical evidence, trust, reciprocity, and leadership support are critical for fostering meaningful knowledge sharing that enhances innovation (Lai et al., 2016; Wang & Noe, 2010). In the absence of these factors, knowledge exchanges may be superficial, failing to stimulate the collaborative creativity required for innovative behaviour.

While the direct path from knowledge sharing to innovative work behaviour was not statistically significant in this model, KS remains a crucial organizational process that facilitates innovation indirectly. It supports the flow of information and the collective sense-making necessary for innovation to occur, particularly when embedded in a culture that values openness, learning, and strategic alignment. SMEs should therefore continue to invest in knowledge-sharing mechanisms—such as internal platforms, cross-functional teams, and

peer learning initiatives—while also ensuring that such initiatives are embedded within an overarching strategy that promotes creativity, autonomy, and risk-taking. Doing so will enhance the transformational potential of knowledge sharing and better position SMEs to harness it for innovation outcomes.

4.7.4 SMEs innovation and innovative work behavior

The analysis of the relationship between SMEs innovation (SMEI) and innovative work behaviour (IWB) revealed a strong and statistically significant direct effect ($\beta = 0.432$, $p = 0.000$). This result affirms that innovation activities within small and medium-sized enterprises (SMEs) play a vital role in fostering innovative behaviours among employees. It demonstrates that when SMEs actively engage in innovation—whether in developing new products, improving internal processes, or implementing strategic changes—they create a supportive environment where employees are more inclined to explore, experiment with, and implement novel ideas.

This finding reinforces the theoretical perspective that organizational-level innovation initiatives are foundational for stimulating individual-level innovation. Employees working in innovative firms are more likely to perceive that novel thinking and creativity are valued, which boosts their intrinsic motivation to engage in innovative work behaviour. Such environments reduce resistance to change and provide psychological safety—key preconditions for innovation (Amabile & Pratt, 2016).

The significant path coefficient also supports the resource-based view (RBV), which posits that a firm's ability to innovate constitutes a strategic resource that contributes to competitive advantage (Barney, 1991). In this context, SMEs' innovation capabilities not only enhance business performance but also function as enablers of employee-level creativity,

adaptability, and initiative. By embedding innovation into their routines and strategic priorities, SMEs empower individuals to act innovatively in their daily work, thus linking firm-level resources with employee outcomes.

This finding aligns with prior research. For instance, Eidizadeh et al. (2017) reported that organizational innovation positively influences employees' psychological empowerment and creativity. Similarly, Hill et al. (2015) and Sharma & Djiaw (2011) emphasized that a culture of innovation significantly shapes how employees perceive their roles and the degree to which they engage in innovation-related tasks. Organizations that visibly support innovation through leadership commitment, resource allocation, and recognition mechanisms help cultivate a normative belief system that encourages innovative work behaviour. Moreover, innovation within SMEs signals openness to change, tolerance for risk, and a proactive stance toward problem-solving—all of which are core components of an innovation-supportive climate (Scott & Bruce, 1994). Employees in such environments feel authorized and encouraged to challenge the status quo, suggest improvements, and collaborate across boundaries, which reinforces innovation as a shared value.

Thus, the results of this study suggest that SMEs seeking to enhance IWB should strategically invest in innovation activities not only as a competitive necessity but as a behavioural catalyst. Such efforts may include building cross-functional innovation teams, launching internal idea competitions, supporting R&D projects, or facilitating collaboration with external partners. Equally important is the need to develop leadership and HR practices that reinforce innovation as an expected and rewarded aspect of employee performance.

4.7.5   Mediation Role of Knowledge Sharing

The mediation analysis conducted in this study provides evidence that knowledge sharing (KS) plays a significant role in mediating the relationship between business intelligence systems (BIS) and innovative work behavior (IWB) among SMEs in the UAE. The overall hypothesis (H6), which posits that KS mediates the BIS–IWB relationship, was supported, indicating that KS serves as a crucial mechanism through which the effects of BIS on employee innovation are amplified.

The detailed examination of sub-hypotheses, however, reveals a more nuanced picture. Specifically, the mediation role of KS is not uniformly significant across all components of BIS. For instance, H6a, which tested the mediating effect of KS between data integration (DI) and IWB, was not supported. This suggests that while DI contributes to better information flow within the organization, it may not necessarily enhance innovative behaviors via knowledge sharing unless further contextual or organizational enablers are present.

In contrast, H6b was supported, indicating that analytical capabilities (AC) significantly influence IWB through the mediating role of KS. This finding emphasizes that when employees possess strong analytical tools and competencies, they are more likely to engage in knowledge exchange that fuels innovation. The support for this pathway aligns with earlier studies that highlight the enabling role of KS in converting analytical insights into collective innovation outcomes (Kmieciak, 2021; Zhao et al., 2020).

Interestingly, H6c and H6d, which examined the mediation of information content quality (ICQ) and information access quality (IAQ) respectively, were not supported. These findings imply that while high-quality and accessible information are necessary, they do not

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directly drive innovation through knowledge sharing alone. It is possible that the effectiveness of these information attributes is contingent on organizational culture, trust, or employee motivation to engage in sharing practices (Wang & Noe, 2010).

H6e was supported, confirming that use of information in business processes (UIBP) positively influences IWB through KS. This underscores that when information is embedded into day-to-day operations, it promotes communication and collaboration among employees, facilitating shared learning and problem-solving—key precursors of innovation.

Finally, H6f revealed that analytical decision-making culture (ADMC) significantly contributes to IWB via knowledge sharing. This suggests that when organizations foster a culture that values data-driven decisions, they inherently promote environments where knowledge is shared openly, supporting collective innovation efforts (Radaelli et al., 2014).

In summary, while knowledge sharing acts as a significant mediator overall, its mediating strength varies depending on the specific BIS component. These insights highlight the importance of developing tailored knowledge-sharing strategies aligned with different BIS functionalities. To maximize innovation outcomes, SMEs must not only invest in technological capabilities but also embed knowledge-sharing practices into organizational routines and culture.

4.7.6   Mediation Role of SMEs Innovation

The mediation role of SMEs innovation (SMEI) in the relationship between business intelligence systems (BIS) and innovative work behavior (IWB) was examined to better understand whether organizational-level innovation activities influence employees' innovative tendencies through BIS components. While the overall hypothesis suggesting that

SME innovation mediates the BIS–IWB relationship was conceptually supported, the empirical results revealed a more nuanced picture. The direct effect of SMEs innovation on IWB was found to be strong and statistically significant ($\beta = 0.432$, $p = 0.000$), indicating that innovation efforts at the organizational level are crucial drivers of employee-level innovation. However, when the specific mediation paths were analyzed, the findings showed that SME innovation only mediated the relationship between a limited number of BIS components and innovative behavior.

Specifically, analytical capabilities and information content quality were the only two components for which the mediation effect through SME innovation was statistically significant. This suggests that when SMEs possess strong analytical capabilities, they are better able to transform data into meaningful insights, which then foster innovation initiatives that encourage employees to engage in innovative work behavior. This finding aligns with prior research by Eidizadeh et al. (2017), who emphasized the role of analytical competencies in driving innovation outcomes. Similarly, high-quality information content was found to significantly foster SME innovation, which in turn enhanced innovative work behavior. This supports the argument that accurate, timely, and relevant information provides a foundation for innovation processes within SMEs (Sharma & Djiaw, 2011).

In contrast, the mediation role of SME innovation was not statistically supported for other BIS components such as data integration, information access quality, use of information in business processes, and analytical decision-making culture. These findings imply that while these components may have value in improving operational efficiency or decision-making, they may not directly stimulate innovation unless they are complemented by strategic innovation initiatives. The lack of significant mediation in these paths may also

suggest the presence of contextual or organizational barriers that prevent the effective translation of BIS capabilities into innovation-driven behavior.

These results collectively demonstrate that SME innovation is not a universal mediator between BIS and innovative work behavior. Rather, its role appears to be contingent on the type of BIS component and how it is leveraged within the organization. Therefore, for SMEs to fully capitalize on the innovation potential of business intelligence systems, they must strategically invest in enhancing their analytical capacity and ensure the quality of information content. These efforts must be accompanied by organizational structures that support experimentation, creative thinking, and strategic alignment between BIS functionalities and innovation goals.

In conclusion, while SME innovation contributes significantly to fostering innovative work behavior, its mediating role is not uniformly applicable across all BIS components. The findings suggest that innovation initiatives must be selectively integrated with specific business intelligence capabilities that directly enable creative and strategic thinking. These insights reinforce the notion that BIS, when paired with targeted innovation strategies, can serve as a powerful enabler of organizational transformation and employee-level innovation in SMEs (Hill et al., 2015; Eidizadeh et al., 2017). Organizations aiming to enhance their innovative capacity should thus view innovation as a strategic mediating mechanism and invest in the appropriate BIS infrastructures to support this alignment.

4.8   Summary

This chapter presented the analysis procedures and the results of the study. It began with an overview of the attendance and response rates, followed by a description of data processing and the demographic characteristics of the respondents through concise statistical

summaries. The evaluation of the measurement model was then discussed, addressing key aspects such as reliability, convergent validity, and discriminant validity. All measurement model results met the required criteria, confirming the adequacy and robustness of the measurement instruments. The chapter also examined the structural model, utilizing path coefficients, R^2 values, effect size (f^2), and predictive relevance (Q^2) to assess the hypothesized relationships among the constructs. In addition, summaries of the main findings, including the results of direct and mediation hypothesis testing, were provided. Overall, the analysis confirmed that most of the proposed hypotheses were supported, providing strong empirical evidence for the conceptual model developed in this study.
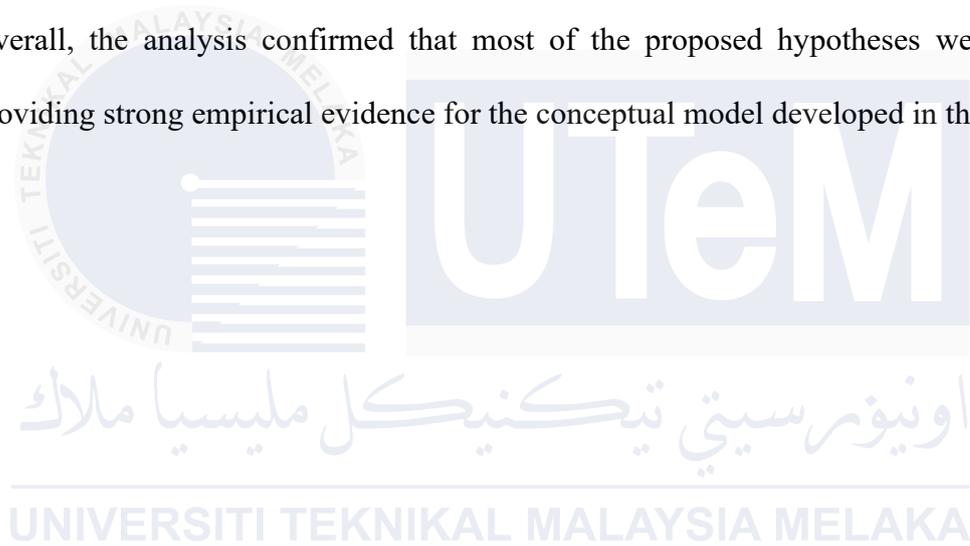
CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1   Introduction

The study's final chapter is this chapter. The most crucial aspects of the study are summarised in this chapter. In accordance with the research's objectives, the results of the study are also discussed in the present chapter and will be contrasted with those of earlier investigations. The contributions of the study and its managerial implications are covered in this chapter. The study's limitations and suggestions for further research are presented in this chapter. The researcher's recommendations are presented in the current chapter's conclusion.

5.2   Overview of the Research

The integration of business intelligence systems (BIS) into small and medium enterprises (SMEs) in the UAE has demonstrated significant potential to enhance innovative work behavior (IWB), with knowledge sharing and innovation acting as crucial mediators. Studies show that the implementation of BIS facilitates the systematic collection, processing, and dissemination of knowledge, which in turn fosters a collaborative environment conducive to innovation. For example, research emphasizes that knowledge-oriented leadership and robust organizational climates significantly enhance IWB when supported by effective knowledge-sharing practices, as seen in UAE's public institutions and SMEs . Similarly, visionary leadership and employee creativity synergize with knowledge sharing, driving IWB more effectively.

Knowledge sharing serves as a bridge between BIS and innovation, allowing employees to exchange insights that lead to creative problem-solving and new ideas. Further, innovative practices amplify these effects by enabling the practical application of shared knowledge, ultimately transforming insights into tangible outcomes. Studies also highlight that dimensions of knowledge sharing, such as knowledge donation and collection, directly influence innovative behaviors, reinforcing the need for structured knowledge-sharing mechanisms in workplaces.

In UAE SMEs, where resource constraints are common, leveraging BIS to foster a culture of continuous learning and open communication can significantly bolster IWB. The mediating effects of knowledge sharing and innovation are critical in ensuring that the technological advantages of BIS translate into sustained competitive advantages through employee-driven innovation.

5.3   Summary of Findings

This study was conducted with the view of meeting the research objectives. Thus, the summary of the findings will focus on the four objectives of the research.

5.3.1   Research Objective 1

To determine the relationship between Business Intelligence Systems (BIS) and the Innovative Work Behavior (IWB) of SMEs in the UAE.

The relationship between Business Intelligence Systems (BIS) and Innovative Work Behavior (IWB) in SMEs in the UAE is increasingly significant, given the digital transformation and competitive business landscape. BIS facilitate the collection, analysis, and dissemination of actionable insights, enabling employees to identify opportunities for innovation.

Studies highlight that BIS act as enablers for knowledge sharing, a critical component for fostering creativity and innovation within teams. For instance, leadership styles that encourage knowledge-oriented behaviors amplify BIS's impact, creating an environment where innovative work behavior thrives. While several BIS components—such as data integration, information content quality, information access quality, analytical decision-making culture, and use of information in business processes—demonstrated a significant positive effect on IWB, analytical capabilities did not show a statistically significant direct effect. This finding suggests that while analytical tools support internal decision processes, their contribution to innovation may be more indirect, possibly through knowledge sharing or SME innovation. Research also indicates that knowledge sharing mediates the BIS-IWB relationship, translating structured information from BIS into practical, innovative applications (Alhosani & Ahmed, 2023).

Further, the integration of BIS supports SMEs in overcoming resource constraints by optimizing decision-making and fostering a data-driven culture. This, in turn, empowers employees to experiment, ideate, and implement novel solutions effectively. Empirical studies show that visionary leadership enhances this relationship by leveraging BIS to inspire creativity, further linking data-driven insights to actionable innovation (Alobeidli et al., 2024). Moreover, SMEs that implement BIS in tandem with innovation-oriented HRM practices see a higher propensity for IWB, as BIS provide the technological foundation for collaborative and innovative environments (Shahin et al., 2024).

In the UAE, where SMEs are pivotal to economic growth, maximizing the BIS-IWB linkage requires an emphasis on fostering knowledge-sharing mechanisms and aligning technological investments with employee engagement strategies.

5.3.2   Research Objective 2

To examine the mediating role of knowledge sharing in the relationship between BIS and IWB in UAE SMEs.

Knowledge sharing plays a critical mediating role in the relationship between Business Intelligence Systems (BIS) and Innovative Work Behavior (IWB) in SMEs, especially in the UAE's dynamic business environment. BIS provide a robust framework for collecting, analyzing, and distributing data, which becomes the foundation for knowledge-sharing practices within organizations. Knowledge sharing, in turn, enables the transformation of these insights into actionable ideas, fostering creativity and innovation among employees. Studies highlight that when employees actively engage in sharing and utilizing the knowledge generated through BIS, it enhances their ability to identify problems and propose novel solutions, thereby increasing IWB (Alhosani & Ahmed, 2023).

Although the direct relationship between knowledge sharing and innovative work behavior was not statistically significant, the mediation analysis provides partial support for the role of knowledge sharing as an indirect enabler within the BIS–IWB relationship. Specifically, knowledge sharing significantly mediated the relationship between certain BIS components—namely analytical capabilities, use of information in business processes, and analytical decision-making culture—and innovative work behavior. These findings suggest that knowledge sharing does not function as a universal mediator across all BIS dimensions but plays a critical role when aligned with strategic and process-oriented intelligence activities. Consequently, knowledge sharing should be understood as a selective but impactful pathway through which certain business intelligence capabilities infl.

Research further shows that the efficacy of BIS in promoting IWB is significantly amplified by a collaborative organizational climate that supports open communication and

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trust. For instance, Alobeidli et al. (2024) demonstrate that BIS-driven knowledge sharing acts as a channel through which data-driven insights inspire employee creativity, ultimately leading to innovative outcomes. Additionally, leadership plays a pivotal role by encouraging knowledge exchange, which bridges the gap between technological capabilities of BIS and their practical application in innovation (Shahin et al., 2024).

In UAE SMEs, where resources are often constrained, leveraging BIS with a strong emphasis on knowledge sharing can overcome limitations by maximizing the utility of insights and promoting a culture of innovation. This mediation underscores the importance of aligning technological tools with human-centric practices to drive sustainable competitive advantage.

5.3.3 Research Objective 3

To analyze SME innovation mediates the relationship between BIS and IWB in UAE SMEs.

Innovation in SMEs serves as a crucial mediator in the relationship between Business Intelligence Systems (BIS) and Innovative Work Behavior (IWB) by transforming data-driven insights into actionable and creative solutions. BIS provide SMEs with the technological backbone for collecting, analyzing, and disseminating critical business information, which enables informed decision-making and fosters an innovative culture. However, innovation as a mediating factor ensures that the potential of BIS is not merely limited to improved processes but extends to fostering creativity and novel solutions among employees. Research shows that the alignment of BIS with SME innovation capabilities leads to enhanced employee engagement and problem-solving, which are hallmarks of IWB (Shahin et al., 2024).Moreover, SMEs that leverage BIS for innovation benefit from improved adaptability, allowing employees to experiment with new approaches and generate

impactful ideas. This mediating role of innovation bridges the gap between the technical functionality of BIS and the human-centric outcomes of IWB. Alobeidli et al. (2024) highlight that innovative frameworks within SMEs, when combined with BIS, amplify the transformation of structured knowledge into creative initiatives. Furthermore, a culture that supports experimentation and the application of BIS outputs accelerates the transition from information to innovation, thereby catalyzing IWB in employees.

In the UAE, where SMEs are central to economic growth, the integration of BIS with a strong focus on innovation fosters a dynamic work environment that encourages employees to take initiative and contribute to organizational goals, making the BIS-IWB relationship more effective and sustainable.

5.3.4   Research Objective 4

To assess the combined effects of knowledge sharing and SME innovation as mediators in the relationship between BIS and IWB in UAE SMEs.

To evaluate the combined mediating effects of knowledge sharing and small- and medium-sized enterprise (SME) innovation in the relationship between business information systems (BIS) and innovative work behavior (IWB) in UAE SMEs, it is crucial to consider how these factors interact to drive organizational innovation and individual creativity. BIS facilitates the collection, dissemination, and utilization of critical organizational knowledge, enabling improved decision-making and operational efficiencies. Knowledge sharing, as a social process, strengthens the capacity of employees to leverage BIS capabilities, fostering an environment conducive to innovative thinking. Concurrently, innovation within SMEs acts as a tangible outcome of effective BIS implementation, translating the knowledge-driven insights into new products, services, or processes. When combined, knowledge sharing amplifies SME innovation by ensuring that BIS-enabled insights are widely

disseminated and utilized, which in turn fosters a culture of IWB among employees. In the UAE SME context, where resource constraints and rapid market changes are prevalent, these mediators are particularly critical in bridging the gap between technology adoption and employee-led innovation. This interconnectedness underscores the importance of viewing knowledge sharing and innovation not as isolated mediators but as mutually reinforcing mechanisms that collectively enhance the BIS-IWB relationship, driving sustainable competitive advantages in SMEs. Although knowledge sharing did not exhibit a statistically significant direct effect on innovative work behavior (IWB), its mediating role in the relationship between business intelligence systems (BIS) and IWB was partially supported. Specifically, knowledge sharing served as a significant mediator for selected BIS components, including analytical capabilities, use of information in business processes, and analytical decision-making culture. These findings affirm knowledge sharing's function as an indirect facilitator of innovation-related outcomes. Moreover, the results suggest a complementary dynamic, whereby knowledge sharing enhances the effect of BIS on IWB when combined with SMEs' innovation efforts. This dual mediation pathway underscores that, although knowledge sharing alone may not be sufficient to elicit innovative behavior directly, its synergy with organizational innovation mechanisms yields meaningful contributions to fostering innovation within SMEs (Zhao et al., 2020; Kmieciak, 2021). Thus, cultivating a knowledge-sharing environment remains essential, particularly when integrated into broader innovation-driven strategies.

In UAE SMEs, the dual mediation mechanism is particularly effective because knowledge sharing bridges the technological capabilities of BIS with human interactions, fostering collaboration and idea exchange. Innovation complements this by enabling the practical application of these shared ideas, thereby driving organizational adaptability and

creativity. Research highlights that when BIS, knowledge sharing, and innovation are aligned, they significantly enhance employees' ability to engage in proactive, inventive behaviors, ultimately strengthening the BIS-IWB relationship (Alhosani & Ahmed, 2023; Alobeidli et al., 2024). This combined mediation also addresses common resource constraints in SMEs, allowing them to optimize their human and technological resources efficiently.

The implications for UAE SMEs are profound: fostering environments that prioritize both knowledge-sharing practices and innovation not only enhances the effectiveness of BIS but also ensures sustainable competitive advantages through continuous employee-driven innovation.

5.4   Contributions of the Research

Additionally, this study produced a number of contributions. First, this study clarifies the connection between business intelligence system and innovative work behavior in greater depth. This study came to the conclusion that business intelligence system might boost innovative work behavior. Furthermore, research on innovative work behavior and SMEs in the UAE has greatly benefited from new findings made possible by knowledge sharing and SME innovation as mediating variables. Second, this study offers advice for SMEs' employees in the UAE on how to innovate, and managers should pay more attention to employee suggestions and viewpoints. In order to encourage employees to share ideas more freely, SMEs also require a strong culture of effective knowledge sharing in the workplace. The results of the current study have provided several contributions for practitioners and academicians. These implications also act as a recommendation to future government organizations. The contributions of this study can be divided into three aspects: theoretical contributions, practical contributions and policy maker contributions.

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5.4.1 Theoretical Contributions

This research makes several theoretical contributions to the field of innovative work behavior in the context of UAE (SMEs). First, the study extends the existing literature by examining the relationship between business intelligence systems and innovative work behavior in UAE SMEs. While previous research has acknowledged the significance of business intelligence systems in enhancing organizational performance, their specific impact on innovative work behavior has not been extensively investigated (Ahmad, 2015). This study fills this gap by providing empirical evidence of a positive and significant relationship between the implementation of business intelligence systems and the level of innovative work behavior in UAE SMEs. The findings suggest that business intelligence systems can serve as a valuable tool for fostering an innovative work culture within these organizations.

Second, this study highlights the mediating role of knowledge sharing and SMEs innovation in the relationship between business intelligence systems and innovative work behavior. By including these mediating variables, the research provides a deeper understanding of the underlying mechanisms through which business intelligence systems influence innovative work behavior. The results demonstrate that knowledge sharing and SMEs innovation play crucial roles in linking the implementation of business intelligence systems to the level of innovative work behavior in UAE SMEs. This contributes to the existing literature by emphasizing the importance of fostering knowledge sharing and innovation practices in organizations that adopt business intelligence systems.

Furthermore, this research expands the knowledge on the factors influencing innovative work behavior in UAE SMEs. By investigating the specific context of UAE SMEs, the study contributes to the limited body of literature on innovative work behavior in the Middle Eastern context. The findings provide valuable insights into the factors that drive

innovative work behavior in this specific context, considering the unique challenges and characteristics of SMEs in the UAE. This contributes to a more comprehensive understanding of the determinants of innovative work behavior and highlights the importance of considering the specific context when examining this phenomenon.

This study makes theoretical contributions by examining the relationship between business intelligence systems and innovative work behavior, highlighting the mediating role of knowledge sharing and SMEs innovation, and expanding the knowledge on innovative work behavior in the context of UAE SMEs. The findings contribute to the existing literature and provide valuable insights for researchers, practitioners, and policymakers aiming to promote innovative work behavior in SMEs.

5.4.2 Practical Contributions

The findings of this study have some significant managerial implications. To start, organizational leaders should encourage people to take part in knowledge-giving and knowledge-collecting work activities in order to create a sharing and inventive atmosphere. Various people have different motivations for sharing information. Therefore, recognizing the primary motivators for the majority of workers is crucial in the SME sector. Some people give their expertise merely for the sake of social approval, while others want to learn something new in return. Therefore, building and fostering a culture of information sharing inside a company will benefit from the proper identification of the motivating reasons. Additionally, developing such a knowledge-sharing environment is crucial for sectors that are product- and service-driven. Organizations must establish a business-intelligent environment and launch a knowledge-driven organizational environment in order to enhance idea development, promotion, and execution.

5.4.3 Policy Maker Contributions

Policymakers play a crucial role in fostering the integration of Business Intelligence Systems (BIS) and enhancing Innovative Work Behavior (IWB) in UAE SMEs by creating supportive ecosystems, incentivizing technological adoption, and facilitating innovation-driven cultures. The UAE government's strategic focus on digital transformation, evidenced by initiatives like the National Innovation Strategy and UAE Digital Economy Strategy, underscores the importance of equipping SMEs with advanced BIS capabilities. Policymakers can contribute by subsidizing the costs of BIS implementation, offering grants for technological upgrades, and facilitating access to expert training programs, thus alleviating financial and technical barriers commonly faced by SMEs.

Moreover, regulatory frameworks that encourage knowledge sharing and collaborative innovation among SMEs are vital. Policymakers could establish innovation hubs and digital platforms where SMEs can share BIS insights and co-develop solutions, fostering a culture of collective intelligence and creativity. Policies promoting leadership development and employee training on leveraging BIS effectively can ensure that the technology translates into actionable insights and fosters IWB. Additionally, targeted incentives, such as tax breaks or recognition programs, can motivate SMEs to integrate BIS into their workflows and align them with broader national innovation goals.

Finally, by creating benchmarks for BIS utilization and monitoring SME innovation metrics, policymakers can provide data-driven feedback to refine their strategies continually. This holistic approach ensures that BIS not only improves operational efficiency but also transforms UAE SMEs into innovation leaders, contributing to economic resilience and diversification.

5.5   Limitations of the Research

This research has certain limitations that should be acknowledged and could guide future studies in this field. Firstly, the data collection for this study was conducted using non-probability sampling, which may limit the generalizability of the findings. Future research could employ probability sampling methods to enhance the representativeness of the sample and the generalizability of the results.

Secondly, the study's cross-sectional design provides a snapshot of the relationships between business intelligence systems, knowledge sharing, SME innovation, and innovative work behavior. However, it does not capture the dynamics of these relationships over time. Longitudinal studies could offer deeper insights into how these relationships evolve and the long-term impacts of business intelligence systems on SMEs.

Thirdly, this study focused on the UAE's SMEs, limiting the findings' applicability to other contexts. Future research could replicate this study in different geographical locations or industry sectors to examine whether the findings hold in varied settings.

Additionally, while this study has shed light on the relationships between BIS, knowledge sharing, SME innovation, and IWB, there is scope to explore other potential antecedents and moderators that could influence these relationships. For instance, organizational culture, leadership style, and external environmental factors might play significant roles in shaping the innovative work behavior in SMEs.

Lastly, exploring both the positive and negative aspects of BIS, knowledge sharing, and innovation in knowledge- and innovation-intensive sectors could provide a more nuanced understanding of how these factors interact to influence IWB. This approach could

offer practical insights for SMEs seeking to foster a culture of innovation and competitiveness.

5.6   Recommendations and Future Research

Based on the obtained results and the understanding of the topic, several recommendations can be made to promote innovative work behavior in UAE (SMEs) (SMEs).

Firstly, it is recommended to encourage the use of business intelligence system tools within SMEs. Organizations should identify specific areas where these tools can be useful and implement them to support and enhance innovative work behavior. By integrating data analysis, reporting, and decision-making capabilities into their processes, SMEs can empower employees to make informed and innovative decisions. Providing employees with the necessary training and support to effectively utilize these tools will further enable them to leverage the power of data-driven insights.

Secondly, knowledge sharing should be emphasized as a fundamental aspect of SME management. Creating a culture that values and promotes knowledge sharing within the workplace can significantly enhance team performance and provide a sustainable source of competitive advantage. SMEs should recognize the importance of fostering a collaborative environment where employees are encouraged to share their knowledge, expertise, and best practices. Implementing knowledge-sharing platforms, facilitating cross-functional collaboration, and recognizing and rewarding knowledge-sharing behaviors can further strengthen the knowledge-sharing culture within SMEs.

Moreover, SME owners and managers need to be aware of the broader benefits of innovative work behavior beyond individual skill and knowledge development. It is essential to recognize that fostering innovative work behavior can contribute to problem-solving, adaptability, and the ability to seize new opportunities. By understanding and highlighting

these advantages, SMEs can create a supportive environment that encourages employees to think creatively, take calculated risks, and contribute to the organization's overall innovation efforts.

In addition, SMEs should leverage creative work behavior as a strategic approach for sustainability and growth. These organizations often operate in dynamic and competitive markets, which require them to continuously innovate and differentiate themselves. Encouraging employees to exhibit creative work behavior can lead to the generation of new ideas, the identification of novel solutions, and the ability to adapt to changing circumstances. SMEs should provide employees with the autonomy, resources, and support necessary to explore innovative ideas, experiment with different approaches, and contribute to the organization's innovation initiatives.

Also To further enhance the understanding and application of BIS in promoting innovation within SMEs, the following research recommendations are proposed:

Expanding the Number of Independent Variables: While this study focused on BIS as the sole independent variable, future research should consider incorporating additional independent variables. This approach would provide a more holistic understanding of the factors influencing IWB in SMEs. Potential variables could include organizational culture, leadership styles, employee engagement, and external environmental factors. Incorporating multiple independent variables can offer a more comprehensive perspective on the complex interplay of factors that foster or hinder innovation within SMEs.

Exploring Different Industry Sectors: The current study was conducted within the context of UAE SMEs without specifying industry sectors. Future research could examine the role

of BIS in different industry sectors to determine if the impact varies across industries. This would help identify industry-specific strategies for implementing BIS to enhance innovation.

Longitudinal Studies: To capture the dynamic nature of BIS implementation and its impact on IWB, future studies could adopt a longitudinal research design. This would allow researchers to observe changes over time and provide insights into the long-term effects of BIS on innovative behavior within SMEs.

Investigating the Role of Organizational Size: This study focused on SMEs without differentiating between (SMEs) . Future research could explore whether the size of the organization influences the effectiveness of BIS in promoting IWB. Understanding the nuances between small and medium-sized enterprises can lead to more tailored recommendations for each category.

Cross-Cultural Comparisons: Since this research was geographically confined to the UAE, conducting similar studies in different cultural contexts could provide insights into the cultural factors that may influence the relationship between BIS and IWB. Cross-cultural comparisons can highlight universal best practices as well as culturally specific strategies for leveraging BIS to foster innovation.

Lastly, organizing training programs focused specifically on fostering employee innovation is recommended for SMEs. These programs can provide employees with the necessary tools, techniques, and mindset to generate and implement innovative ideas. By investing in employee innovation capabilities, SMEs can enhance their overall innovation perfor-

mance and drive sustainable growth. These training programs can cover areas such as creative thinking, problem-solving methodologies, and innovation management, equipping employees with the skills and mindset needed to thrive in an innovation-driven environment.

By implementing these recommendations, SMEs in the UAE can create a conducive environment for innovative work behavior, foster a culture of knowledge sharing, and capitalize on the potential of their employees to drive innovation and competitive advantage. These strategies can contribute to the long-term success, growth, and resilience of SMEs in the dynamic business landscape of the UAE.

5.7 Conclusion

Business intelligence system were established as an information system innovation to give data integration and analytical capabilities to stakeholders at various organizational levels (Ammar, 2017). This research defines business intelligence system as 'quality data in well-designed data storage, paired with software tools that enable users with rapid access, effective analysis, and intuitive presentation of the correct information' (Bach et al., 2016). The main direct benefits of business intelligence system are time savings and better information for decision making (Bhatiasevi and Naglis, 2018).

The quantitative requirements differ from nation to country, and economic factors determine them in each case. A number of qualitative considerations make distinguishing between a Micro, Small, and Medium-Sized Enterprise very challenging.

The situation of SMEs is critical in the UAE, which is heavily reliant on the external environment. It covers a wide range of traits that may help SMEs develop. A competitive corporate growth in the UAE depends on a number of things (Gupta and Mirchandani, 2018). The UAE is a gateway to other markets in the area. Changes in the Middle East, Africa, and Eastern Europe affect SMEs in the UAE (S. Z. Ahmad et al., 2019). According to the

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findings, a clear framework for the Innovative work behaviors of SMEs in the UAE is required. This study uncovers and analyzes the elements that contribute to Innovative work behaviors in SMEs. As a result, this study will focus on the success factors for UAE SMEs in trading and distribution (Alefari et al., 2020).

Although a number of studies have established the limitations and difficulties facing small and medium-sized enterprises globally, yet academic resources are scared in the Asian Pacific and Arab regions, particularly in the UAE. The acceptance of SMEs is limited, despite numerous policy measures, including economic and Innovative work behavior perspectives (Alkaabi, 2021). For SMEs in the UAE as the key financial barriers to growth and knowledge sharing and innovation, including restricted financial competence, lack of effective business intelligence system, therefore most SMEs are unable to render smart tools for the optimal market.

The (SMEs) in the UAE have been severely impacted by the global economic downturn, and many SMEs are under tremendous financial pressure to continue business operations and make repayments to their creditors (Abderazak et al., 2020). In addition, the weakening of the UAE Dirham currency and the stagnation of China's economy resulted in a 150% higher cost of imported goods, a thinner profit margin and less profitable for all companies (Alkaabi, 2021). Therefore, due to inadequate working capital, many corporate clients demand longer credit terms or delays in making payments that put additional strain on the survival of SMEs.

According to S. Z. Ahmad et al. (2018), SMEs are suffering from sluggish demand, rising commodity prices, and diminishing profit margins. Inflationary pressures harm economic growth in most emerging nations. An increased internal and external threat has limited their capacity and prospects to expand since the Covid-19 pandemic started. Some

SMEs are also battling to survive in a turbulent political and economic environment, making it difficult for them to reach their global business potential. Almtiri and Miah (2019) noted a growth in government attention to SMEs' difficulties, as well as financial support from policymakers and financial institutions in several sectors, allowing SMEs better access to the Innovative work behavior.

The government of the UAE is making strides in this direction; however, small and medium-sized enterprises (SMEs) must realign their road maps by making technological investments to digitally engage with their customers, paving the way for interoperability, information transfer, and ease of data sharing, to name a few benefits. The effective business intelligence system will help SMEs in improving its knowledge sharing and innovation and gaining Innovative work behaviors (Alsharari et al., 2020). SMEs will be identified, evaluated, underwritten, and monitored by lenders, who will play a vital role in this respect because these technologies will assist lenders in doing so in the most cost-effective way. Consequently, banks will be able to build scalable loan portfolios that can generate significant spreads while also generating risk-adjusted profitability that is greater than what they now earn on their consumer product exposure (Polas et al., 2021).

Small and medium-sized firms need institutional assistance, which the UAE lacks (AlSharji et al., 2018). Studies on family-owned firms have found that passing the baton to the next generation is a well-known determinant of company failure (Oudah, 2018). To ensure long-term viability, family-owned businesses must prioritize succession, strategic planning, and corporate governance. Saudi Arabia's economy is similar to that of the UAE. Individual, business, and managerial traits, business assistance, the business climate, and capital availability all influence SME knowledge sharing and innovation in Saudi Arabia (Al-Tit, 2019). To attain maturity and avoid early decline, small and medium-sized business

owners and managers must focus on critical Success Factors throughout the Organizational Life Cycle (Angeles, 2019). Most SMEs' growth paths resemble a roller coaster, with far too many ups and downs to keep track of.

The business climate and external variables have a big impact on SME growth (SMEs). Knowledge is vital for creating strategic alliances and aligning organizational resources (Temouri et al., 2020). Strategic, Human, and Competitive Capabilities would all help the SME acquire a competitive edge needed for long-term market success. Small and medium-sized businesses (SMEs) are now focusing on the local market as well as foreign markets. With economies expanding and technology permitting every facet of business today, it is vital to stay relevant with goods and services for both the local and global markets. In order to maintain a competitive edge in the sector, companies must consider both innovation and exporting goods and services to other countries (Ng and Hamilton, 2021).

The current research was developed for the purpose of achieving three main objectives, which are 1) to determine the impact of business intelligence system on the innovative work behaviour of (SMEs) in the UAE. 2): to propose a new model to investigate the relationship between business intelligence system and innovative work behaviour through mediator's SMEs innovation and KS. And 3): to investigate the SMEs innovation and KS mediate the relationship between business intelligence system and innovative work behaviour.

A comprehensive literature review has been carried out. The literature review resulted in the theoretical framework, conceptual framework, and underpinning theories of the study. The definitions of the variables were also gathered from the literature. Finally, empirical evidence on the interrelationships between the research variables was reviewed.

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This study concerned the interrelationship between business intelligence system, SMEs' knowledge sharing and innovation, and SMEs' Innovative work behaviors in the UAE. This study relied on theories that interpret the adoption of business technology as a resource of the organization toward improving its knowledge sharing and innovation and innovative work behavior. Theories adopted by this study included resource-based view theory and innovative work behavior theory. The population of this study included all managers within the SMEs operating in the UAE. The quantitative data analysis was carried out using the IBM Statistical Package for Social Sciences (SPSS) and the PLS-SEM version 4 data packages. PLS-SEM is a statistical software package that stands for structural equation modelling. PLS-SEM is designed for Structural Equation Modeling (SEM), path analysis, and confirmatory factor analysis (CFA) procedures

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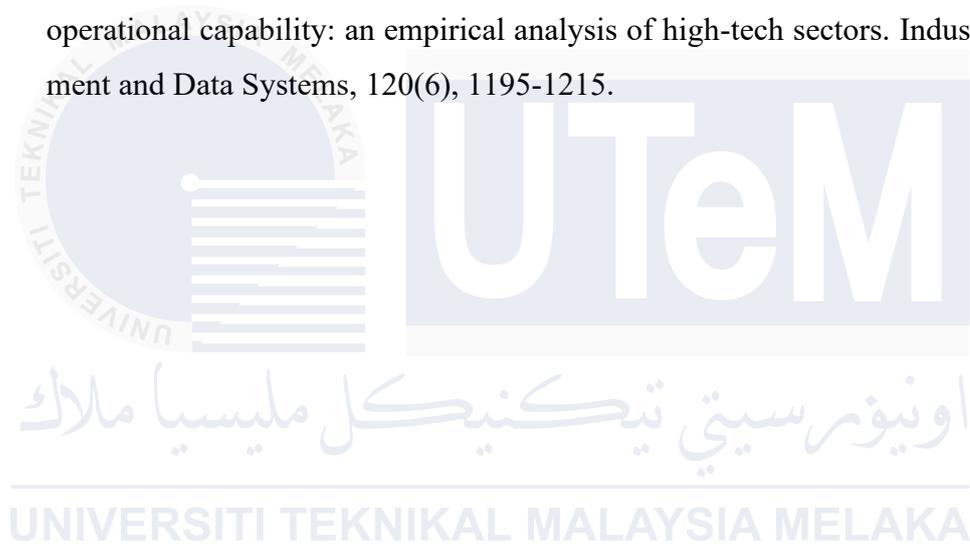
APPENDIX A

List of Arbitrators (validators) assessors

Name	Specialization	position	Country
Dr.Adel Widan	Statistics	Associate Prof. in (QASSIM)	KSA
Prof Dr. Bassam Zaher	Total quality management	Prof. in (TESHREEN)	Syria
Dr.Farah Amalina Nawi	Knowledge management	Senior Lecturer in (USZA)	Malaysia
Dr.Mahmoud Al Fayyad	IT	Associate Prof. in (QASSIM)	KSA

APPENDIX B

S U R V E Y

Business Intelligence Systems and Innovative Work Behavior in UAE SMEs and the Mediating Roles of Knowledge Sharing and SMEs Innovation

General Information

This study is a PhD research to determine the impact of business intelligence system on the united arab emirates' (SMEs) innovative work behaviour: the mediating role of knowledge sharing and innovation.The researcher believed that the outcome of the study will be of immense benefit to improve (SMEs) in UAE. Ythe effort in filling the questionnaire is highly appreciated in order to produce quality of research.

Instruction

You are expected to choose the answer that represents ythe opinion. Ythe answer plays a significant role in the success of this study and you are assured that such information will be treated with utmost confidentiality. (Please tick (✓) in the appropriate box).

1) There are five (5) sections in this questionnaire. Please answer ALL questions in ALL sections.

2) Completion of this form will take you approximately 5-10 minutes. Thanks for participating in this survey.

Inquiry: if you have any question or concerns about answering this questionnaire, please do not hesitate to contact:

Saif Alderei (student). Faculty of Technology Management and Technopreneurship.
       Universiti Teknikal Malaysia Melaka (UTeM).
       Melaka Tel:+7150- e-mail**:** saifalderei@gmail.com
Dr. Fam Soo Fen (supervisor). Faculty of Technology Management and Technopreneurship.
       Universiti Teknikal Malaysia Melaka (UTeM).
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2023

Questionnaire:

<div style="border:1px solid black; text-align:center; font-weight:bold;">Section 1: General information</div>

This section relates with ythe background in brief. Please give ONE tick (√) to ythe answer in each question respectively.Your response will remain anonymous.

Q1 Gender :

| 1 | | Male |
| 2 | | Female |

Q2 Age :

1		18- 25
2		26-35
3		36-45
4		46 and above

Q3 Highest education : :

1	High School
2	Diploma
3	Degree
4	Master
5	PhD
6	Other

Q3 Work Experiences :

1		18- 25
2		26-35
3		36-45
4		46 and above

<div style="border:1px solid black; text-align:center; font-weight:bold;">Section 2: Business intelligence system</div>

Please read each statement carefully and Tick (√) for each item that represent your answer. Five scales ranging from "strongly disagree" to "strongly agree" use to reflect your level of agreement.

KEY: **SD**-Strongly Disagree; **D**-Disagree; **M**-Moderate; **A**-Agree; **SA**-Strongly Agree.

Construct	SD	D	M	A	SA
DI: Data Integration					
The available information within our organization's business processes.	1	2	3	4	5
Through managing the organization's information, we are adding value to the services delivered to customers.	1	2	3	4	5

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Through managing the organization's information, we are reducing risks in the business.	1	2	3	4	5
Through managing the organization's information, we are reducing the costs of business processes and service delivery.	1	2	3	4	5
AC: Analytical Capabilities					
The information reduces uncertainty in the decision-making process, enhances confidence, and improves operational effectiveness.	1	2	3	4	5
The information enables us to rapidly react to business events and perform proactive business planning.	1	2	3	4	5
We are using the information provided to make changes to corporate strategies and plans, modify existing KPIs and analyze newer KPIs.	1	2	3	4	5
ICQ: Information Content Quality					
The scope of information is adequate.	1	2	3	4	5
The information is precise enough and close enough to reality.	1	2	3	4	5
The information is to the point, void of unnecessary elements.	1	2	3	4	5
The information is completely.	1	2	3	4	5
The information is free of distortion, bias, or error.	1	2	3	4	5
The information is up-to-date and not obsolete.	1	2	3	4	5
IAQ: Information Access Quality					
The provision of information corresponds to users' needs and habits.	1	2	3	4	5
The information is processed and delivered rapidly without delay.	1	2	3	4	5
The background of the information is not visible.	1	2	3	4	5
Information consumers cannot interactively access the information.	1	2	3	4	5
UIBP: Use of Information in Business Processes					
The available information within our organization's business processes exposes the problematic aspects of current business processes and makes stakeholders aware of them.	1	2	3	4	5
The available information within our organization's business processes provides valuable input for assessing business processes against standards, for continuous process improvement programs, and for business process change projects.	1	2	3	4	5
The available information within our organization's business processes stimulates innovation in internal business processes and external service delivery.	1	2	3	4	5
ADMC: Analytical Decision-Making Culture					
The information is easily understandable by the target group.	1	2	3	4	5
The information reduces uncertainty in the decision-making process, enhances confidence, and improves operational effectiveness.	1	2	3	4	5
We are using the information provided to make changes to corporate strategies and plans, modify existing KPIs and analyze newer KPIs.	1	2	3	4	5

Section 3: Knowledge sharing

Please read each statement carefully and Tick (√) for each item that represent your answer. Five scales ranging from "strongly disagree" to "strongly agree" use to reflect your level of agreement.

Construct	SD	D	M	A	SA
Knowledge sharing					
The company has formal mechanisms to guarantee the sharing of the best practices among the different fields of the activity.	1	2	3	4	5
There are individuals within the organization who take part in several teams or divisions and who also act as links between them.	1	2	3	4	5
There are individuals responsible for collecting, assembling and distributing internally employees' suggestions.					
The employees attend fairs and exhibitions regularly.					
There is a consolidated and resourceful RandD policy.	1	2	3	4	5
New ideas and approaches on work performance are experimented continuously.	1	2	3	4	5

Section 4: SMEs innovation

Please read each statement carefully and Tick (√) for each item that represent your answer. Five scales ranging from "strongly disagree" to "strongly agree" use to reflect your level of agreement.

KEY: **SD**-Strongly Disagree; **D**-Disagree; **M**-Moderate; **A**-Agree; **SA**-Strongly Agree.

Construct	SD	D	M	A	SA
SMEs innovation					
Creativity is encouraged here.	1	2	3	4	5
Around here, people are allowed to try to solve the same problems in different ways.	1	2	3	4	5
This organization can be described as flexible and continually adapting to change.	1	2	3	4	5
The best way to get along in this organization is to think the way the rest of the group does.	1	2	3	4	5
This organization is open and responsive to change.	1	2	3	4	5
In this organization, we tend to stick to tried and true ways.	1	2	3	4	5
This place seems to be more concerned with the status quo than with change.	1	2	3	4	5
Assistance in developing new ideas is readily available.	1	2	3	4	5
There are adequate resources devoted to innovation in this organization.	1	2	3	4	5

Section 5: Innovative work behaviour

Please read each statement carefully and Tick (√) for each item that represent your answer. Five scales ranging from "strongly disagree" to "strongly agree" use to reflect your level of agreement.

*KEY*: **SD**-Strongly Disagree; **D**-Disagree; **M**-Moderate; **A**-Agree; **SA**-Strongly Agree.

Construct	SD	D	M	A	SA

| **Innovative work behaviour**					
Our ability to function creatively is respected by the leadership.	1	2	3	4	5
People around here are expected to deal with problems in the same way.	1	2	3	4	5
The people in charge around here usually get credit for others' ideas.	1	2	3	4	5
There is adequate time available to pursue creative ideas here.	1	2	3	4	5
Lack of funding to investigate creative ideas is a problem in this organization.	1	2	3	4	5
Personnel shortages inhibit innovation in this organization.	1	2	3	4	5
This organization gives me free time to pursue creative ideas during the workday.	1	2	3	4	5

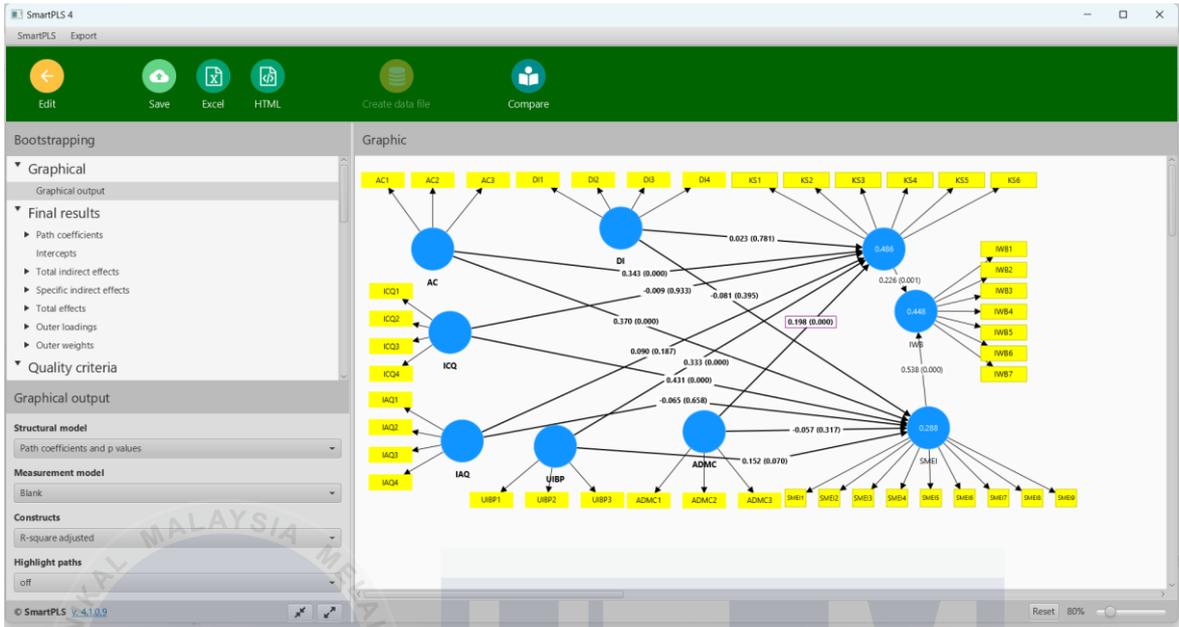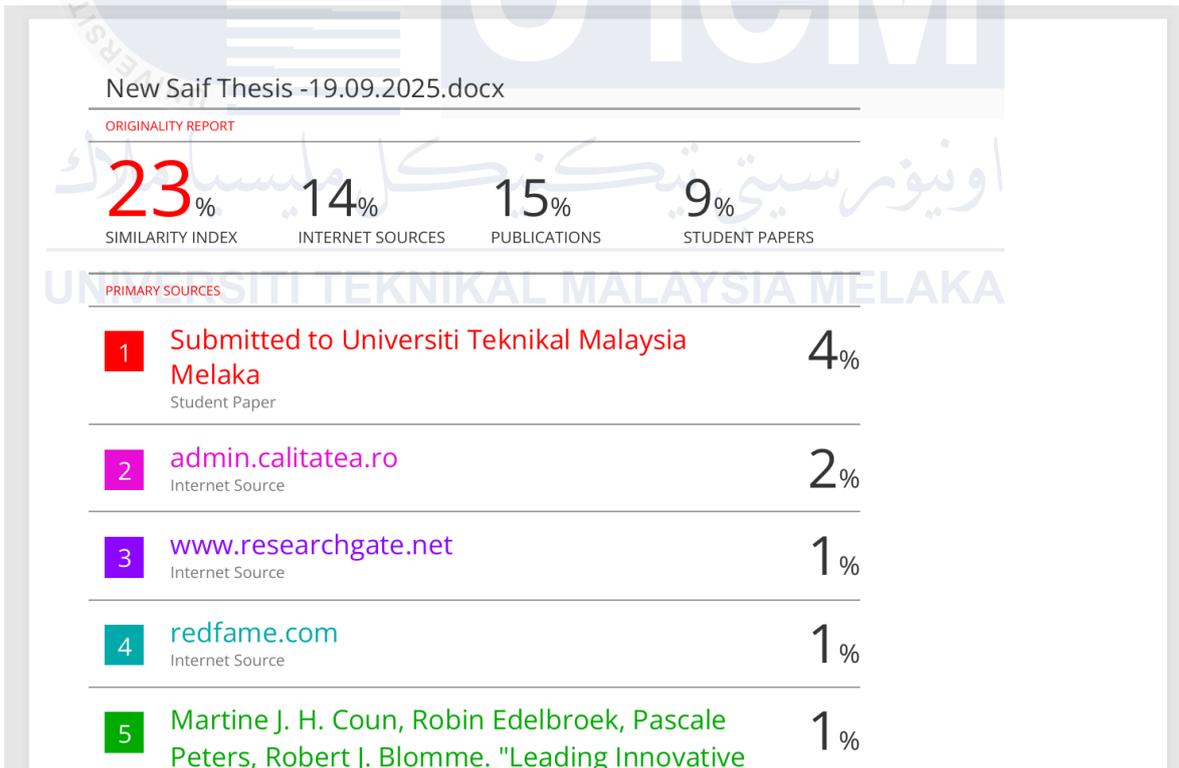Thank you very much for ythe cooperation

APPENDIX C
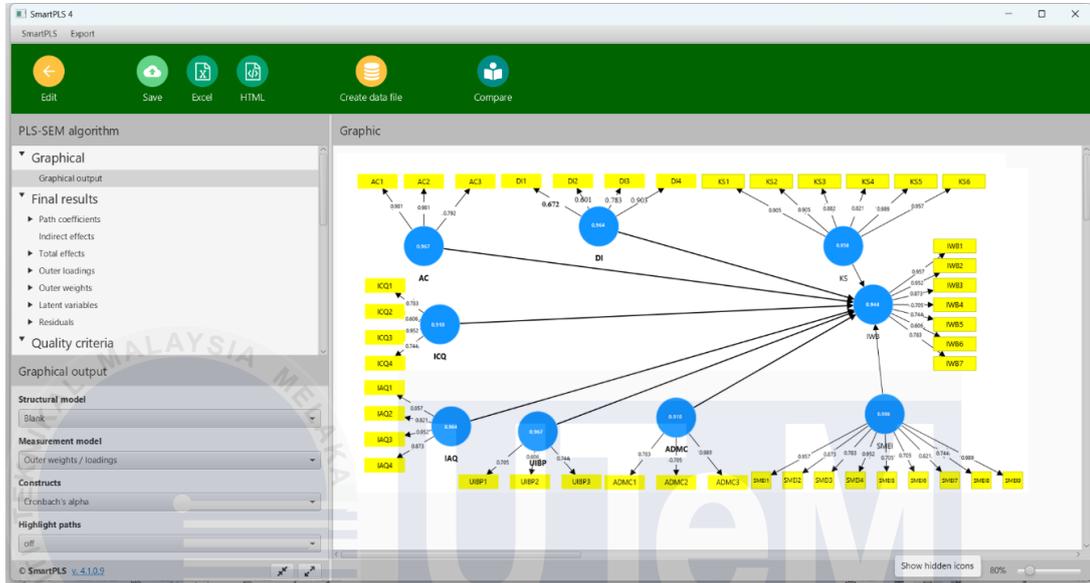
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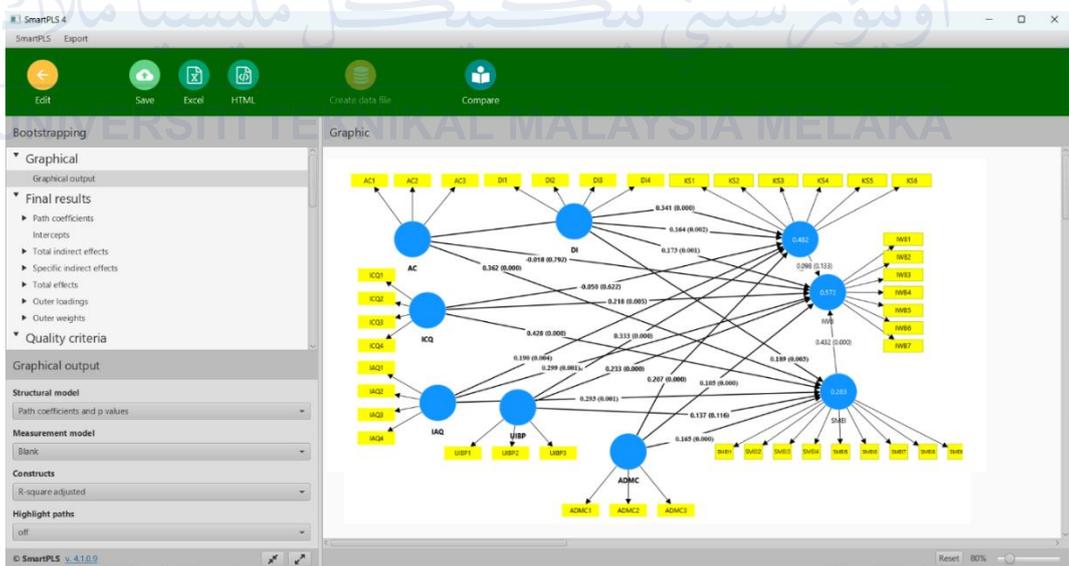
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