DOCTORAL THESIS

Driving digital transformation: Strategies and Innovations in the Jordanian Telecom industry

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Resumen

La industria de las telecomunicaciones en Jordania ha experimentado transformaciones significativas y desafíos en los últimos años, reflejando el cambiante panorama de la tecnología y las demandas de los consumidores. El sector de las telecomunicaciones desempeña un papel fundamental en el desarrollo socioeconómico y la conectividad con la comunidad global. Sin embargo, al igual que en muchos países, ha enfrentado su parte justa de diferentes desafíos para adaptarse al cambiante panorama de las telecomunicaciones.

Los desafíos en el sector de las telecomunicaciones en Jordania abarcan diversos problemas. Estos van desde barreras internas de comunicación que obstaculizan la transformación digital hasta una cultura aversa al riesgo que dificulta el desarrollo. Problemas de financiación derivados de un enfoque operativo en lugar de inversión estratégica también obstaculizan el progreso. Además, existe una escasez de expertps digitales, limitando la innovación y la adopción de tecnología, así como una escasez de recursos técnicos que desafía la competitividad en el dinámico panorama de las telecomunicaciones. Para obtener visión práctica sobre cómo abordar estos desafíos, se recopilaron datos a través del diseño de una encuesta que involucró a tres empresas de telecomunicaciones jordanas y una muestra de 307 empleados de nivel directivo. Estos actores clave en el sector de las telecomunicaciones ofrecieron perspectivas de valor incalculable para comprender la dinámica de la industria. Hemos usado estos datos para hacer tres investigaciones con respecto a la transformación digital.

La vigilancia estratégica de la innovación tecnológica es un determinante crucial para adaptarse a cambios a largo plazo y estructurales en el mercado y el

entorno. Basándose en la teoría de la capacidad dinámica para lograr ventajas competitivas a largo plazo, el primer estudio de investigación tiene como objetivo analizar la influencia de las dimensiones de la vigilancia estratégica en la orientación empresarial así como identificar cómo la innovación tecnológica media en la relación entre las variables. Los autores utilizaron el modelo de ecuaciones estructurales para probar los impactos de la vigilancia estratégica en la orientación empresarial. Los resultados del estudio encontraron que una mayor conciencia de monitoreo y seguimiento del entorno interno y externo contribuye a la flexibilidad y ahorro de tiempo al detectar señales tempranas de amenazas y oportunidades. Esta alineación con la asunción de riesgos, la proactividad y la innovación tecnológica genera nuevos bienes y servicios para el valor compartido. Sin embargo, la vigilancia estratégica no afectó la proactividad empresarial debido a la intensa competencia y la necesidad de estudiar el comportamiento del cliente. Por lo tanto, la vigilancia estratégica impacta positivamente en la orientación empresarial, y la innovación tecnológica media en este impacto, especialmente en las empresas de telecomunicaciones.

El papel de la inteligencia de negocios en la planificación estratégica de las organizaciones ha recibido considerable atención de muchos académicos. No obstante, existe un área prometedora para futuras investigaciones, especialmente cuando se consideran variables moderadoras en efectos como la gestión del conocimiento, que ha contribuido a que las empresas aprecien la importancia de la inteligencia de negocios. Con este fin, en el segundo estudio de investigación, los investigadores construyeron un modelo conceptual basado en la literatura existente incorporando variables de investigación relevantes. Los investigadores utilizaron el modelo de ecuaciones estructurales con AMOS 21.0 para validar y probar el modelo. Los hallazgos del estudio revelaron que la inteligencia de negocios tiene una influencia significativa positiva en la previsión estratégica.

Además, el análisis indicó que la gestión del conocimiento media en la relación entre la inteligencia de negocios y la previsión estratégica. También se discuten las implicaciones y recomendaciones de la investigación académica.

Para sobrevivir en un entorno dinámico y ferozmente competitivo, las empresas se ven obligadas a ofrecer simultáneamente herramientas y soluciones digitales para prosperar, aunque la literatura indica el valor de la inteligencia de negocios en las empresas, existen estudios mínimos sobre cómo combinar la inteligencia de negocios y el marketing digital para mejorar la ambidestreza estratégica. El tercer estudio de investigación examina el impacto de la inteligencia de negocios en la ambidestreza estratégica y descubre el papel moderador del marketing digital en la relación entre ambas. Los datos se analizaron utilizando programas de software SPSS versión 23. Los resultados respaldan la idea de que la inteligencia de negocios y el marketing digital están positivamente asociados con actividades exploratorias y explotadoras, lo que a su vez mejora el rendimiento y la competencia para aumentar.

Esta tesis tiene como objetivo presentar una narrativa cohesiva que entrelaza de manera fluida los temas explorados en tres investigaciones, arrojando luz sobre el viaje multifacético de la industria de las telecomunicaciones en Jordania. También proporciona perspicacia sobre cómo superar desafíos y promover la transformación digital en este sector dinámico. En conjunto, abordan temas de vigilancia estratégica, orientación empresarial, innovación tecnológica, inteligencia empresarial, previsión estratégica, gestión del conocimiento, marketing digital y ambidestreza estratégica. A través de estos artículos de investigación, exploramos estrategias e innovaciones que tienen el potencial de transformar la industria de las telecomunicaciones en Jordania, fomentando un sector más resiliente y adaptable frente a las cambiantes demandas tecnológicas y de mercado.

Abstract

The telecom industry in Jordan has undergone significant transformations and challenges in recent years, reflecting the evolving landscape of technology and consumer demands. The telecom sector plays a pivotal role in its socio-economic development and connectivity with the global community. However, as with many countries, it has faced its fair share of different challenges to adapt to the changing telecommunications landscape.

Challenges in Jordan's telecom sector encompass various issues. These range from internal communication barriers hindering digital transformation to a risk-averse culture hindering development. Funding issues stemming from an operational focus rather than strategic investment further impede progress. Additionally, there's a shortage of digital expertise, limiting innovation and technology adoption, and a scarcity of technical resources, challenging competitiveness in the dynamic telecom landscape. To gain practical insights into addressing these challenges, data was collected through a survey research design involving three Jordanian telecom companies and a sample of 307 managerial-level employees. These key stakeholders in the telecom sector provided invaluable perspectives for understanding the industry's dynamics. We have used these dates to make a mix of three different researches around digital transformation.

Strategic vigilance of technological innovation is a crucial determinant in accommodating long-term and structural changes in the market and environment. Drawing upon dynamic capability theory to achieve long-term competitive advantages, the first research aims to investigate the influence of strategy vigilance dimensions on entrepreneurial orientation and analyzes how technological innovation mediates the relationship between variables. The authors used

structural equation modeling to test the impacts of strategic vigilance on entrepreneurial orientation. The study results found that increased awareness of monitoring and following the internal and external environment contributes to flexibility and time saving by detecting early signals of threats and opportunities. This alignment with risk-taking, proactiveness, and technological innovation generates new goods and services for shared value. However, strategic vigilance did not affect entrepreneurial proactiveness due to intense competition and the need to study customer behavior. Thus, strategic vigilance positively impacts entrepreneurial orientation, and technological innovation mediates this impact, particularly in telecom companies.

The role of business intelligence in driving strategic planning in organizations has received considerable attention from many scholars. Nonetheless, there remains a promising area for further research, especially when considering moderating variables on effects such as knowledge management, which has contributed to businesses' appreciation of the importance of business intelligence. To this end, in the second research study, the researchers constructed a conceptual model based on existing literature by incorporating relevant research variables. The researchers then utilized structural equation modeling with AMOS 21.0 to validate and test the model. The findings of the study revealed that business intelligence has a positive significant influence on strategic foresight. Furthermore, the analysis indicated that knowledge management mediates the relationship between business intelligence and strategic foresight. The implications and recommendations of academic research are also discussed.

To survive in a dynamic and fiercely competitive environment, companies are forced to simultaneously offer digital tools and solutions to thrive, although the literature indicates the value of business intelligence on companies, but minimal studies on how to combine business intelligence and digital marketing in improving

strategic ambidexterity. The third research study examines the impact of business intelligence on strategic ambidexterity and then discovers the moderator role of digital marketing in the relationship between them. The data was analyzed using SPSS version (23) software programs. The results support the notion that business intelligence and digital marketing are positively associated with explorative and exploitative activities, which in turn enhances performance and competition to increase productivity and maximize profits. Moreover, the study found that companies that use strategic ambidexterity are evolving toward a future of new technology and new markets through proper management of the corresponding exploitation and exploration processes.

This thesis aims to present a cohesive narrative that seamlessly weaves together the themes explored in three researches, collectively shedding light on the multifaceted journey of the Jordanian telecom industry. Also provides insights into overcoming challenges and driving digital transformation in this dynamic sector. They collectively address themes of strategic vigilance, entrepreneurial orientation, technological innovation, business intelligence, strategic foresight, knowledge management, digital marketing, and strategic ambidexterity. Through these research papers, we explore strategies and innovations that can potentially transform the Jordanian telecom industry, fostering a more resilient and adaptive sector in the face of evolving technological and market demands.

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Chapter 1

1.1 Introduction

This chapter serves as the entry point to our research topic. It encompasses an exploration of the study's background, which comprises several components. First, we present the researcher's rationale for conducting this study in the initial four lines. Subsequently, we delve into a review of existing literature on each variable, drawing connections between these variables through relevant studies. Finally, we conclude with the researcher's comprehensive formulation, company overview, and objectives.

In Jordan, the telecom sector holds immense significance in driving national economic development and fostering technological and entrepreneurial endeavors (Atlam *et al*., 202). Accounting for 62.6% of the country's GDP in 2022, this sector presents Jordan with a valuable opportunity to establish a competitive advantage over neighboring Arab nations (The American Chamber of Commerce in Jordan, 2022). Consequently, the performance enhancement and capability development of telecom companies in Jordan significantly impacts the country's overall economic growth (Zighan *et al*., 2022). However, the industry is not immune to the influences of its surrounding environments (Tapinos & Pyper, 2018). For instance, the COVID-19 pandemic has posed significant challenges to businesses, and small and large firms alike (Kutieshat & Farmanesh, 2022; Atlam *et al*., 2022). The telecom sector, in particular, has experienced adverse effects (Alzuod & Dalain, 2023). These challenges encompass issues related to funding and resourcing as well as inadequate networking capabilities (Emami *et al*., 2022). To address the survival and growth challenges faced by the industry, further research is warranted to offer practical solutions. Additionally, fostering collaborative efforts among national telecommunications firms can enhance their competitiveness in relation to global market leaders and contribute to the economy's advancement.

Entrepreneurial orientation (EO), characterized by risk-taking and proactivity, is proposed as a mechanism to enhance resilience and foster innovation (Zighan *et al*., 2022). Strategic vigilance (SV), involving the continuous monitoring of internal and external signals, enables companies to identify early threats and opportunities, contributing to competitiveness and performance (Mulcaster, 2009; Schoemaker & Day, 2021). In the face of intense competition, technical innovation (TI) becomes imperative for telecom companies to ensure survival and excel in the industry (Donbesuur *et al*., 2022; Indrawati *et al*., 2020).

The global literature on entrepreneurship highlights EO's significance in driving business expansion, technological advancements, and wealth creation (Covin & Slevin 1991; Abdalla & Mohamed, 2020). EO's impact on firm performance is influenced by various factors such as environmental dynamism and managerial styles (Lumpkin & Dess, 1966; Jin *et al*., 2017). SV, crucial for early signal identification, is essential for making informed investments and maintaining competitiveness. The development of SV relies on organizational capabilities cultivated through investment and a culture of curiosity and openness (Suandi, 2022). Vigilant organizations actively gather and utilize knowledge to identify business opportunities and mitigate uncertainty risks (Breckel *et al*., 2011).

TI is positioned as a catalyst for SV, enhancing a firm's reputation for product quality (Adomako, 2017). This study aims to explore the relationship between SV and EO in the telecom sector in Jordan, addressing a gap in the literature. Additionally, it investigates the mediating role of TI in the SV-EO relationship, contributing to a comprehensive understanding of dynamic capabilities. The study not only provides insights into the telecommunications industry's specific context but also contributes to the broader literature on SV, EO, and TI relationships. This

research is timely, given the increasing complexity and uncertainty in the business environment, especially amid the ongoing COVID-19 crisis. Understanding these relationships can inform strategies for long-term success in a rapidly changing corporate landscape. The study will proceed with a literature review, methodology outline, results presentation, discussion facilitation, and conclusion offering.

EO has been proposed to help businesses transform and build their resilience to withstand significant challenges and shocks. The entrepreneurial approach, which is based on taking risks and being proactive, enables the development of new abilities to protect companies against various threats (Zighan *et al*., 2022). Thus, many companies have developed strategies around the SV concept to gain flexibility in identifying early signals of internal and external threats and opportunities. Companies then delve deeper into understanding the signs through further probing, connecting dots, and continuous monitoring (Schoemaker & Day, 2021). Through SV, companies can maintain and improve their competitiveness and performance (Mulcaster, 2009; Schoemaker & Day, 2021). Further, faced with intense competition between telecom companies, engaging in TI activities is considered a prelude to their growth and expansion to other markets (Donbesuur *et al*., 2022) as well as their survival and excelling in the industry (Indrawati *et al*., 2020). Addressing the gaps in the literature, the study seeks to investigate the impact of SV on EO and the mediating role of TI. The lack of empirical studies on SV's effect on EO in Jordanian telecom companies and the limited understanding of how TI can be effectively combined with entrepreneurship in this context highlights the significance of this research (Kiani *et al*., 2020; Liem *et al*., 2019; Vivarelli, 2013; Donbesuur *et al*., 2022). The study aims to contribute valuable insights into the dynamics of SV, EO, and TI, considering their interconnectedness and implications for the sustainability and growth of telecom companies in Jordan.

Scenarios have long been utilized as powerful tools for decision-making in the face of competition and uncertainty by government planners, corporate managers, and military analysts (Azeroual & Theel, 2018). Strategic foresight (SF) enables companies to envision future scenarios and develop new capabilities to navigate challenges (Irtaimeh & Obeidat *et al*., 2016). SF offers numerous advantages, including anticipating future trends, improving decision-making, managing risks, gaining competitive advantage, fostering innovation and adaptability, and ensuring long-term sustainability (Leandro & Fernanda *et al*., 2020).

In dynamic and competitive environments, SF plays a crucial role in shaping the competitiveness, growth, and sustainability of organizations (Costa & Monteiro, 2016). While the origin of SF remains ambiguous, it offers the opportunity to develop diverse scenarios that can be explored, manipulated, or experienced by future users (Shujahat *et al*., 2019). To support future planning and decrease uncertainty (Riccardo & Claudio, 2010), tools are needed to organize the increasing volume of data (Kasemsap, 2018). Business intelligence (BI) solutions, which include appropriate technologies and tools for data collection, integration, storage, editing, and analysis, have gained importance in recent years (Cammarano *et al*., 2023). The effective implementation of BI systems can streamline workflows and enhance organizational performance (Trieu *et al*., 2022). According to the theory of effective use (TEU), BI effectively supports decision-making processes, gains insights, and enhances overall organizational performance (Shujahat *et al*., 2019). A study by Cammarano *et al*. (2023) indicated that BI knowledge enhances decision-making processes, enabling companies to align their technological capabilities with customer expectations and market demands.

In response to these unprecedented challenges, entrepreneurial orientation has emerged as a critical factor in fostering organizational resilience and transformation. SF, involving the creation of future scenarios, has become crucial in equipping companies with the necessary skills to navigate uncertainties effectively (Zighan *et al*., 2022). The telecommunications sector, a key driver of technological and strategic innovations, significantly contributes to national economic growth (Emami *et al*., 2022). However, the dynamic and unpredictable business environment in Jordan necessitates proactive measures, with a particular emphasis on BI, which enables companies to predict future scenarios, mitigate potential failures, and enhance decision-making.

SF plays a pivotal role in determining organizational competitiveness, growth, and survival in dynamic and volatile environments. Managers are required to scan the environment, evaluate uncertainties, and make strategic decisions to thrive (Tapinos & Pyper, 2018). Despite its importance, the true nature of SF remains ambiguous and under-theorized, prompting scholars and practitioners to explore its emergence from scenarios (George & Anup, 2020). SF involves creating scenarios that future users can observe, manipulate, or touch, providing a strategic dimension to managers and allowing for discussions about a desirable future (Alzuod & Dalain, 2023).

The increasing volume of data poses challenges in gathering comprehensive information, leading to the adoption of BI solutions with appropriate technologies for data collection, integration, storage, editing, and analysis. The BI market, once the interest of large companies, has grown significantly, offering tools to enhance workflow organization and facilitate decision-making (Azeroual & Theel, 2018).

Implementing BI systems improves company performance, supporting optimal decision-making through information analysis (Azeroual & Theel, 2019).

To enhance the competitiveness of Jordanian telecom companies, improving their position among competitors becomes imperative. KM emerges as a methodology fostering knowledge sharing within companies, encompassing acquisition, creation, transfer, storage, and application of knowledge (Costa & Monteiro, 2016). KM practices encourage employees to share knowledge, creating an environment conducive to knowledge assimilation and organization. The relationship between KM and creativity has been established, emphasizing its significance in organizational processes (Shujahat *et al*., 2019). With the evolution of global insight, the combination of strategic and technological foresight with conditional projection becomes crucial. This study aims to explore how Jordanian telecom companies utilize BI to enhance operations and meet customer needs, bridging the gaps in understanding the relationships between BI, SF, and KM.

Based on discussions with telecom company managers and insights from theoretical literature, the study seeks to develop strategic solutions for enhancing competitiveness. The research draws on a survey of related literature from prior studies and interviews with executive managers, this study aims to address gaps in the literature, firstly by investigating the innovative strategic perspective of the impact of BI on SF, acknowledging the changing dynamics prompted by the COVID-19 pandemic and the need for in-depth discussions on these variables (Leandro & Fernanda *et al*., 2020; Suandi, 2022).

Secondly, the study explores how KM practices positively affect BI and SF, offering insights into the complex interplay between these variables and their

impact on corporate outcomes. Jordanian telecom companies, including Zain, Umniah, and Orange, face intense competition, necessitating the use of SF to develop future scenarios for survival and growth. BI solutions aid in collecting, processing, and analyzing data to provide timely insights for optimal decision-making. This research aims to contribute practical solutions, results, and recommendations to help these companies maintain and expand their customer base.

Another method that can assist organizations in transforming and increasing their resilience to resist major challenges and crises is Strategic Ambidexterity (SA) (Stokes et.al, 2019). Huang *et al*., (2020) explain the importance of SA for firms as a way to expand their product knowledge in the market by experimenting with new alternatives. Moreover, exploitation enhances efficiency through existing routines and experiences, in general ambidexterity supports the quality, speed, flexibility, and costs of companies (Tamayo-Torres *et al*., 2017). Consequently, many businesses have recognized the growing importance of Business Intelligence (BI) tools in today's competitive landscape. In the modern business environment, where data is abundant, and data science is employed to address a wide range of business challenges, companies of all sizes are actively incorporating BI strategies to stay competitive. (Cybulski & Scheepers, 2021). As a result, marketers need to come up with new, creative strategies to affect consumer behavior (Lingqvist *et al*., 2015). Moreover, Osmundsen and Bygstad (2022) confirmed the continuous development of digital infrastructure evolution and exploring ongoing development of Digital Marketing (DM) has significantly improved both usage and profitability and led to a digital ecosystem connected with customers' behavior continuously (Mayer-Schönberger & Cukier, 2013).

SA necessitates organizational flexibility, independence, and experimentation to compete in dynamic technologies and markets, combining efficiency, control, and incremental improvement (Birkinshaw & Gupta, 2013; Almajali *et al*., 2021). Exploration and exploitation, integral to SA, enhance efficiency and introduce companies to diverse market areas and product knowledge, respectively (Huang *et al*., 2020; Tamayo-Torres *et al*., 2017).

Recognizing the critical role of BI in contemporary business competitiveness, companies are increasingly turning to BI tools, leveraging data science to address various business challenges (Cybulski & Scheepers, 2021). Marketers, grappling with the rapid digitalization of the marketing landscape, face challenges in drawing clients through conventional efforts, necessitating the development of new, creative strategies (Webster & Ksiazek, 2012; Lingqvist *et al*., 2015). The continuous evolution of digital infrastructure and Digital Marketing (DM) has significantly improved usage and profitability, creating a digital ecosystem linked with customers' behavior (Osmundsen and Bygstad, 2022; Tiago & Veríssimo, 2014; Mayer-Schönberger & Cukier, 2013).

March (1991) emphasizes components such as learning, analysis, regeneration, and technological changes to enhance organizational performance and strengthen competitive advantage. Ambidextrous innovation positively impacts company performance indicators, with a delicate trade-off between exploration and exploitation crucial for success (Jansen *et al*., 2006; Junni *et al*., 2013). BI tools contribute to decision-making by monitoring business performance, and aiding in the development of competitive strategies (Aruldoss *et al*., 2014). Big data analytics, integral to BI, provides value by transforming data for better decision-making and creating a competitive advantage (Akter & Wamba 2016).

The positive impact of BI on knowledge sharing and gaining a competitive advantage has been established (Eidizadeh *et al*., 2017; Foroudi *et al*., 2017). Digital Marketing, a modern method, enhances the relationship between BI and SA by facilitating faster experimentation and improving performance predictability (Božič & Dimovski, 2019; Bhosale *et al*., 2020). Exploration and exploitation within SA are positively influenced by DM, impacting data content infrastructure, customer-employee integration, and performance improvement (Tariq *et al*., 2022).

Addressing gaps in BI, SA, and DM literature, this study explores the strategic impact of BI on SA, considering DM as a moderator variable. The fast-paced technological advancement and market openness in Jordan create a need for companies to adapt swiftly to environmental changes, making dynamic capabilities an effective strategy (Barreto, 2010). This study, distinct in its reliance on prior studies, recommendations, and interviews with a focus on competition within Jordanian telecom companies, aims to contribute valuable insights into the relationship between BI and SA, with DM as a moderator variable.

This Thesis aims to build a cohesive narrative and flow from strategic vigilance and its impact on entrepreneurial orientation and technological innovation, to the moderation of synergies between business intelligence and strategic foresight and knowledge management, and finally to adopting business intelligence for strategic ambidexterity in digital marketing in driving performance and success in Jordanian telecom companies.

1.2 Research Justification

This thesis explains three gaps to face the challenges that faced the telecom companies in Jordan, and advantages are providing a firm's competitive edge, especially during times of uncertain environments, and differentiates themselves from the competitors, leading to the development of strategies and practices to success, in today's rapidly changing business landscape, thereby contributing to their long-term sustainability and growth.

The first gap in the literature concerns SV and Entrepreneurial Orientation (EO). This gap pertains to understanding the impact of SV on EO within firms (Rigtering *et al*., 2014; Suandi, 2022; Schoemaker & Day, 2021; Jin *et al*., 2017). Despite the growing interest in how EO can enhance performance and competitiveness, empirical studies on the effect of SV on EO in Jordanian telecom companies have been limited, particularly in the Middle East context (Emami *et al*., 2022; Yu *et al*., 2022; Abdalla & Mohamed, 2020). The study aims to address the positive impact of TI practices on SV and EO through dynamic capabilities (Donbesuur *et al*., 2022; Schwarz *et al*., 2020; Kiani *et al*., 2020). Understanding how TI can be effectively leveraged to drive EO and improve company performance is crucial in dynamic and uncertain environments (Schoemaker & Day, 2021; Jin *et al*., 2017). This study examines TI as a mediator variable in enhancing the effectiveness and continuity in telecom companies, particularly within the context of the COVID-19 crisis, highlighting the significance of these constructs for long-term success in today's fiercely competitive business landscape. While the theoretical significance of exploring the relationship between SV, EO, and TI is evident, empirical research in this area remains limited, making this study crucial for advancing our understanding and identifying best practices for organizations seeking to drive TI and achieve long-term success.

The second gap is related to today's highly competitive landscape, organizations are increasingly recognizing the vital role of BI in their success, especially in the face of challenges like the COVID-19 pandemic (Ratcliffe, 2020). The pandemic has emphasized the need to investigate the strategic perspective of BI's impact on SF (Azeroual & Theel, 2018). While there's growing interest in understanding how BI drives SF, there's still a clear need to expand research on the interplay between KM, and SF. As KM provides a structured approach for capturing, sharing, and utilizing knowledge to improve future planning scenarios (Rehman *et al*., 2022; Fink *et al*., 2017) and emerging technologies (Suandi, 2022). The study aim of the present study is to examine the impact of BI on SF, with a specific focus on the moderating role of KM in this context. The findings and recommendations from this research will offer valuable insights to Jordanian telecom companies, helping them navigate the competitive landscape, make informed decisions, and achieve long-term sustainability and success.

The third gap is in the BI and SA literature. First, it explores the impact of BI on SA from a strategic perspective, which is an area that hasn't been extensively examined. While some research has focused on BI in digital advertising, there's limited exploration of how BI impacts DM systems to improve organizational ambidexterity, or how digital tools create value for customers (Mehanović & Durmić, 2022; Tariq *et al*., 2022; Dabas & Manaktola, 2021). Moreover, SA as a concept has not been completely understood, and further research is needed to delve into its different aspects (Husien *et al*., 2020). This gap arises from the rapid technological advancements and the opening of local markets to international competition in Jordan. This has led Jordanian enterprises to cope with a high degree of environmental changes and increasingly complex and renewable information regarding their internal and external environments (Zraqat, 2019). In such a dynamic context, dynamic capabilities become crucial for companies to adapt

quickly to competition and environmental changes (Barreto, 2010). These advantages provide firms with a competitive edge, particularly during times of uncertainty, differentiating them from competitors (Schwarz *et al*., 2020).

In summary, the study aims to address these gaps and contribute to a deeper understanding of the interplay between (SV on EO and TI) and (BI on SF, and KM), (BI on SA and DM) and the unique challenges and opportunities faced by Jordanian telecom companies.

1.3 Objectives

1.3.1 General Objectives:

The general objective of this research is to conduct a comprehensive examination of the challenges confronted by the telecommunications sector in Jordan, coupled with the proposition of strategic solutions to effectively mitigate these hurdles. By doing so, this study seeks to furnish a well-rounded comprehension of the factors impeding the sector's advancement within the rapidly evolving telecommunications landscape. The ultimate aim is to offer practical insights and recommendations that can empower Jordanian telecom companies to fortify their strategic adaptability, spur innovation, and enhance competitiveness. This undertaking takes into account the contemporary and swiftly shifting business environment, recognizing the need for firms to adapt and thrive in the face of burgeoning competition and capitalize on emerging opportunities.

One pivotal aspect of this investigation is the endeavor to bridge an existing gap in the literature, specifically in the realm of telecom companies in Jordan. By doing so, the research aspires to contribute to a broader understanding of the

intricate interplay between the variables under scrutiny. The endgame is to facilitate organizations in their pursuit of long-term success and sustainability in an environment characterized by dynamism and cutthroat competition. With the ever-increasing prominence of entrepreneurship in the business landscape, it becomes imperative for companies to recalibrate their strategies, ensuring that they remain competitive and primed to seize nascent opportunities. Simultaneously, these strategic shifts should imbue companies with the resilience to withstand crises, proactively identify and evaluate potential threats and opportunities, and uncover best practices that empower organizations to harness the potential of technological innovation as a driver of enduring success.

1.3.2 Specific Objectives:

The primary objective of this research is to conduct an exhaustive analysis of the challenges confronting the Jordanian telecom sector. These challenges encompass a spectrum of issues, from internal communication barriers and a risk-averse culture to funding constraints, shortages in digital expertise, and limitations in essential resources. By delving into these complexities, the aim is to gain a comprehensive understanding of the obstacles impeding the sector's progress within the dynamic telecommunications landscape of Jordan.

In tandem with identifying challenges, a crucial specific objective is to formulate strategic solutions tailored to address the identified issues within the Jordanian telecom sector. This involves a rigorous evaluation of the feasibility and effectiveness of these proposed solutions, with the overarching goal of fostering the sector's advancement and resilience in the face of multifaceted challenges. A

pivotal aspect of this research is the examination of the rapidly evolving business environment, with a dedicated focus on the telecommunications landscape in Jordan. The objective is to meticulously analyze external factors, including technological advancements and emerging opportunities, that significantly influence the dynamics of the sector. By understanding these environmental dynamics, the research seeks to provide valuable insights for telecom companies to adapt their strategies effectively.

To enhance the strategic adaptability of Jordanian telecom companies, specific objectives include providing insights and recommendations. This involves a thorough assessment of their capacity to adjust strategies in response to changing market conditions, competition, and technological advancements. The aim is to equip these companies with the agility to navigate the dynamic landscape and ensure sustained growth. In fostering innovation within the telecommunications sector, the research aims to explore various avenues. This includes identifying specific areas where innovation can be strategically leveraged to drive growth and enhance competitiveness for Jordanian telecom companies. The objective is to encourage a culture of innovation that aligns with the unique challenges faced by companies in the Jordanian context.

Another specific objective is to develop recommendations that empower Jordanian telecom companies to enhance their competitiveness. This involves formulating strategies for differentiation, customer engagement, and market positioning, all geared toward thriving in a highly competitive landscape. The focus is on providing actionable insights to fortify the competitive standing of these companies. Contributing to the existing literature is a significant objective, aiming to bridge gaps related to telecom companies in Jordan. By providing new insights

and knowledge, the research seeks to contribute to the academic and business community's understanding of challenges and strategic solutions specific to the Jordanian context.

A critical objective involves the investigation and analysis of the intricate interplay between various variables affecting the telecommunications sector in Jordan. This includes examining relationships between factors such as strategic adaptability, innovation, and competitiveness. The aim is to unravel the dynamics that shape the sector and provide nuanced insights. The research further aims to offer practical insights and recommendations to facilitate long-term success and sustainability for telecom companies in Jordan. Considering the dynamic and competitive nature of the business environment, the focus is on providing guidance for sustained growth and resilience against evolving challenges.

Lastly, the research emphasizes the importance of recalibrating strategies in light of the increasing prominence of entrepreneurship. Specific objectives include advocating for strategies that enable companies to remain competitive, seize opportunities, and cultivate resilience to withstand crises in the telecom sector. The aim is to promote an entrepreneurial mindset that aligns with the evolving landscape of the industry. This thesis contains three different research as follows:

1. Assessing the impact of strategic vigilance on fostering entrepreneurial orientation through technological innovation. (Chapter 2).
2. Optimizing the synergies between business intelligence and strategic foresight for effective knowledge management and uncertainty navigation. (Chapter 3).
3. Adopting business intelligence practices to achieve strategic ambidexterity in the context of digital marketing. (Chapter 4).

1.4 Research Questions

Entrepreneurs operating in less advanced market economies can benefit by observing and adopting the best practices demonstrated by successful businesses in more developed market economies. However, the complex, chaotic, and uncertain environments pose a huge risk that impacts the ability of companies in the former market to compete and survive. The rapidly changing business characteristics also make finding new innovative business opportunities essential. Managers should take the initiative to develop novel concepts and approaches that provide value to adopt new entrepreneurship skills (Fisher *et al*., 2020). To thrive and grow in a competitive environment and strive towards long-term objectives, entrepreneurs require a comprehensive and all-encompassing perspective.

Moreover, Arunachalam (2018) showed that organizations could enhance innovation-based profitability when focusing on entrepreneurship. An entrepreneur plays a pivotal role as an innovator by introducing changes and creating new opportunities that contribute to long-term economic growth. by identifying opportunities to improve sustainability performance or reduce economic, environmental, and social risks (Morioka *et al*., 2016). Existing literature suggests that entrepreneurship is influenced by various factors such as managerial style, the need for achievement, and other social or motivational aspects. Businesses in the telecom sector have been functioning in an environment marked by environmental instability, greater competition, and international economic penalties and restraints. Under these circumstances, businesses must rely on the entrepreneurial abilities of their management at all levels to innovate, take risks, and understand economic trends (Abdalla & Mohamed, 2020; Nordqvist & Melin, 2010; Wales *et al*., 2020; Lee & Peterson, 2000).

Swanson (2001) indicates that to maintain competitiveness and performance, businesses must adopt SV by proactively managing the market and discovering market developments earlier. Fisher *et al* (2020) clarify that technological vigilance accomplished through research and gathering information about standards and the environment must be open to discovering future technologies with technological advantages and opportunities. It also helps companies reduce potential environmental risks and threats and allows them to acquire technical knowledge that they can employ to develop and extend technical solutions (Wales *et al*., 2020).

Therefore, TI is widely recognized as having a positive impact on a firm's reputation for product quality (Adomako, 2017). Arunachalam (2018) confirms that the development of SV behavior would manifest in more innovative behavior, reflected in new product introductions. EO impacts profit and shows that it depends on marketing capabilities. Brouthers *et al*. (2015) suggest that firms possessing more excellent EO capabilities have better abilities to exploit the opportunities and resources and the advantage of their proactive capabilities to find new opportunities and gain access to new technologies. According to Hasan (2022), the significance of SV is the ability to increase an organization’s capacity for innovation and creativity, place the organization in a position of strength, ensure its performance's success, and familiarize it with cutting-edge tools and technologies. A preliminary study highlights the significance of dynamic capabilities in creating a competitive advantage for a firm, especially in the face of environmental changes (Eisenhardt & Martin, 2000). Dynamic capabilities explain how managers gather resources, change the base, and integrate them to add value to the company, including innovative capabilities to induce performance and increase competitiveness (Donbesuur *et al*., 2022).

The present study has been sourcing the literature review of previous studies and interviews with top managers to answer two questions. The first question is, does SV impact EO? We focus on clarifying the positive effects of dimensions (competitive, environmental, commercial/marketing) on EO dimensions (proactiveness and risk-taking). The second question is, does SV affect EO in the presence of TI as a mediating variable? The study seeks to identify the positive effect of TI to increase the positivity of a relationship between SV and EO.

SF and BI play vital roles in navigating dynamic environments. SF involves creating future scenarios and enables companies to develop new skills for facing challenges. The telecom sector is a major driver of technological and strategic innovations in Jordan. Given the rapidly evolving technology and unpredictable business environment, BI is essential for predicting future scenarios and avoiding failures. SF is essential for competitiveness and survival in dynamic environments. It involves creating various scenarios for strategic decision-making. BI solutions aid in data collection, integration, and analysis, improving company performance. KM encourages knowledge sharing and is linked to creativity. To enhance the competitiveness of Jordanian telecom companies, KM and SF with BI are crucial. to develop future scenarios for survival and growth. This study investigates how these companies use BI to improve operations and meet customer needs, aiming to offer practical solutions and recommendations for maintaining and attracting customers.

Based on my discussions with telecom company managers, I have observed that the competition between companies is increasing, as is reflected in the theoretical literature. Therefore, it is crucial to develop strategic solutions to

enhance competitiveness, which can be achieved through the implementation of KM and BI methodologies. Accordingly, the research draws on a survey of related literature from prior studies and interviews with executive managers. The study aims to answer two questions, The first question is, does BI impact SF? We focus on clarifying the positive effects of BI dimensions (OLAP, data mining, and data warehouse) on SF dimensions (method sophistication, people & network, and organization). The second question is: Does the presence of KM as a moderating variable influence the impact of BI on SF orientation? We aim to identify the positive effect of KM in increasing the strength of the relationship between BI impact and SF orientation.

To enhance the telecom companies' resilience in the face of companies, organizations can implement SA, which involves a balance between exploration and exploitation (Stokes *et al*., 2019; Huang *et al*., 2020). Additionally, the integration of BI tools has become increasingly vital for data-driven decision-making and improved performance (Cybulski & Scheepers, 2021; Fast *et al*., 2021). The rapid digitalization of the marketing landscape, driven by DM, has posed new challenges for marketers, making it more difficult to attract customers through conventional methods (Lingqvist *et al*., 2015). The continuous development of digital infrastructure and ongoing advancements in DM have significantly impacted its usage and profitability (Osmundsen & Bygstad, 2022).

Previous research recommended exploring the interplay between BI, SA, and DM and their collective impact on business performance. Leveraging digital tools and technologies to create value for customers should be a focal point. Understanding the dynamics of exploration and exploitation in various environments is also essential for adapting and succeeding in the evolving market

(El-Adaileh & Foster, 2019; O'Reilly III, Tushman, 2013; Aljumah ., 2021; Dabas & Manaktola, 2021).

This study mainly aims to answer two questions. First, does BI impact SA? We focus on clarifying the positive effects of BI dimensions (OLAP, data mining, data warehouse) on SA dimensions (exploration and exploitation). Second, Is there an impact of BI on SA in the presence of DM as a moderator variable? Identifying the positive effect of DM to increase the positivity of a relationship between BI impact SA.

1.6 Conceptual Framework of the Research

1. Strategic Vigilance (SV): refers to actively monitoring and scanning the external business environment for the identification of emerging threats and opportunities. This process entails ongoing evaluation of market trends, competitor activities, and regulatory modifications to anticipate potential disruptions and adjust the organization's strategy accordingly.

2. Entrepreneurial Orientation (EO): refers to the organizational mindset and strategic orientation towards innovation, risk-taking, and proactiveness. This encompasses a readiness to explore new opportunities, undertake measured risks, and introduce innovations in products, processes, or business models.

3. Technological Innovation (TI): refers to the creation and application of innovative technologies, products, or processes resulting in noteworthy advancements or enhancements. This entails leveraging scientific knowledge and expertise to devise original solutions, improve efficiency, or establish a competitive edge.

4. Business Intelligence (BI): involves gathering, analyzing, and employing data to facilitate strategic decision-making and enhance business outcomes. This encompasses a range of tools, methodologies, and procedures that convert raw data into valuable insights, enabling organizations to comprehend market trends, customer behavior, and internal operations.

5. Strategic Foresight (SF): entails the methodical examination and evaluation of potential future scenarios to predict and ready for potential disruptions and shifts in the business environment. It extends beyond conventional strategic planning by taking into account enduring trends, emerging technologies, and social, economic, and environmental factors that might influence the organization.

6. Knowledge Management (KM): entails the methods, approaches, and systems employed by organizations to acquire, generate, structure, and disseminate knowledge internally. This includes utilizing intellectual capital, expertise, and best practices to bolster decision-making, encourage innovation, and elevate organizational performance.

7. Strategic Ambidexterity (SA): refers to the organizational capacity to concurrently pursue new opportunities and capitalize on existing capabilities. This entails striking a balance between exploring innovative, potentially risky initiatives and exploiting established business models and core competencies, aiming to sustain competitiveness and foster growth.

8. Digital Marketing Matters (DM): is a statement underscoring the crucial role of digital marketing in the contemporary business environment. It highlights the value of utilizing digital platforms, including social media, search engines, email marketing, and online advertising, to connect with customers, establish brand awareness, and boost sales.

1.7 Companies Overview

The telecommunications landscape in Jordan provides an assessment of the country's top telecommunications companies based on various criteria. It begins by categorizing these companies according to customer numbers, network coverage, and internet speed. The leading telecommunications companies in Jordan are identified as Zain Jordan, Orange Jordan, and Umniah Jordan, each with its own unique strengths and weaknesses.

In terms of customer numbers, Zain Jordan emerged as the market leader, boasting a substantial customer base of 45.2 million subscribers by the end of 2022. Orange Jordan follows with around 5 million users, while Umniah Jordan has approximately 3 million customers, as per the most recent statistics. This classification provides valuable insights into the market dynamics and the companies' reach among the Jordanian population.

The evaluation of these telecommunications companies is based on the extent of their network coverage. Zain Jordan is recognized for its extensive and contemporary network infrastructure, while Orange Jordan has exhibited remarkable growth in network coverage since 2010, encompassing over 70% of urban areas in Jordan. In contrast, Umniah Jordan's network coverage is noted to be more limited, primarily confined to specific geographic regions.

Furthermore, the assessment extends to the internet speed provided by these companies. Orange Jordan emerges as the leader in this aspect, offering internet speeds of up to 14 Mbps. Zain Jordan, renowned for its excellent internet speed across the Middle East, secures the second position, with recent statistics ranking Jordan third in internet speed among Arab countries. Umniah Jordan's

internet speed is found to be influenced by its limited network coverage and occasional fluctuations.

The distinctive features offered by each telecommunications company. Zain Jordan is highlighted for its wide range of wholesale solutions, including VPN, VPLS, IP access, IPX, and IX services[1], along with comprehensive cloud network coverage. Orange Jordan is recognized for its provision of 3G services to all customers, high-speed ADSL internet, and support for visual communication services and virtual gaming through advanced technologies. Umniah Jordan, on the other hand, is known for its diverse phone and internet services, as well as its loyalty program and innovation development initiatives known as "The Tank". However, these companies are not without their drawbacks. Orange Jordan faces issues related to frequent internet outages, impacting its customers' connectivity and productivity. Umniah Jordan struggles with weak network coverage and slow internet speeds in many areas, hindering the overall user experience.

In conclusion, the thesis offers a comprehensive analysis of the telecommunications industry in Jordan, data was collected through a survey research design involving three Jordanian telecom companies and a sample of 307 managerial-level employees, to shed light on the competitive landscape, strengths, weaknesses, and challenges faced by the leading telecommunications companies. This information is valuable for academics, researchers, and industry stakeholders seeking a deeper understanding of the telecommunications sector in Jordan.

VPN (Virtual Private Network): is a technology that allows users to establish a secure and encrypted connection over a public network, VPLS (Virtual Private LAN Service): is a type of VPN service that extends a local area network (LAN) over a wide area network (WAN), IP Access: access typically refers to the ability to access and use the internet and other IP-based services, IPX (Internetwork Packet Exchange): It allows communication between devices on a local network, IX Services (Internet Exchange Services): services refer to services related to Internet exchange points).

1.8 Outline of the Thesis

The structure of this thesis unfolds across five cohesive chapters. Chapter 1 sets the stage with an introduction, problem statement, research purpose, objectives, questions, and a comprehensive company overview. Moving forward, Chapter 2 delves into the first research thread, while Chapter 3 addresses the second research dimension. The subsequent chapter, Chapter 4, navigates through the intricacies of the third research area. Lastly, Chapter 5 serves as the conclusion, offering practical implications derived from the research findings.

This research endeavors to deepen our understanding of the intricate relationships, specifically focusing on the interplay between SV on EO and TI, as well as BI on SF and KM, and BI on SA and DM. The aim is to shed light on the distinctive challenges and opportunities encountered by telecom companies in Jordan, providing valuable insights for practitioners and stakeholders involved in navigating the complex landscape of organizational dynamics.

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Chapter 2: Impact of Strategic Vigilance on Entrepreneurial Orientation in Jordanian Telecom Companies: Mediating Role of Technological Innovation

Abstract

Strategic vigilance of technological innovation is a crucial determinant in accommodating long-term and structural changes in the market and environment. Drawing upon dynamic capability theory to achieve long-term competitive advantages, the research aims to investigate the influence of strategy vigilance dimensions on entrepreneurial orientation and analyzes how technological innovation mediates the relationship between variables. Data was collected from participants using a survey research design from three Jordanian telecom companies and a sample of 307 managerial-level employees. The authors used structural equation modeling to test the impacts of strategic vigilance on entrepreneurial orientation. The study results found that increased awareness of monitoring and following the internal and external environment contributes to flexibility and time saving by detecting early signals of threats and opportunities. This alignment with risk-taking, proactiveness, and technological innovation generates new goods and services for shared value. However, strategic vigilance did not affect entrepreneurial proactiveness due to intense competition and the need to study customer behavior. Thus, strategic vigilance positively impacts entrepreneurial orientation, and technological innovation mediates this impact, particularly in telecom companies.

Keywords: strategic vigilance, entrepreneurial orientation, technological innovation, proactiveness, risk-taking, telecom companies.

2.1. Introduction

The telecom sector in Jordan is instrumental in driving national economic development and serves as a catalyst for numerous technological and entrepreneurial initiatives. Consequently, the enhancement of telecom companies' performance and the development of their capabilities will exert a substantial influence on the economic growth of the country. (Emami *et al*., 2022). This industry is affected by its environments (Roehrich *et al*., 2019), and thus, more research is needed to provide practical solutions to address its survival and growth challenges, including funding and resourcing issues and poor networking capabilities (Pannone, 2001).

The COVID-19 pandemic has had a serious impact on national and international Jordanian companies (Shraah *et al.,* 2022; Lutfi *et al.,* 2022; Kutieshat & Farmanesh, 2022; Abuhussein, 2022; Atlam *et al.,* 2022; Alzuod & Dalain, 2023) including telecom companies (Emami *et al.,* 2022). Entrepreneurial orientation (EO) has been proposed to help businesses transform and build their resilience to withstand significant challenges and shocks. The entrepreneurial approach, which is based on taking risks and being proactive, enables the development of new abilities to protect companies against various threats (Zighan *et al.,* 2022). Thus, many companies have developed strategies around the strategic vigilance (SV) concept to gain flexibility in identifying early signals of internal and external threats and opportunities. Companies then delve deeper into understanding the signs

through further probing, connecting dots, and continuous monitoring (Schoemaker & Day, 2021). Through SV, companies can maintain and improve their competitiveness and performance (Mulcaster, 2009; Schoemaker & Day, 2021). Further, faced with intense competition between telecom companies, engaging in technical innovation (TI) activities is considered a prelude to their growth and expansion to other markets (Donbesuur *et al.,* 2022) as well as their survival and excelling in the industry (Indrawati *et al.,* 2020).

The global literature on entrepreneurship emphasizes the significance of EO for companies (Elenurm, 2012) in enabling the development of business opportunities for both start-up ventures and established firms, thereby driving business expansion, fostering technological advancements, and facilitating wealth creation. (Donbesuur *et al.,* 2022; Abdalla & Mohamed, 2020; Covin & Slevin 1991). Similar to environmental factors, such as dynamism and generosity, or structural factors, such as the decentralization of decision-making, EO could also influence firm performance (Lumpkin & Dess, 1966; Jin *et al.,* 2017).

Companies benefit from SV as it enables them to make calculated and incremental investments that facilitate learning and provide a competitive advantage in the market. Organizations that lack vulnerability are prone to overlooking or mishandling early warning signs, leading to a loss of crucial opportunities for adaptation. By the time they recognize the need for action, they have already forfeited valuable flexibility, thereby limiting their ability to effectively respond to events and catch up with competitors. (Schoemaker & Day, 2021). The cultivation of increased vigilance within organizations is not solely reliant on a single leader. Rather, it necessitates the development of a set of capabilities that organizations build through investment and the fostering of a culture characterized

by curiosity, openness, and a lack of tolerance for ambiguity (Suandi, 2022). Vigilant companies are such because of the continual collective action of a group of persons that gather and utilize knowledge willingly and proactively in response to potential changes in the external environment to generate business opportunities and mitigate uncertainty risks (Breckel *et al.,* 2011). The role of SV allows the organization to be updated with new technologies and methods related to its activities and enhance competitiveness by engaging in TI to create positive changes in production methods (Jalod *et al.,* 2021). TI is an approach used to develop and increase the effectiveness of SV. Tende and Onuoha (2020) defined TI as the capability of recognizing opportunities for innovation and allocating resources toward new courses of action. According to the literature, innovation refers to the development of new technologies into existing goods, services, procedures, or any combination for a business or entrepreneur aiming to turn a profit (Bulut *et al.,* 2013; Van *et al*., 2016).

2.1.2 Research Questions

Entrepreneurs operating in less advanced market economies can benefit by observing and adopting the best practices demonstrated by successful businesses in more developed market economies. However, the complex, chaotic, and uncertain environments pose a huge risk that impacts the ability of companies in the former market to compete and survive. The rapidly changing business characteristics also make finding new innovative business opportunities essential. Managers should take the initiative to develop novel concepts and approaches that provide value to adopt new entrepreneurship skills (Fisher *et al*., 2020). To thrive and grow in a competitive environment and strive towards long-term objectives, entrepreneurs require a comprehensive and all-encompassing perspective.

Moreover, Arunachalam (2018) showed that organizations could enhance innovation-based profitability when focusing on entrepreneurship. An entrepreneur plays a pivotal role as an innovator by introducing changes and creating new opportunities that contribute to long-term economic growth. by identifying opportunities to improve sustainability performance or reduce economic, environmental, and social risks (Morioka *et al*., 2016). Existing literature suggests that entrepreneurship is influenced by various factors such as managerial style, the need for achievement, and other social or motivational aspects. Businesses in the telecom sector have been functioning in an environment marked by environmental instability, greater competition, and international economic penalties and restraints. Under these circumstances, businesses must rely on the entrepreneurial abilities of their management at all levels to innovate, take risks, and understand economic trends (Abdalla & Mohamed, 2020; Nordqvist & Melin, 2010; Wales *et al*., 2020; Lee & Peterson, 2000).

Swanson (2001) indicates that to maintain competitiveness and performance, businesses must adopt SV by proactively managing the market and discovering market developments earlier. Fisher *et al*. (2020) clarifies that technological vigilance accomplished through research and gathering information about standards and the environment must be open to discovering future technologies with technological advantages and opportunities. It also helps companies reduce potential environmental risks and threats and allows them to acquire technical knowledge that they can employ to develop and extend technical solutions (Wales *et al*., 2020).

Therefore, TI is widely recognized as having a positive impact on a firm's reputation for product quality (Adomako, 2017). Arunachalam (2018) confirms that the development of SV behavior would manifest in more innovative behavior, reflected in new product introductions. EO impacts profit and shows that it depends on marketing capabilities. Brouthers *et al*. (2015) suggest that firms possessing more excellent EO capabilities have better abilities to exploit the opportunities and resources and the advantage of their proactive capabilities to find new opportunities and gain access to new technologies. According to Hasan (2022), the significance of SV is the ability to increase an organization's capacity for innovation and creativity, place the organization in a position of strength, ensure its performance's success, and familiarize it with cutting-edge tools and technologies. A preliminary study highlights the significance of dynamic capabilities in creating a competitive advantage for a firm, especially in the face of environmental changes (Eisenhardt & Martin, 2000). Dynamic capabilities explain how managers gather resources, change the base, and integrate it to add value to the company, including innovative capabilities to induce performance and increase competitiveness (Donbesuur *et al*., 2022)

This study delves into existing literature and incorporates insights from interviews with top managers to address two pivotal questions. The first question explores the impact of SV on EO. Our emphasis is on elucidating the positive influences of various dimensions competitive, environmental, and commercial/marketing on EO dimensions such as proactiveness and risk-taking. The second question investigates whether SV influences EO in the context of TI serving as a mediating variable. The study aims to discern the constructive role of TI in enhancing the positive relationship between SV and EO. In doing so, we aim to identify and underscore the positive effects of Technological Innovation on bolstering the linkage between Strategic Vision and Entrepreneurial Orientation.

2.1.3 Relevance of the Study

This study addresses two significant gaps in the literature concerning SV and EO. The first gap pertains to investigations on the impact of SV on EO. Although prior research has underscored the significance of proactively identifying change signals, making strategic investments, adopting flexible approaches to uncertainty, and fostering clear accountability and coordination for sharing information and addressing weak signals, there has been limited exploration of how these concepts are interconnected with EO within firms (Rigtering *et al*., 2014; Suandi, 2022; Schoemaker & Day, 2021; Jin *et al*., 2017). With the increasing popularity of business entrepreneurship, companies must modify their strategies to stay competitive and capitalize on new opportunities (Yu *et al*., 2022; Soluk *et al*., 2021). Despite the growing interest in how EO can enhance performance (Emami *et al*., 2022; Kanaan-Jebna *et al*., 2022; Masa'deh *et al*., 2018; Soluk *et al*., 2021), competition (Yu *et al*., 2022) and the importance of adopting EO in telecom companies (Abdalla & Mohamed, 2020), empirical studies on the effect of SV on EO in telecom companies in Jordan, specifically on SV, has been limited. This area is particularly significant given the modern nature of SV in the Middle East and its potential to drive competition between business organizations.

This study also aims to fill the second gap in the literature regarding the positive impact of TI practices on SV and EO through the lens of dynamic capabilities. Despite the potential benefits of TI in enhancing company performance, an understanding of how it can be effectively combined with entrepreneurship to drive innovation has been limited (Donbesuur *et al*., 2022). This area is significant because businesses can create shared value by developing

cutting-edge products and services and maintaining a competitive advantage through dynamic capabilities in turbulent and unpredictable environments (Schwarz *et al*., 2020). Previous studies have highlighted the importance of proactive EO behavior in improving performance, and TI has been shown to contribute to increased sales and profit. Therefore, how TI can be leveraged to enhance SV and EO in telecom companies and how these variables can lead to improved performance and sustainability need to be examined (Kiani *et al*., 2020; Liem *et al*., 2019; Vivarelli, 2013).

Our study is the first to examine TI as a mediator variable to enhance the effectiveness and continuity in telecom companies. The rapid advancement of technology and increased competition in international markets have transformed the economy, making the world smaller and creating a high degree of environmental uncertainty for Jordanian enterprises. The rapid improvements in various fields have resulted in information regarding the internal and external business environments becoming increasingly complex and dynamic (Zraqat, 2019). The ongoing COVID-19 crisis has brought even more uncertainty and complexity to the global economy, leading to a new field of study that considers the relationship between SV, EO, and TI as mediator variables to be crucial for organizations seeking to attain long-term success in the hectic and fiercely competitive corporate world of today. SV allows companies to proactively identify and assess potential threats and opportunities, while EO enables them to pursue innovative solutions and take calculated risks.

TI is a key driver of competitive advantage, allowing businesses to create new goods and services, expand into new markets, and boost operational effectiveness. By studying the relationship between these three constructs, researchers and

practitioners can gain insights into how companies can effectively leverage SV and TI to drive EO to support and enhance these capabilities. This knowledge can inform the development of strategies and practices to help organizations succeed in today's rapidly changing business landscape, thereby contributing to their long-term sustainability and growth. However, despite the theoretical significance of exploring the relationship between SV, EO, and TI, empirical research in this area has been lacking. Therefore, conducting research in this field is crucial for advancing our understanding of these constructs and identifying best practices for organizations looking to leverage the capability to drive TI and achieve long-term success.

The study will conduct a literature review, outline the methodology, present the results, facilitate a discussion, and offer conclusions.

2.2 Theoretical Framework and Hypothesis

This chapter presented a detailed review of past studies and relevant literature based on the variables in this research study. As a result, relevant literature relating to each of the constructs in this study will be reviewed. The researcher discussed the concept of variables, reviewed relevant pieces of literature, and then discussed their dimensions and interrelationships to build the study's model. The essence of these determinants is to provide a better understanding of the concept and later relate it to the purpose of this research study.

Strategic vigilance of technological innovation is a crucial determinant in

accommodating long-term and structural changes in the market and environment. Drawing upon dynamic capability theory to achieve long-term competitive advantages, the research investigates the influence of strategy vigilance dimensions on entrepreneurial orientation and analyzes how technological innovation mediates the relationship between variables. Increasing awareness of monitoring and following the internal and external environment contributes to flexibility and time saving by detecting early signals of threats and opportunities. This alignment with risk-taking, proactiveness, and technological innovation generates new goods and services for shared value.

A pivotal aspect of this investigation is to bridge existing gaps in the literature, specifically concerning telecom companies in Jordan. The research aspires to contribute to a broader understanding of the intricate interplay between various variables affecting the sector. The intention is to facilitate organizations in their pursuit of long-term success and sustainability within an environment characterized by dynamism and fierce competition. With the growing prominence of entrepreneurship, the study emphasizes the need for companies to recalibrate their strategies to remain competitive, seize opportunities, and cultivate resilience against crises. Simultaneously, these strategic shifts should enable companies to proactively identify and evaluate potential threats and opportunities while uncovering best practices that harness technological innovation as a driver of enduring success.

2.2.1 Entrepreneurial Orientation

EO encompasses the organizational methods, procedures, and decision-making styles that exhibit an act entrepreneurially (Miller, 1983). EO is a combination of two major behaviors: risk-taking (RT), refers to the inclination of

strategic decision-makers to allocate resources towards initiatives that have uncertain outcomes, while proactiveness entails actively entering new markets with innovative products and aiming for leadership positions in the marketplace (Kiani *et al*., 2020). It is considered a strategic stance based on how businesses are consistently innovative and proactive (Covin & Wales, 2019; Hanandeh *et al*., 2023).

Entrepreneurship is usually a multidimensional concept (Gao *et al*., 2018), where uncertainty and riskiness are the principal factors separating entrepreneurs from hired employees. Researchers classify entrepreneurship into five dimensions: new business venturing, product, service, and process innovativeness, self-renewal, and proactiveness (Lampe *et al*., 2020). Other researchers discuss other dimensions, such as proactiveness, RT, and innovation (Karyotakis & Moustakis, 2016; Omisakin *et al*., 2016; Ejdys, 2016). Other scholars (e.g., Lumpkin & Dess, 1966; Duru *et al*., 2018) also include competitive aggressiveness and autonomy as additional dimensions. We consider the two dimensions of proactiveness and RT based on different EO dimensions. EO defines the processes, established practices, and decision-making activities that facilitate the pursuit of new market entries. (Lumpkin & Dess, 1966). The key dimensions that define an EO consist of a proclivity to act autonomously, a readiness to innovate and embrace risks, a disposition to adopt an aggressive stance towards competitors, and a proactive approach to seizing marketplace opportunities.

The first dimension, risk-taking, is a quality used to describe entrepreneurship. RT refers to the willingness of its members to invest resources in uncertain projects that pose a significant potential for failure, which can result in substantial costs. It also refers to the willingness to take calculated risks, adjust one's risk profile, and carefully identify the risks and benefits of a particular decision. For small and medium-sized enterprises (SMEs), implementing risk management strategies minimizes potential negative impacts while maximizing

potential rewards. SMEs can make informed decisions and optimize their chances of success by carefully assessing risks and developing proactive plans to address potential challenges. Effective risk management practices can help businesses remain competitive, navigate complex market conditions, and achieve long-term goals (Karen & Wang, 2013; Hammouri *et al*., 2021). In this way, Firms characterized by an EO often exhibit RT behavior, which can include taking on substantial debt or making significant resource investments to capitalize on market opportunities and achieve higher returns (Lumpkin & Dess, 1966). The risk describes managerial choices associated with uncertain outcomes (Palmer & Wiseman1999). The essence of EO lies in pursuing new market entries, which can be achieved by entering either new or established markets with either new or existing goods or services.

The second dimension is Proactiveness, a key aspect of EO, which entails taking proactive measures by anticipating and actively pursuing new opportunities, as well as engaging in emerging markets (Lumpkin & Dess, 1966). Proactiveness plays a critical role in EO as it signifies a forward-thinking mindset coupled with innovative and new-venturing activities. Proactiveness is a key trait among successful entrepreneurs and is defined by their initiative and ability to think in a visionary way. These individuals develop short- and long-term strategic plans to guide their decision-making. Additionally, entrepreneurs understand the value of learning from the experiences and failures of others, allowing them to improve their practices and approaches. Entrepreneurs can continually refine their strategies and remain ahead of the curve in a constantly evolving business landscape by accepting criticism and suggestions for development. This proactiveness helps entrepreneurs stay agile, innovative, and responsive to changing market conditions, leading to sustained success in the long run (Karen & Wang, 2013). In a study in the telecom sector in Sudan, Abdalla and Mohamed (2020) found that companies achieve superior values and performance by adopting a proactive strategy in their environment.

2.2.2 Strategic Vigilance

SV is the ability to perform business in a specific way or a group of methods that prevent other organizations from keeping up with them in the short term or the future (Kotler, 2004). It serves as a discovery mechanism to identify both threats and opportunities, gathering the necessary information and knowledge that can inform decision-making and enhance the competitiveness of the enterprise (Karima & Zohra, 2021). According to Suandi (2022), individuals who are able to perceive impending risks and opportunities earlier than their competitors gain an advantage by taking swift action once the fog of uncertainty clears. Tende and Onuoha (2020) define it as the capacity to spot opportunities for innovation, allocate resources to new strategies, or prevent inefficient use. SV often refers to the capacity to maintain perceptible attention to the environment to predict industry changes; it is a decision-making process that calls for thorough information gathering, information assimilation, and thoughtful decision-making (Breckel *et al*., 2011). Vigilance is a protective strategy for dealing with any scenario and making the best judgments (Ruckstuhl *et al*., 2003). SV increases any organization's potential by preparing it to confront internal and external abnormalities (Tende & Onuoha, 2020).

Vigilant organizations can detect impending hazards and potential prospects earlier than their competitors and can take prompt action once the ambiguity dissipates (Schoemaker & Day, 2021). SV is one of the concepts of modern management sciences; the importance of implementing a vigilance system of performance has emerged in monitoring an organization's surrounding environment to ensure more control over the internal and external environment (Jalod *et al*., 2021). SV is a structured, formal, and orderly process that organizations

adopt with complete awareness to monitor and control the continuous changes in the environment to avoid and address weaknesses and enhance and support their strengths (Jaaz & Jamal, 2021). It also refers to being aware of societal changes that may threaten an organization, such as demographic shifts, urban developments, conflicts, and controversies. It includes factors like customs, traditions, religious and ethnic conflicts, and the structure of families. Comprehensive vigilance involves monitoring various political, legal, social, economic, demographic, and cultural developments (Jaaz & Jamal, 2021).

SV reflects the organization's ability to deal with its environment, continuous changes, and dynamic state. It requires it to provide a degree of cooperation and focus on many requirements, including leadership orientation towards vigilance, which enhances organizational directions (Schoemaker & Day, 2021). The literature identifies various dimensions of SV. The first dimension is competitive vigilance, which is how an organization assesses its present and future competitors by gathering and examining qualitative and quantitative knowledge to identify competitors' strategies, capacities, objectives, and results. Competitive vigilance identifies R&D initiatives and connections to products, markets, suppliers, and emerging technologies (Hassan & Dawood, 2020). Additionally, it is a competitive investigation that reveals a company's strengths and weaknesses (Allawi, 2016).

The second dimension is commercial/marketing vigilance, defined as monitoring customers' needs and desires in the short and long term and anticipating customers' loyalty by constantly reviewing complaints and covering sales representatives and distributors (Ben Ali, 2017). This endeavor involves leveraging resources such as processors and customers, acquiring new market-related skills, and capitalizing on market growth rates to gather, process, and disseminate valuable knowledge that serves the business and contributes to organizational, marketing, and strategic development (Hassen, 2014). The third

dimension is environmental vigilance, defined as comprehensive vigilance to continuously monitor various developments, including demographic, economic, social, cultural, and legal factors, which impact an organization's operations. This involves staying informed about relevant environmental events and changes (Hassan & Dawood, 2020).

Marketing vigilance is the collection of tools that managers may use to continually monitor changes in the marketing environment by identifying customers' desires to achieve their satisfaction (Al Noori & Al-Janabi, 2022).

2.2.3 Strategic Vigilance and Entrepreneurial Orientation

Companies unwilling to take risks in today's dynamic business environment could lose market share and fail to compete effectively with other entrepreneurial firms in the same sector. However, risk-taking must be managed carefully because it inherently involves potential dangers and pitfalls. Only risks managed through vigilant monitoring and analysis will likely lead to a competitive advantage (De Wet & Tselepis, 2020). EO is a critical factor that contributes to a company's success by increasing its vigilance in facing business competition. This orientation involves the development of innovative strategies to improve the company's efficiency, effectiveness, and productivity, as well as its ability to remain competitive in the marketplace. Businesses can become more proactive in approaching the competition, anticipating potential challenges, and taking proactive steps to mitigate risks by embracing an entrepreneurial mindset. This heightened awareness allows companies to adapt and evolve in response to changing market conditions, leading to greater long-term success. (Isa, 2011). Entrepreneurial behavior often involves being proactive and breaking or bending the rules. This may include creative interpretations of agreements or stipulations and using resources in ways

they were not intended. As a result, entrepreneurs need to exercise vigilance when adhering to ethical standards. The very nature of this behavior requires marketers to be mindful of ethical considerations and act in ways that are responsible and sustainable. By adopting a vigilant approach to ethical decision-making, entrepreneurs can establish a strong reputation and build trust with their customers, partners, and stakeholders. This, in turn, can contribute to long-term success and profitability (Morris *et al*., 2002; Van *et al*., 2016).

The link between SV and EO is important because there are two critical factors that contribute to the success of an organization: effective leadership and a strong organizational culture. SV enables firms to be proactive in identifying opportunities and threats (Zighan *et al*., 2022), while EO helps organizations respond effectively to these opportunities and threats (Karima & Zohra, 2021; Ala'eddin Ahmed *et al*., 2021). EO comprises two primary behaviors, proactiveness, and risk-taking, necessary for identifying and pursuing new opportunities. Proactiveness is important for EO because it helps firms predict and pursue emerging markets and new opportunities. On the other hand, risk-taking is also critical for EO because it enables firms to invest resources in projects with uncertain outcomes (Miller, 1987), which can lead to significant gains.

SV is the ability of an organization to perform business in a specific way that makes it difficult for other firms to keep up with them. It is a discovery method for threats and opportunities and involves being vigilant about environmental changes. The link between SV and EO is important because vigilant organizations can better detect impending hazards and potential prospects before their competitors, which helps them take prompt action when the fog of uncertainty lifts.

In conclusion, examining the link between SV and EO is important because they are two critical factors enabling firms to identify opportunities and threats and

respond effectively. These factors correspond to the gap between SV and EO in organizations that our study seeks to explore. Our study highlighted the lack of empirical studies on the effect of SV on EO in telecom companies in Jordan and the importance of exploring this relationship. Our study also provides an overview of the concepts of EO and SV and their importance in helping organizations thrive in dynamic environments. Thus, understanding the relationship between SV and EO is crucial for companies to remain competitive and capitalize on new opportunities. While previous research has emphasized the importance of being proactive in detecting change signals and employing flexible approaches to uncertainty, little attention has been given to how these concepts relate to EO in firms. Therefore, empirical studies that explore the impact of SV on EO, particularly in the Middle East, where the concept of SV is being introduced and has the potential to drive competition between business organizations, are necessary.

Hypothesis 1: Strategic vigilance and its dimensions (competitive, environmental, and commercial/marketing) positively impact entrepreneurial orientation in the telecom companies in Jordan.

Based on the components of strategic vigilance, the first main hypothesis can be divided into two sub-hypotheses:

Hypothesis 1.1. Strategic vigilance and its dimensions (competitive, environmental, and commercial/marketing) positively influence proactiveness.

Hypothesis 1.2. Strategic vigilance with its dimensions (competitive, environmental, and commercial/marketing) positively influences risk-taking.

2.2.4 Strategic Vigilance and Technological Innovation

The significance of innovation in the success and survival of firms cannot be overstated. The introduction of new production methods through TI can result in

improved performance in production capacity, product quality, and cost of production (Tavassoli & Karlsson, 2016). However, TI investments can be costly and risky, making it imperative for companies to develop effective TI strategies that enable them to expand and compete (Amankwah-Amoah *et al*., 2018; Ren, Eisingerich & Tsai, 2015). Tende and Onuoha (2020) define TI as the capacity to recognize opportunities for innovation and allocate resources toward pursuing new courses of action.

Several studies have demonstrated that engaging in TI activities leads to growth and expansion, particularly in highly competitive markets (Naidoo, 2010; Sharif & Huang, 2012). The link between TI, business growth, and performance measures, such as sales and productivity, is significant for SMEs (Tavassoli & Karlsson, 2016). Organizations must monitor their technological environment continually to achieve sustainable success (Ben Ali, 2017).

Product innovation, which involves introducing new products or services to the market, can significantly impact sales and product quality (Expósito & Sanchis-Llopis, 2019). Vigilance significantly impacts achieving success and excellence by monitoring its technological environment and discovering distinctive technological methods and means of producing goods or services for customers quickly and at the lowest cost (Jaaz & Jamal, 2021). The practice of SV, which involves monitoring and analyzing the scientific and technological landscape to identify opportunities and mitigate threats, has emerged as a crucial strategic variable (Jalod *et al*., 2021) because technology has become a continual component of vigilance. It has become an essential strategic variable because of its technology and awareness of the competition, and it understands its strengths and weaknesses. To attain long-term knowledge, the company must develop a strategy to monitor its technological surroundings (Al-Dahan *et al*., 2020). SV demonstrates a dynamic capability that enables businesses to achieve a competitive advantage in unstable marketplaces.

Strategy academics frequently employ SV to weaken a firm's capacity to respond to numerous demands from dynamic competitive situations (Tende & Onuoha, 2020). Park (2021) confirmed that some firms have thrived because of adopting the behaviors of leadership's vision and vigilance and emphasizing digital innovations. Moreover, SV synchronized among corporate levels helps break the routine inertia, thus assisting the companies to leave potential technological procedures and explore new alternatives (Tende & Onuoha, 2020).

To summarize, innovation and technological vigilance are critical to the competitiveness and survival of firms, particularly in highly competitive markets. Companies must develop effective TI strategies, continually monitor their technological environment, and leverage SV to achieve growth and improve performance measures.

The authors emphasize the importance of SV, EO, and TI For organizations striving to achieve long-term success in the dynamic and rapidly evolving business environment of today. It highlights the need for businesses to proactively manage the market and discover market developments earlier to reduce potential environmental risks and threats and acquire technical knowledge (Wales *et al*., 2020; Fisher *et al*., 2020). The study also aims to fill the gap in empirical research in this area and identify best practices for organizations to leverage these capabilities to drive TI and achieve long-term success. Furthermore, a previous article suggests that the positive impact of TI practices on SV and EO through the lens of dynamic capabilities needs to be examined to enhance company performance and maintain a competitive advantage in unpredictable environments (Schwarz *et al*., 2020).

Hypothesis 2: Strategic vigilance and its dimensions (competitive, environmental, and commercial/marketing) positively impact technological innovation.

2.2.5 Technological Innovation and Entrepreneurial Orientation

Companies have recognized the critical role of innovation, particularly TI, in revitalizing an organization's competitiveness. The generation and commercialization of value-added outcomes, encompass new or enhanced products, services, managerial expertise, and advancements in production or service delivery processes (Danish *et al*., 2016; Al-Gasawneh *et al*., 2022). Covin & Slevin (1991) highlighted the proactive behavior needed to be aggressive and stout while exploring opportunities and taking the initiative to take risks (Lumpkin & Dess, 1996). Companies have been forced to develop new innovative plans and adjust current ones to push TI strategies due to the dynamism of client demands and the global shift in the business landscape. According to Kiani *et al*. (2020), EO significantly impacts TI. They suggest that incorporating TI into future EO assessments could lead to better decision-making by managers when evaluating new opportunities. Therefore, TI can play a crucial role in enhancing the effectiveness and success of EO initiatives in organizations (Mansour *et al*., 2022; Albourini *et al*., 2021).

According to Monteiro *et al*. (2017), there is a crucial link between EO, innovation, and the capacity of SMEs to attain business sustainability and growth. This connection holds particular significance in the current hypercompetitive and dynamic business landscape. The awareness of the external environment for companies will ease the barriers and encourage entrepreneurial potential (Lee & Peterson, 2000). The impact of innovation on EO can be better understood through actual innovation actions, as noted by Genc *et al*. (2019) in their previous studies. Hence, EO is closely related to innovation, and actual innovation actions can be used to measure the effectiveness of EO in achieving strategic goals.

As highlighted by Hughes *et al*. (2020), innovation is a crucial aspect of EO. They emphasize the need for exploring potential innovation methods to enhance EO. Moreover, Covin and Wales (2019) find that not adopting new activities can hinder the strategic objectives of EO. To foster innovation, businesses must invest in technical innovation-related activities, such as technology implementation and new product development, as Kiani *et al*. (2020) indicated. Moreover, innovativeness is a fundamental component of EO, which contributes to the creation of novel technological knowledge and, in turn, increases organizations' capacity for TI. Miller (1987) points out that TI with risk-taking is a crucial initiative because it reflects how willing businesses are to allocate resources and invest in them despite the inherent high risk of failure and uncertainty.

Taking risks and TI initiatives can bring several advantages to a company. It encourages experimentation, hastens learning, and facilitates the absorption of fresh outside technologies, which leads to improved EO (Kiani et al., 2020; Lyon *et al*., 2000). The effect of TI on proactive businesses is that they have the option to initiate innovations either by using knowledge developed by other firms or relying on the creation of TI developed internally by their scientists, as indicated by (Kiani *et al*. 2020; Nusairat *et al*., 2021).

Technological advancements significantly impact a company's proactiveness, which is a fundamental part of EO. Hughes *et al*. (2020) highlight that proactiveness promotes exploratory (discovery) and exploitative (execution) searches that guide the company towards a path supporting technological advancements as a driver for market position. This organizational behavior contributes to the growth and development of the company by increasing its competitive advantage in the market.

Hypothesis 3: Technological Innovation positively impacts Entrepreneurial Orientation in telecom companies.

2.2.6 The relationship between strategic vigilance and entrepreneurial orientation is moderated by technological innovation.

TI assumes a crucial mediator role between SV and EO. SV, in turn, is indispensable for organizations as it enables them to discern opportunities and threats within their environment, which can lead to innovation (Al-Dahan *et al*., 2020; Hamdan *et al*., 2021). The process of SV involves searching for information, acquiring it, analyzing it, and creating knowledge that can be used for decision-making. As noted by Tende and Onuoha (2020), a significant disturbance in the surroundings can trigger finding ways for IT by alerting organizations to cues for innovation. It highlights the importance of TI in enabling organizations to carry out SV effectively. Moreover, TI is also important for organizations to discover future technologies that can provide advantages and opportunities to reduce potential risks and threats and acquire technical knowledge for developing technical solutions (Jaaz & Jamal, 2021; Antonelli, 2023).

On the other hand, EO is a strategic approach business used to identify new possibilities and carry out entrepreneurial tasks. Entrepreneurial companies consistently develop TI, obtain risky business possibilities, and lead the market in bringing innovative advances before rivals (Miller, 1983; Hammouri *et al*., 2022). It emphasizes the significance of TI in supporting EO and helping organizations maintain a competitive edge.

Innovation is a key component of EO (Covin & Wales 2019), though it is the strategic approach businesses use to identify new possibilities and carry out

entrepreneurial tasks (Dess & Lumpkin, 2005). It can promote company restructuring, hasten the flow and revolution of new knowledge, and contribute cumulatively to developing new TIs (Miller, 1987). Innovation exhibits multiple dimensions and encompasses a range of activities, including the development of new products and processes, the implementation of efficient management and administrative procedures, and the evolution of company structures (Damanpour & Aravind, 2012). Thus, TI is critical in enabling EO by supporting and facilitating innovative activities. SV is a desire to innovate (Weick & Sutcliffe, 2006). EO can only be comprehended by experiencing actual innovation action (Genc *et al*., 2019). Therefore, strategic management is necessary to realize TI (Burch *et al*., 2015) and maintain consistent, observable attention to the surrounding environment for a long period to forecast industry patterns (Giessing & Thiel 2011). To do so, EO, which entails continuous conduct to achieve the beginning of a new work that will subsequently create a lasting competitive advantage over the long run, is necessary (Wiklund and Shepherd, 2003). Thus, TI is a key component of EO, enabling organizations to effectively carry out SV and stay ahead in the market through innovative practices (Miller, 1987).

Hypothesis 4.1. Technological innovation mediates the relationship between strategic vigilance and proactiveness in telecom companies.

Hypothesis 4.2. Technological innovation mediates the relationship between strategic vigilance and risk-taking in telecom companies.

Figure 2.1 shows the hypothesized relationships between SV, EO, and TI.

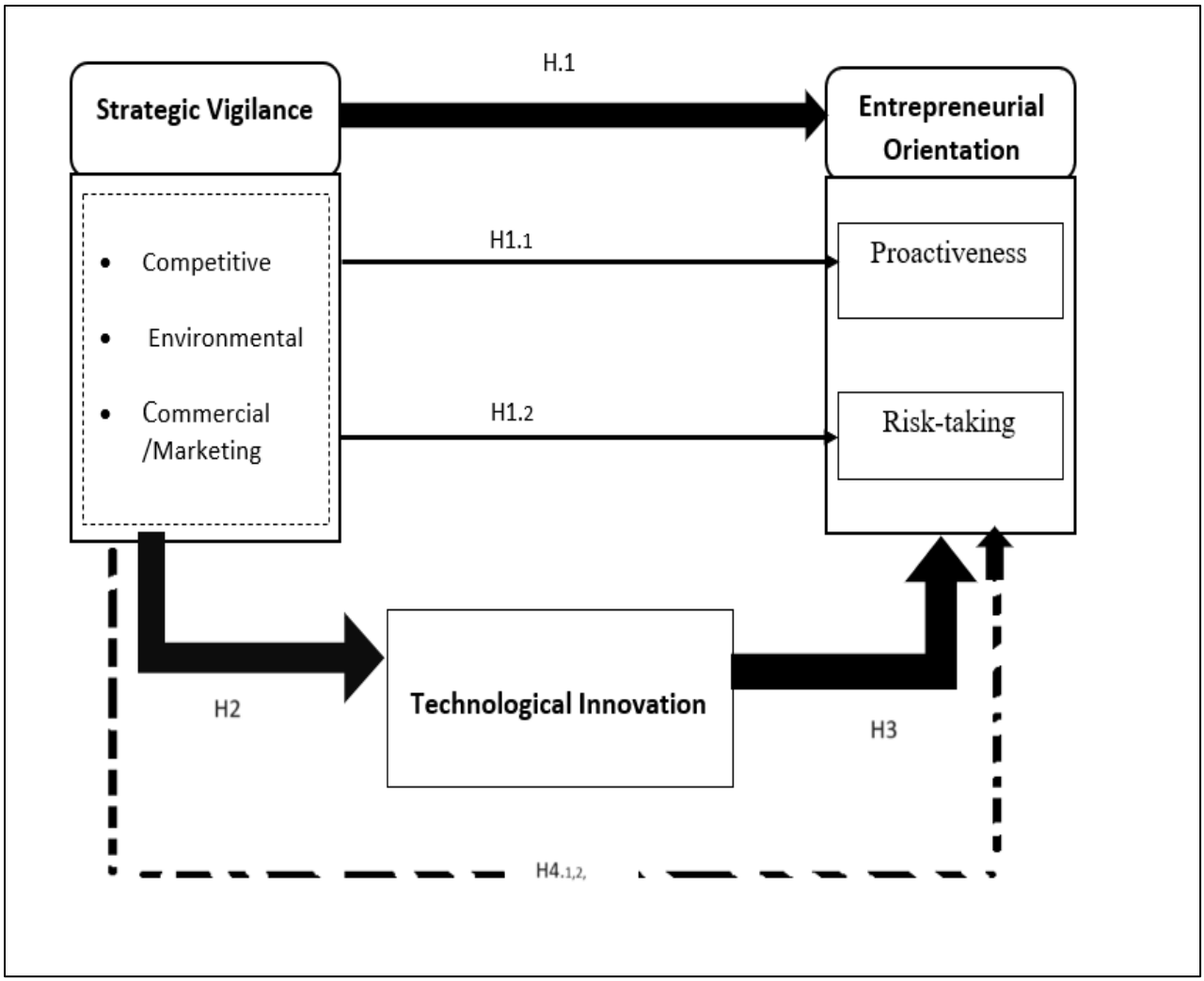


Figure 2.1: The study's model

The model of this study is based on many previous literature reviews. Figure 2.1 shows the mediation of TI on the effect of SV on EO in Telecom Jordanian industries. The measurements of all the constructs were adopted from the previous studies.

2.3 Methodology

This section outlines the steps involved in administering the research instrument and ways of analyzing the results. The author targets the telecom sample and population for this research as follows:

2.3.1 Sample and Procedure

The current study sample is random, stratified, and proportional and was compiled according to the job title. It includes all employees with the following job titles: directors, general managers, team leaders, experts, and seniors of the Jordanian telecom companies. The sample size was 350. These strata were chosen from the sample to accurately represent the community because they are responsible for various tasks, including the organization's internal and external environment, to participate in the decision-making processes. We have divided the population into classes according to job titles based on the size shown in Table 2.1 and the sample is for each telecom company in Table 2.2, and a random sample was drawn from each layer. Hence, the sample represents its community, and the results can be generalized according to Sekaran and Bougie (2016). Data were collected from managerial employees in various job positions (e.g., directors, general managers, team leaders, experts, and seniors) in three telecom companies in Jordan, namely, Orange, Umniah, and Zain.

The researcher personally distributed the questionnaire to the study's sample and through email. The number of questionnaires recovered was 350, among which 307 were valid for the statistical analysis yielding a response rate of 87.7% after

excluding 43 questionnaires for being incomplete. Table 2.3 shows the positions and numbers of employees in each position in three companies. The sample drawn from each position is 350 employees, and the number of surveys used for analysis is 307. The study relied on two sources for data collection: secondary sources represented in documentary sources, books, articles, periodicals, university theses, and publications related to the subject of the study.

Primary data included an interview to determine the problem of the study and consisted of a set of open questions on the three study variables. Furthermore, data collection involves the utilization of a carefully designed questionnaire tailored to align with the study's objectives, research questions, and the specific subject of investigation. This questionnaire aims to collect relevant data and information encompassing all the aspects addressed by the study.

Table 2.1: Study population

Company	Employees number
Umniah	1143
Zain	1055
Orange	1687
Total	3885

Table 2.2: Sample size from each telecom company

Company	Sample calculation	Sample by company
Umniah	1143/3885=0.294*350=103	103
Zain	1055/3885=0.272*350=95	95
Orange	1687/3885=0.434*350=152	152
Total	350	350

We have divided the population into classes according to job titles based on the size shown in Table 2.2 The sample is for each telecom company in the previous table and a random sample was drawn from each layer.

Table 2.3 shows the positions and numbers of employees in each position in the three companies. The sample drawn from each position is 350 employees, and the number of surveys used for analysis is 307.

Table 2.3: Sample size from each company according to the job title

Position	Total Employees	Sample per position	The Sample	Analysis samples
Director	144	144/3885=.0371*350=13	13	12
General Manager	355	355/3885=.0914*350=32	32	26
Team leader	711	711/3885=0.183*350=64	64	50
Expert	1110	1110/3885=0.286*350=100	100	79
Senior	1565	1565/3885=0.403*350=141	141	140
Total population	3885	350	350	307

The sample was drawn from each position in each company in the table below.

Table 2.4: Sample size from companies

Position	Zain company's sample	Umniah company's sample	Zain company's sample
Director	4	4	5
General manager	9	9	14
Team leader	17	19	28
Expert	27	29	44
Senior	38	42	61
Total	95	103	152

2.3.2 Measures

The survey questionnaire was administered to employees in the upper and middle administrative levels of Jordanian telecom companies. The measurement scales used in the questionnaire were adapted from previous literature were to capture the research variables. Particularly, SV was assessed using three dimensions, including environmental, Marketing, and Competitive, and a total of 15 items were borrowed from different studies (Karima & Zohra, 2021) to cover the aforementioned dimensions. EO was evaluated using 10 items related equally to Risk-taking and proactive adapted from (Taatila & Down, 2012). Finally, TI was operationalized using 5 items which were adapted from Abdukhoshimov & DURMUŞ-ÖZDEMİR (2016). The questionnaire was translated by back-translating technique, which involved two business professors proficient in both languages (English & Arabic) refer to appendix (A). All items were rated on a seven-point Likert scale, with 1 indicating strongly agree and 5 indicating strongly disagree. The score for each variable was calculated by averaging the responses of the corresponding items. Prior to the main survey, the questionnaire underwent a pre-testing phase, where two academic experts and two company experts evaluated it to ensure its face validity.

2.4 Analysis and Results

Data analysis was conducted using two basic software programs: SPSS version (23) and Smart PLS (Version 3.3.7). The empirical (primary) model's basic tests and calculations are performed using Smart PLS software. In the confirmatory factor analysis, factor loadings, Cronbach's alpha (CA), composite reliability (CR), average variance extracted (AVE), and multiple regression were conducted. The four hypotheses were used to check for model validation and reliability. SPSS was used to evaluate the means, standard deviations, skewness, and kurtosis in addition to the frequencies and percentages of the sample's description.

The description of the sample's essential demographic characteristics can be found in Table 2.5.

Table 2.5: Demographic characteristics of the sample

Variable	Category	Count	%
Gender	Female	120	39.1
	Male	187	60.9
	Total	307	100
Age	less than 30	32	10.4
	30 to less than 35	105	34.2
	35 to less than 40	104	33.9
	40 to less than 45	54	17.6
	more than 45	12	3.9
	Total	307	100
Educational Level	Bachelor	228	74.3
	Diploma	8	2.6
	Higher Diploma	12	3.9
	Masters	57	18.6
	Ph.D.	2	.7
	Total	307	100
Nature of Work	Director of department or unit	12	3.9
	Expert in the department	79	25.7
	General Manager/ Assistant General Manager	26	8.5
	Seiner of the department	140	45.6
	Team leaders of the department	50	16.3
	Total	307	100
Experience	less than five years	97	31.6
	Five years to less than ten years	148	48.2
	Ten years to less than fifteen years	36	11.7
	more than fifteen years	26	8.5
	Total	307	100

Two major types in the current research expressed validity: convergent and divergent. The researcher performed the necessary calculations and tested the study hypotheses, where the standardized loadings were used to reflect the convergent validity for a given construct factor by the items it was assumed to represent. The Furnell and Parker method was used to examine the divergent validity, which compares the values of inter-correlation among the constructs to the square root of the AVE.

The factor's reliability is assessed using three indicators: CA, CR, and AVE. The first type of reliability describes the ratio of the variance of the items representing a construct to the total variance CA. In contrast, the second approach considers the errors of the squared loading of the items CR, and the third reliability is AVE, which refers to the average variance that each item could explain. The results of validity and reliability are provided in the succeeding Table 2.6.

Table 2.6: Standardized loadings, reliability analysis results C.A., C.R., and AVE for the factors

Factors	Sub Factor	Items			Factor			
		Code	Mean	Sd	loadings	CA	CR	AVE
Strategic Vigilance (Independent Variable)	Environmental	x1.1	4.03	0.68	0.739	0.808	0.867	0.567
		x1.2	4.13	0.64	0.829			
		x1.3	4.12	0.70	0.746			
		x1.4	4.03	0.70	0.739			
		x1.5	4.09	0.66	0.708			
	Marketing/ Commercial	x2.1	4.12	0.63	0.717	0.806	0.866	0.564
		x2.2	4.01	0.68	0.713			
		x2.3	4.06	0.65	0.886			
		x2.4	3.98	0.73	0.729			
		x2.5	3.96	0.66	0.704			
	Competitive	x3.1	4.06	0.62	0.844	0.818	0.873	0.580
		x3.2	4.04	0.58	0.728			
		x3.3	4.07	0.62	0.753			
		x3.4	4.06	0.65	0.760			
		x3.5	4.10	0.63	0.716			
Technological Innovation (Mediator)	Technological Innovation	y1.1	4.01	0.70	0.749	0.828	0.879	0.595
		y1.2	3.99	0.69	0.885			
		y1.3	3.96	0.66	0.751			
		y1.4	3.98	0.68	0.739			
		y1.5	3.99	0.65	0.722			
Entrepreneurial Orientation (Dependent Variable)	Risk-taking	y2.1	4.03	0.68	0.753	0.798	0.861	0.553
		y2.2	4.03	0.70	0.719			
		y2.3	3.61	0.90	0.729			
		y2.4	3.65	0.98	0.730			
		y2.5	3.97	0.66	0.787			
	Proactiveness	m1	3.92	0.65	0.716	0.809	0.868	0.569
		m2	4.01	0.63	0.748			
		m3	3.98	0.61	0.818			
		m4	3.93	0.62	0.761			
		m5	3.85	0.74	0.724			

Table 2.6 presents the loadings of the items, which indicate the level of convergent validity using the CFA technique. Upon reviewing the provided results, the lowest loading value was found to be 0.704, corresponding to the item labeled as x2.5 in the marketing/commercial factor. This loading value surpasses the minimum threshold of 0.50, thereby indicating satisfactory convergent validity for each factor. Hence, it can be concluded that the convergent validity requirement has been met.

The table also includes the values of the AVE, which serves as a significant indicator for assessing the validity of the factors. The AVE represents the amount of shared variance among the items within a factor. For a factor to be considered valid, the AVE value should exceed 0.50. Upon examination of the provided values, the minimum AVE value obtained was 0.553 for the sub-factor RT. Consequently, the results indicate that the validity of the sub-factor has been established and met the required threshold.

The results in Table 2.6 show the CA and CR. An inspection of the provided values of the CA indicates that the minimum value obtained was 0.798 for Risk takin (RT) sub-factor items, while the minimum value estimated by the mean of the CR was 0.861 for RT sub-factor items. The reliability mentioned values reflect satisfactory reliability values because they exceeded 0.70; hence, a high-reliability conclusion could be derived.

Table 2.7: Discriminant validity results

Factors	Competitive	Environmental	Marketing/ Commercial	Proactiveness	Risk-Taking	technological Innovation
Competitive	0.761					
Environmental	0.436	0.753				
Marketing	0.449	0.509	0.753			
Proactiveness	0.363	0.291	0.272	0.754		
Risk-Taking	0.374	0.180	0.303	0.412	0.744	
Technological Innovation	0.447	0.368	0.381	0.433	0.424	0.771

The values in diagonal are the square roots of AVE previously mentioned. Table 2.7 presents the discriminant validity results. This validity postulates that the variable correlates with other variables (factors) to a minimum acceptable degree.

According to the results, the most significant correlation value recorded was between marketing/commercial and environment innovation at 0.509. Another important measure for discriminant validity is the square root of the AVE presented diagonally. This measure assumes that its values must exceed the intercorrelations for a given subfactor. The mentioned values fulfill the criterion for discriminant validity, indicating that the factors in the study exhibit distinctiveness from one another.

2.4.1 Results

Table 2.8 indicates the values of means and standard deviation, standard deviations' normality, and multi-collinearity indicators (factors). Normality was examined by the skewness and kurtosis indicators. The values of skewness ranged between -0.933 and -0.156; these values suggest an approximate normal data distribution as it was within the -3 to +3 range. The maximum kurtosis indicator observed was 4.009 in the TI, which was less than 8, and thus, the values reflect the absence of normality issues (Hair *et al*., 2010; Kline, 2005).

Table 2.8: Means standard deviations normality and multi-collinearity indicators

Factors	Mean	S.D.	Skewness	Kurtosis	Multi-collinearity	
					VIF	Tolerance
Environmental	4.08	0.51	-.397	.673	1.455	0.687
Marketing/ Commercial	4.03	0.50	-.156	.628	1.476	0.678
Competitive	4.07	0.47	-.131	.046	1.350	0.741
Strategic Vigilance	4.06	0.39	-.326	.865	1.436	0.696
Technological Innovation	3.99	0.52	-.933	4.009	1.544	0.648
Risk-Taking	3.86	0.59	-.395	.908	1.350	0.741
Proactiveness	3.94	0.49	-.407	1.971	1.381	0.724
Entrepreneurial Orientation	3.90	0.45	-.362	2.114	-	-

Collinearity was checked using the variance inflation factor (VIF) and tolerance of the reciprocal of VIF. Multi-collinearity is the degree of linear association among the predictors. It is assumed to have fewer degrees of association less than 10. The maximum value of VIF was 1.544, which was less than 10. In the same context, this value corresponds to a tolerance value of 0.648, such that this obtained tolerance value was >0.056, and thus, no multicanonicity issues relate to the data (Hair *et al*., 2014; Kline, 2005).

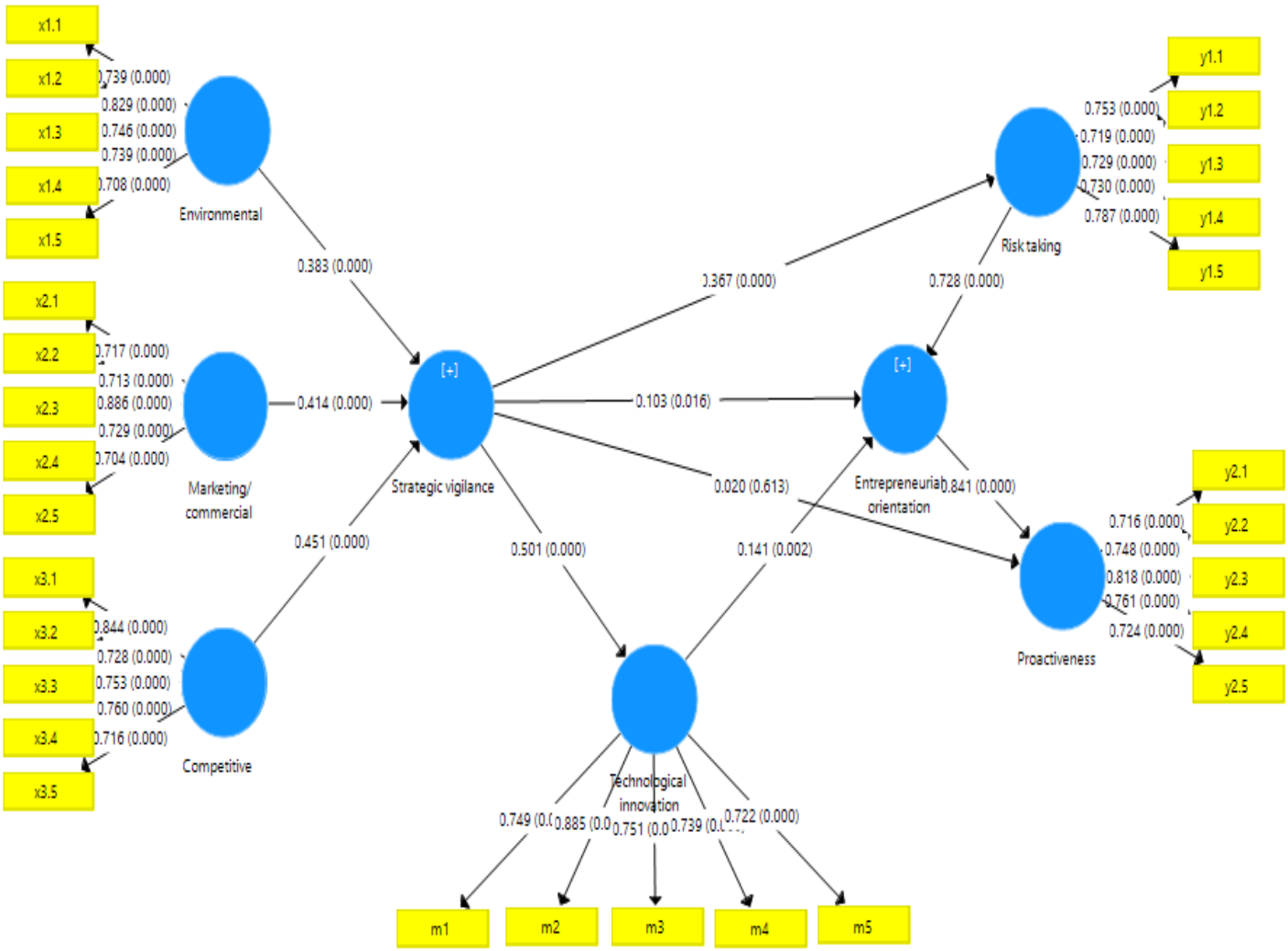


Figure 2.2: The Structural Model

The following table summarizes the results of the hypotheses being tested.

Table 2.9: Standardized impact values effects with the statistical significance relevance

Hypotheses	Impact Direction			B	Se	T	Prob.	Hypothesis Result
H1	Strategic Vigilance	--->	Entrepreneurial Orientation	0.103	0.043	2.42	0.016	Supported
H1.1	Strategic Vigilance	--->	Proactiveness	0.020	0.040	0.51	0.613	Not Supported
H1.2	Strategic Vigilance	--->	Risk-Taking	0.367	0.057	6.43	0.000	Supported
H2	Strategic Vigilance	--->	Technological Innovation	0.501	0.050	9.98	0.000	Supported
H3	Technological Innovation	--->	Entrepreneurial Orientation	0.141	0.046	3.08	0.002	Supported

Table 2.9 displays the impact of SV on EO, as indicated by the standardized beta coefficient of 0.103. This impact value is deemed statistically significant since the corresponding probability value 0.016 is less than the significance level of 0.05. As a result, the first main hypothesis is accepted, suggesting that there is a significant relationship between SV and EO. The results presented in table 2.9 indicate that the impact of SV on proactiveness is represented by a standardized beta coefficient of 0.020. However, this impact value is not statistically significant, as the corresponding probability value of 0.613 is greater than the significance level of 0.05.

Therefore, the first sub-main hypothesis is rejected, suggesting that there is no significant relationship between SV and proactiveness. On the other hand, according to the results in Table 2.10, the impact of SV on RT is represented by a standardized beta coefficient of 0.367. This impact value is considered statistically significant since the corresponding probability value of (0.000) is less than the

significance level of 0.05. As a result, the second sub-main hypothesis is accepted, indicating a significant relationship between SV and RT. Table 10 shows the results of the impact of TI on the relationship between SV and EO.

Table 2.10: Indirect effect of the TI on the relationship between SV and EO

Impact Direction			Direct Impacts				Indirect Impact			
			β	Se	T	Prob	β	Se	T	prob
Strategic Vigilance	--->	Entrepreneurial Orientation	0.103	0.043	2.42	0.016	0.071	0.024	2.951	0.003
Strategic Vigilance	--->	Technological Innovation	0.501	0.050	9.98	0.000				
Technological Innovation	--->	Entrepreneurial Orientation	0.141	0.046	3.08	0.002				

In the second hypothesis, according to the results provided in Table 2.10, the impact value of SV on TI was expressed by the standardized beta coefficient 0.501. This impact value was considered statistically significant because the related probability value (0.000) was < 0.05. Consequently, the second main hypothesis was accepted.

In the third hypothesis, the impact of TI on EO is indicated by a standardized beta coefficient of 0.141, as shown in Table 2.10. This impact value is considered statistically significant, as the corresponding probability value of 0.002 is less than the significance level of 0.05. Therefore, the third main hypothesis is accepted, suggesting a significant relationship between TI and EO.

In the fourth hypothesis, the moderator variable, TI, has a significant statistical impact on the relationship between SV and EO at the $\alpha \leq 0.05$ level. Table 2.10 shows the results of the impact of TI on the relationship between SV and EO. The table provides the direct (previously mentioned) and indirect impact values of

the TI. The indirect impact value is 0.071, which was statistically significant because the corresponding probability value 0.003 was <0.05. As a result, the fourth hypophysis was accepted.

2.5 Discussions

The telecom industry is critical to Jordan's economic development and, like any other business, faces challenges such as funding, resourcing, and networking. The COVID-19 pandemic has significantly impacted the industry, highlighting the need for companies to adopt EO to transform and build resilience. Adopting SV is also essential to maintain competitiveness and performance by identifying early signals of threats and opportunities. TI is also essential for telecom companies' growth and expansion. Entrepreneurs in less developed market economies can benefit from adopting the best practices of successful businesses in developed market economies, with EO facilitating business opportunities and wealth creation. Furthermore, SV can help organizations learn and gain a favorable market position, while vulnerable organizations are likely to miss early warning signs. Vigilant companies generate business opportunities and mitigate uncertainty risks by proactively and collectively utilizing knowledge.

It discusses two gaps in the literature concerning SV and EO in telecom companies in Jordan. The first gap examines the impact of SV on EO, which has not been explored considerably despite the increasing interest in EO to enhance company performance, competition, and sustainability. The second gap focuses on the positive impact of TI practices on SV and EO through dynamic capabilities. The study proposes to fill these gaps by examining the mediating role of TI in enhancing the effectiveness and continuity of telecom companies in Jordan, given the fast-paced and highly competitive business environment. The study aims to provide

insights into how companies can leverage SV, EO, and TI to drive TI, which can inform the development of strategies and practices for sustainable growth and achieve long-term success. However, empirical research in this area has been lacking, making it crucial for further studies to advance our understanding of these constructs and identify best practices for organizations.

Regarding the first hypothesis, the impact of SV on EO was found to be statistically significant $\beta = 0.103$, $p = 0.016$, and thus, the hypothesis is supported. However, the impact of SV on proactiveness was not statistically significant $\beta = 0.020$, $p = 0.613$, leading to the rejection of the first sub-main hypothesis. The impact of SV on R.T. was also statistically significant $\beta = 0.367$, $p = 0.000$), supporting the second sub-main hypothesis. The second hypothesis states that the impact of SV on TI is statistically significant.

The results in Table 2.9 show the second hypothesis is supported $\beta = 0.501$, $p = 0.000$. The third hypothesis indicates that the impact of TI on EO is statistically significant. These results also support the hypothesis $\beta = 0.141$, $p = 0.002$. Finally, the fourth hypothesis tests the moderating effect of TI on the relationship between SV and EO. Table 2.10 indicates that the indirect effect of TI on the relationship between SV and EO is statistically significant. This finding supports the moderating effect of TI on the relationship between SV and EO. The results presented provide strong evidence to support the research hypotheses. The study highlights the importance of SV and TI in enhancing EO and offers insights for practitioners and policymakers in developing strategies to foster entrepreneurial activities.

2.6 Implications, Conclusions, and Limitations

2.6.1 Theoretical Implications

The theoretical implications of this study extend to telecom companies in Jordan, suggesting that embracing SV and EO can propel Technological Innovation, paving the way for long-term success. By scrutinizing the mediating role of TI, the study addresses gaps in the existing literature and offers insights into fortifying the effectiveness and continuity of telecom companies in Jordan. Notably, the results indicate a positive impact of Strategic Vision on Entrepreneurial Orientation and Risk-Taking, though not on proactiveness. Additionally, the study unveils a positive influence of Strategic Vision on Technological Innovation, and in turn, Technological Innovation positively affects Entrepreneurial Orientation. Crucially, the research reveals that Technological Innovation moderates the relationship between Strategic Vision and Entrepreneurial Orientation. In essence, the study accentuates the pivotal role of Technological Innovation in amplifying the effects of Strategic Vision on Entrepreneurial Orientation, presenting valuable considerations for practitioners and policymakers in formulating strategies to foster entrepreneurial activities.

This study unfolds a multifaceted narrative in the context of organizational dynamics. Firstly, it underscores the crucial role of EO and SV as pivotal elements for companies to not only weather crises, exemplified by the challenges posed by the COVID-19 pandemic, but also to flourish in such demanding circumstances. Secondly, the study accentuates the significance of TI as a catalyst for expansion and competitiveness, particularly within the telecom industry. Thirdly, it delves into the intricate interplay between environmental factors, such as dynamism and generosity, as well as structural factors like decentralized decision-making,

elucidating their impact on firm performance. Fourthly, the research illuminates the importance of fostering a culture characterized by curiosity, openness, and tolerance for ambiguity to instill heightened vigilance within organizations. Lastly, the study sheds light on the instrumental role of entrepreneurship in catalyzing new opportunities for economic growth and sustainable performance.

2.6.2 Practical Implications

The study makes two practical contributions. Firstly, it highlights that SV plays a crucial role in enabling organizations to acquire new technologies and methods relevant to their operations. This acquisition of TIs helps enhance competitiveness and facilitates positive changes in product production methods, leading to improved performance. Secondly, the study emphasizes the importance of recognizing that, similar to environmental and structural factors, EO can significantly influence firm performance. Factors such as the dynamism of the market and industry, as well as the decentralization of decision-making within the organization, can impact the effectiveness of EO in driving positive outcomes.

These practical contributions provide valuable insights for organizations seeking to enhance their competitive position and improve performance. By focusing on SV and understanding the influential factors that shape EO, companies can make informed decisions and implement strategies that promote innovation, agility, and overall success. Hence, Jordanian telecom companies should be aware of the value of competitive vigilance that helps companies adapt their organizational plans to monitor the strategies utilized by competitors. Market excellence should also be a priority. Third, the telecom companies in Jordan, especially during the COVID-19 pandemic, should adopt an EO to develop resilience to withstand significant challenges and shocks.

Additionally, telecom companies should invest in SV to gain flexibility in searching for early signals of internal and external threats and opportunities, allowing them to maintain or improve their competitiveness and performance. TI is also an essential approach for companies to survive and excel. Companies should develop a culture of curiosity, openness, and intolerance for ambiguity to foster greater vigilance. Furthermore, innovation opportunities should be identified, and resources for new courses of action to be developed should be allocated to create positive changes in production methods. By adopting EO, SV, and TI, telecom companies can develop new abilities to protect themselves against various threats and enhance their growth and expansion to other markets.

2.6.3 Conclusions

This study is considered a causal study approach used to investigate the mediating role of technological innovation on the effect of SV on EO. Three research questions addressed the use of SEM in Jordanian telecommunications companies in Amman, Jordan. The three companies (Orange, Umniah, and Zain) were chosen for the study community, including all its employees of the following job titles: directors, general managers, team leaders, experts, and seniors.

The literature review shows us that to compete in the unstable environments of the twenty-first century, firms should develop different competencies because they need to adapt to customers' needs. In this way, our first hypothesis relates SV with EO. The results of our study show that companies that develop SV, those companies that adopt knowledge or try to solve their threats are developing the facilities to develop their EO. If we continue analyzing the results, we can contrast

that SV positively influences TI, highlighting the importance of observation for the telecoms companies, which can get new ideas and readapt them in the company through new technological tasks, processes, or development. This relation also shows a long-term view of SV as TI is considered; TI tries to adapt new knowledge for the processes and services of the company while SV wants to improve.

Telecom companies face significant challenges in adaptability and competition in the markets. Thus, they must anticipate the activities and development of competitors and discover unique and sophisticated companies that can be purchased or partnered with them to develop learning opportunities in the market. Moreover, it must know and monitor all market developments, such as technological developments and modern methods of competitors, understand the characteristics of new markets, and benefit from competitors' experiences.

Adopting SV in a company is a competition and represents superiority over competitors because it depends on the continuous development of products and improving relations between them and customers. This adoption reduces risks of environmental uncertainty and raises safety.

They can be proactive and adopt the plan risk to be the first to move in the markets. Other strategies include predicting opportunities and good exploitation, avoiding threats, diagnosing and identifying best practices, applying strategies, ensuring it is competitive, comparing the performance of the company with its competitors, trying to develop it, giving it a competitive advantage, and assessing its current and future competitive position towards competitors. It also includes analyzing an organization's practical, technical, and technological environment.

Jordanian telecom companies have the potential to enhance EO by leveraging the diverse ideas and expertise contributed by both employees and

customers. This can be achieved by implementing mechanisms that encourage brainstorming sessions and organizing strategy workshops to seize opportunities for planning the next steps. By fostering a collaborative and inclusive environment, these companies can stimulate entrepreneurial thinking and drive innovation throughout their operations. Hence, by encouraging experienced individuals to develop new creative ideas by employing TI to assist strategic decisions and create strategies and plans that professionally address SV. Companies should also monitor and follow up on the changes in their environment to attract the best workers in the markets, improve the communication network between the division and its customers, and train its employees on new technologies by tracking the development of information systems and new technology and work more on the area of R&D. Finally, SV had no impact on the proactiveness of EO because companies need to be more cautious about being the first mover in the market due to intense competition between the three companies.

Companies must adapt to various changes and emergencies, improve current products and services to get competitive advantages, adopt a flexible strategy, and continually judge the quality of decisions over time. On the other hand, the managers invest in a high-planned risk project, explore weak signs, and agree on one vision through departments with a clear strategy to reduce time and lower the cost in the best condition. The first companies in the market are those with modern ideas, products, and services. They must act as a leader in TI and invest in TI for the next five years.

2.6.4. Limitations and Suggestions for Future Research

The research recommends that companies hire committees and teams with expertise in SV and provide access to all the resources these experts require to work toward company goals. The study further highlights the necessity of practicing SV

and using innovative technology because of its significant role in improving the EO, thereby supporting decision-making functions for best service practices, retaining customers, sustainability, and future continuity. Moreover, it suggests that companies should have the abilities and practices of proactiveness critical to an EO because they reflect a forward-looking viewpoint accompanied by creative or new-venturing activities.

This study acknowledges several limitations that should be taken into account. Firstly, the research design specifically targets telecom companies' top, middle, and supervision levels, which may limit the generalizability of the findings to other industries or service sectors. It is important to recognize that the study's applicability may be constrained to Jordan and may not be directly applicable to companies operating in similar industries outside of Jordan. Additionally, the study outcomes are contingent upon the responsiveness and objectivity of the individual participants involved in the research. The accuracy and reliability of the results rely on the participants' willingness to provide honest and accurate responses. It is essential to consider the potential impact of individual biases or subjective interpretations on the study findings.

These limitations should be considered when interpreting the results and should motivate future research to expand the scope and diversity of the sample population to achieve broader generalizability and enhance the reliability of the study's conclusions.

Chapter 3: Moderating the Synergies between Business Intelligence and Strategic Foresight: Navigating Uncertainty for Future Success through Knowledge Management.

Abstract

The amount of data and information available is rapidly and significantly growing, alongside evolving marketing trends and unpredictable environmental factors. Despite businesses' appreciation of business intelligence. However, there remains a shortage of scholarly investigations on the link between business intelligence and strategic foresight, when considering the influence of knowledge management as a moderator. The study aimed to consider the impact of the independent variable represented by business intelligence and the dependent variable which was strategic foresight moderated by the knowledge management variable. Moreover, it provides insights and recommendations that can assist Jordanian telecom companies in making informed decisions in uncertain situations, navigating the competitive landscape, and achieving long-term sustainability and success. The research employed a quantitative methodology, specifically a survey, to collect primary data from upper and middle-level management within Jordanian telecom companies. The study sample included 307 valid questionnaires. The collected data was analyzed using SEM and Regression analysis by AMOS (V.22). The findings of the study revealed that business intelligence has a positive significant influence on strategic foresight. Furthermore, knowledge management mediates the relationship between business intelligence and strategic foresight. Additionally, the implications of academic research are discussed.

Keywords: business intelligence, strategic foresight, knowledge management, telecom companies.

3.1 Introduction

Scenarios, as a prime technique for future studies, have long been used by government planners, corporate managers, and military analysts as powerful tools to aid in decision-making in the face of competition and uncertainty (Mietzner & Reger 2005; Zraqat, 2020). Strategic foresight (SF), which involves envisioning future scenarios, can help companies develop new capabilities that enable them to navigate a variety of challenges (Zighan *et al*., 2022). As SF has many advantages, these include anticipation of future trends and changes, enhanced decision-making, improved risk management, competitive advantage, innovation and adaptability, and long-term sustainability (Mietzner & Reger 2005). These scenarios would be beneficial for the telecom sector in Jordan as it plays a vital role in driving national economic development and acts as a catalyst for various technological and entrepreneurial endeavors, accounting for 14% of the country's GDP in 2014 (Jordan Investment Commission, 2015).

This sector presents an opportunity for Jordan to establish a competitive advantage over neighboring Arab nations in the region (Yaseen *et al*., 2016). Consequently, the performance enhancement and capability development of telecom companies in Jordan significantly impact the country's economic growth (Emami *et al*., 2022). Given that this industry is influenced by its surrounding environments (Roehrich *et al*., 2019), the impact of the COVID-19 pandemic on businesses, including both small and large firms, has been significant (Atlam *et al*., 2022; Kutieshat & Farmanesh, 2022). The telecom sector, in particular, has been adversely affected (Emami *et al*., 2022; Yaseen *et al*., 2016). Further research is needed to offer practical solutions to address the industry's survival and growth challenges. Other challenges encompass issues related to funding and resourcing, as well as inadequate networking capabilities (Pannone, 2001). Moreover, fostering

collaborative efforts among national telecommunications firms can enhance their competitiveness compared to global market leaders and contribute to economic advancement.

In dynamic and competitive environments, SF plays a pivotal role in shaping the competitiveness, growth, and sustainability of organizations. Hence, managers must analyze the environment and assess uncertainties to make informed strategic choices (Tapinos & Pyper, 2018). Although scholars have debated the origin of SF from scenarios, practitioners and scenario planning researchers propose that scenarios offer managers a strategic perspective by presenting them with multiple, equally viable future scenarios. The exact nature of SF remains ambiguous and inadequately theorized (Burt & Nair, 2020).

SF refers to the development of diverse scenarios that can be explored, manipulated or experienced by future users. Within this framework, the design offers an opportunity to envision, discuss, and define a desirable future (Tamayo-Torres & Roehrich, 2017). With the increasing volume of data, companies face challenges in manually gathering comprehensive information. Hence, BI solutions, equipped with appropriate technologies, offer tools and techniques to collect, integrate, store, edit, and analyze existing data. While the BI market was once only of interest to large companies, it has been steadily growing in previous years (Azeroual & Theel, 2018).

The implementation of BI systems can enhance company performance by streamlining and organizing workflows. The term BI was first introduced in the mid-1990s by Howard Dresner, an analyst at Gartner Group. It refers to the concepts and methods that aid decision-making by analyzing information delivery and processing (Azeroual & Theel, 2019). To keep up with the advancements in information technology and meet its demands, organizations must employ

intelligent tools to manage their work and overcome competition and challenges (Irtaimeh *et al*., 2016). Globalization and technological advancements have created a highly competitive environment for organizations (Hitt, 1998).

In response, organizations must differentiate themselves and adopt unique approaches to thrive in the market. Consequently, competitive advantage is no longer solely derived from the final products and services offered to customers, but rather from the resources that generate them. Sustaining competitive advantage requires organizations to effectively and efficiently utilize their resources to deliver value to specific market segments (Hunt & Moran, 1995).

This necessitates the development of value-creating strategies based on organizational resources to ensure long-term growth and success (Chaithanapat *et al*., 2022). Several studies have emphasized the link between SF and scenario building through knowledge management (KM) and modern technology (Nascimento *et al*., 2021). To improve their market position and stay competitive, Jordanian telecom firms must explore strategies that can enhance their performance (Yaseen *et al*., 2016). Furthermore, the adoption of digital technologies by both public and private stakeholders has become increasingly popular in recent years, as they aim to strengthen entrepreneurial ecosystems and achieve sustainable competitiveness (Dabbous *et al*., 2023).

KM is a methodology that promotes knowledge sharing among employees by creating an environment that supports the assimilation, organization, and dissemination of knowledge within organizations (Al-Tit, 2022). The concept of KM involves acquiring, creating, transferring, storing, and applying knowledge within organizations, both from within and outside the company (Costa & Monteiro, 2016). Studies have also shown that there is a positive correlation between KM and new technology (Shujahat *et al*., 2019).

3.1.1 Research Questions

SF and scenario building through KM and modern technology have become increasingly important for companies seeking to enhance their competitive advantage (Fergnani, 2022; Hammouri & Altaher, 2020). While further research on the interactions between KM, SF, and emerging technologies is warranted (Kasemsap, 2018), the fierce competition faced by Jordanian telecom companies (Zain, Umniah, and Orange) necessitates the need to retain customers and offer superior services (Yaseen *et al*., 2016).

SF can help these companies develop future scenarios for survival and growth. BI solutions, on the other hand, can collect, process, and analyze data to provide timely insights that support optimal decision-making. Furthermore, BI solutions can assist by collecting, processing, and analyzing data to provide timely insights that support optimal decision-making. The objective of this study is to combine SF and BI approaches and integrate KM

The study intends to contribute to the enhancement of the performance and capability development of telecom companies in Jordan, ultimately impacting the country's economic growth and enabling and providing insights and recommendations that can assist Jordanian telecom companies in navigating the competitive landscape nationally and internationally, overcome challenges, making informed decisions, and achieving long-term sustainability and success.

The study's purpose is to answer two questions:

1. Is there an impact of BI intelligence impact SF? This study centers on elucidating the positive effects of BI dimensions. (OLAP, data mining, and data warehouse) on SF dimensions (method sophistication, people & network, and organization).

2. Is there an impact of BI on SF orientation in the presence of KM as a moderating variable? The authors aim to identify the positive effect of KM in increasing the strength of the relationship between BI impact and SF orientation.

3.1.2 Relevance of the Study

This study aims to fill two gaps in the literature on the impact of BI on SF Firstly, the study aims to investigate the strategic perspective of the impact of BI on SF in light of the COVID-19 pandemic that has affected all aspects of our lives (Ratcliffe, 2020; Rafiuddin *et al*., 2023; Charina, 2022). Also, the study aims to address the need for in-depth discussions on the variables of BI and SF as suggested by previous researchers (Nascimento *et al*., 2021).

Moreover, companies need to develop foresight compared to their competitors and take early action based on insights and alerts to ensure survival and continuity (Suandi, 2022). This study discusses the combination of BI and SF and emphasizes the role of scenarios in providing a framework for flexible and adaptive planning. By doing so, the aims can better respond to factors driving change and increase our awareness of them.

Therefore, “Horizon Scanning”, which is also referred to as environmental scanning, is crucial for any significant strategic policy research. In the second gap, several studies have underscored the significance of KM in organizations based in Jordan and have explored the factors that impact its successful implementation (Hawari & Al-Sukkar, 2008; Gharakhani & Mousakhani, 2012).

However, given the emerging economy of Jordan, there remains a need for further research and understanding of KM implementation and its role within the country (Bruton *et al*., 2007; Gharakhani & Mousakhani, 2012). In the face of uncertain business environments, organizations must continuously invest in change and development to effectively respond to market dynamics (Venkitachalam & Willmott, 2017; O'Regan & Ghobadian, 2004).

KM offers a valuable avenue for organizations to facilitate the creation, sharing, and utilization of knowledge. By adopting KM practices, telecom firms operating in Jordan can enhance their ability to navigate and adapt to environmental uncertainties (Zraqat, 2020). KM provides a structured approach for capturing and disseminating knowledge, fostering learning, and promoting innovation. It equips organizations with the capability to anticipate, monitor, and respond to changes in the market environment, thereby enhancing their competitive advantage (Akroush & Al-Mohammad, 2010).

The link between BI and SF and KM has been examined in numerous studies, establishing an evidence base of relationships between these variables (Azeroual & Theel, 2018; Irtaimeh *et al*., 2016; Nascimento *et al*., 2021; Shujahat *et al*., 2019; Fergnani, 2022; Hammouri & Altaher, 2020; Ratcliffe, 2020; Rafiuddin *et al*., 2023; Charina, 2022; Nascimento *et al*., 2021; Pouru *et al*., 2018). However, there is a shortage of research on BI and SF as moderated by KM in particular. Consequently, the objectives of the research were as follows: first, provide insights and recommendations that can assist Jordanian telecom companies in making informed decisions in uncertain situations, navigating the competitive landscape, and achieving long-term sustainability and success (Zraqat, 2019; Nusairat *et al*., 2021; Akroush & Al-Mohammad).

Second, the role of KM in moderating the impact of BI on SF, KM can help

companies understand their environment better, identify best practices, and develop solutions and sustainable recommendations for Jordanian companies (Zraqat, 2019; Nusairat *et al*., 2021). However, there is minimal evidence on the impact of KM on a company's success (Rehman *et al*., 2022; Grant, 1996; Hawari & Al-Sukkar, 2008; Gharakhani & Mousakhani, 2012), and more research is needed on this topic.

3.2 Theoretical Framework and Hypothesis

The intersection of business intelligence and strategic planning within organizations has been a focal point in academic discussions, yet a promising avenue for further exploration lies in understanding moderating variables like knowledge management. The recognition of the pivotal role business intelligence plays in organizational dynamics has been underscored by its impact on strategic planning. In response to this, our study seeks to contribute to this discourse by constructing a conceptual model that integrates pertinent research variables, drawing upon existing literature.

As the volume of data and information experiences rapid and exponential growth, coupled with the dynamic shifts in marketing trends and environmental uncertainties, a critical gap emerges. Despite the acknowledged value of business intelligence in the corporate landscape, there is a noticeable dearth of studies addressing the synergies between business intelligence and knowledge management for the enhancement of strategic foresight. Strategic foresight, a methodology designed to navigate environmental unpredictability, holds the potential for significant improvement through the integration of business intelligence. This involves the systematic gathering and analysis of data, as well as the automation of information research and analysis processes, ultimately aiming

for long-term competitiveness and sustainability.

This research endeavors to dissect the impact of business intelligence on strategic foresight to explore the moderating role of knowledge management in shaping the relationship between variables. By doing so, the study aspires to shed light on the intricate dynamics at play when combining business intelligence and knowledge management, offering valuable insights for organizations seeking to fortify their strategic planning in the face of an evolving and uncertain landscape.

3.2.1 Business Intelligence

In 1958, Hans Peter, an investigator in IBM's software and computer hardware division, created the phrase "business intelligence" to create an automated method for sharing information inside a company. BI implies a collection of applications and tools used to gather, store, retrieve, and then analyze data to enhance decision-making. Companies that rely on BI need to consider factors such as the primary strategic vision, the level of sponsorship, the resources needed, the impact on personnel and procedures, and the benefits (Abhari & McGuckin, 2023; Fink *et al*., 2017). BI solutions encompass various applications and underlying information technology infrastructure, such as servers, operating systems, integration platforms, and networks. Since BI encompasses a broad range of application areas and related software products, its scope varies in terms of functionality, sophistication, and complexity. These elements can be identified using the BI scope construct, which also forecasts the positive influence content has on the level of quality of executive decision-making processes (Wieder & Ossimitz, 2015).

Azeroual and Theel (2018) state that the use of BI has three primary objectives: improving the decision-making process, increasing corporate

transparency, and demonstrating relationships between isolated information. The perceived relative advantage, complexity, interoperability, and observability of BI features are also crucial in ensuring the success of BI (Ahmad, 2015).

The development of BI systems is intricately linked to the Theory of Effective Use (TEU), offering a structured framework for comprehending and enhancing the utilization of information systems. In the context of BI, these systems are specifically crafted to collect, analyze, and present data, providing crucial support for decision-making within organizational contexts. TEU accentuates the pivotal role of system quality and usability in ensuring the effective use of BI systems. This emphasis extends to the design aspects of the system, encapsulating its interface, functionality, and features.

Notably, Trieu *et al*. (2022) underscore the importance of prioritizing a user-friendly interface, seamless navigation, and effective visualizations. This approach not only enhances the user experience but also fosters increased engagement with the BI system. Such engagement proves vital in navigating the effects of uncontrollable or unpredictable factors in the environment, facilitating the construction of future scenarios.

Examining the dimensions of BI data, Azeroual and Theel (2018) identify three key components. Firstly, data warehouses house integrated, detailed, and consolidated historical data (Wrembel *et al*., 2005). Secondly, OLAP (Online Analytical Processing) software extracts data from these warehouses or data marts to generate knowledge (Rumondor & Irawati, 2019). Lastly, data mining emerges as a powerful technique, employing mathematical, and statistical methods, artificial intelligence, and deep learning machines to locate and extract relevant information and novel insights from data warehouses. This data mining process, as highlighted by Irtaimeh *et al*. (2016) and Hanandeh *et al*. (2023),

proves instrumental in predicting future outcomes, discovering behavioral trends, and expediting timely decision-making by promptly addressing pertinent queries.

Moreover, BI serves as an offensive approach when combined with risk management scenarios, enabling the prediction of competitor actions (Albrecht, 2000). This multifaceted approach to BI, encompassing TEU principles, data dimensions, and predictive analytics, underscores its critical role in not only facilitating decision-making but also in proactively shaping organizational strategies in response to dynamic and competitive environments.

BI enables companies to identify profitable sectors and acquisition opportunities in new markets through environmental analysis. It also provides insights into how technological features of product components impact perceived quality and market value. By analyzing data, companies can determine essential components for improving product quality and make informed decisions on technological development, resulting in high-quality products that meet customer preferences and needs (Cammarano *et al*., 2023). The study argues that BI variables can help solve gaps in SF by providing organizations with timely and accurate information about their internal and external environments. By using BI tools such as OLAP, data mining, and data warehouse, organizations can analyze large amounts of data to identify patterns and trends that may be relevant to their strategic decision-making processes.

This can help organizations anticipate changes in their industry or market and make more informed decisions about how to respond. Additionally, by searching the surrounding environment for possible industries and target acquisitions, BI can assist companies in diversifying away from their existing markets (Marceau & Sawka, 1999).

3.2.2 Strategic Foresight

With the business environment becoming more turbulent, organizations are increasingly turning to SF to respond. Not being aware, prepared, and adaptable can fail to adjust to disruptions, making it crucial to establish an effective intelligence system as part of a strategic plan (Ratcliffe, 2019). Scenarios are useful tools for organizing perspectives on potential future events where present actions could materialize and are viewed as a crucial instrument for strategic planning toward future goals. Scenarios remain effective tools for decision-making under conditions of ambiguity and are utilized by military analysts, business strategists, and government planners (Ratcliffe, 2020). SF is a structured approach that leverages ideas to anticipate and prepare for future changes (Lari *et al*., 2020). SF enables organizations to capture more opportunities while minimizing risks by anticipating the future and developing appropriate responses. SF has long been used to comprehend future perspectives, locate essential resources, plan for significant advancements, and even reshape the business environment (Nonthapat & Ronald, 2018; Ahmad *et al*., 2020).

The SF technique, as outlined by Lari *et al*. (2020), encompasses two crucial dimensions: sophistication and people & networks. The sophistication dimension involves the strategic utilization of information and data sources to gain a competitive edge. This aspect of SF involves processes that extract meaning from information, particularly in terms of upcoming innovations, technological shifts, and competitor initiatives (Rohrbeck *et al*., 2015). On the other hand, the people & networks element recognizes the inevitability of system disruption and underscores that effective foresight is rooted in successful knowledge utilization. Rohrbeck *et al*. (2015) emphasize that actionable insights arise from interpreting data using informal methods.

In the organizational dimension, innovation management intersects with various processes to fully leverage future insights. Lari *et al*. (2020) highlight the importance of employing formal methods to transform data into practical insights. Four components of SF, identified by Rohrbeck *et al*. (2015) - technical intelligence, competitive intelligence, the political environment, and consumer analysis - form integral parts of the foresight process. Technology intelligence involves finding, analyzing, and using information about new technologies and disruptive developments, while competitive intelligence includes assessing rivals and scrutinizing products and services in development or available in leading markets.

The SF variables - method sophistication, people and network, and organization - play a pivotal role in enhancing understanding, facilitating proactive decision-making, supporting robust planning, and fostering collaboration and innovation. This utilization of variables, as highlighted by Bootz (2010) and Zraqat (2020), cultivates a forward-looking mindset within organizations, enabling them to navigate uncertainties and position themselves for future success.

For telecom companies, the application of SF becomes a strategic imperative to enhance the reliability and validity of their strategic foresight. This involves capturing key factors that influence desired future outcomes, allowing organizations to make informed decisions grounded in a comprehensive understanding of the complex interplay among various actors and variables. This, as emphasized by Nonthapat & Ronald (2018), not only improves the effectiveness of decision-making processes but also elevates the overall quality

of strategic foresight efforts, enabling organizations to better anticipate and shape future developments.

3.2.3 Impact of Business Intelligence on Strategic Foresight

The literature confirmed the relationship between BI and SF; they both involve monitoring and reporting on the external business environment, identifying opportunities and threats, acting as an early warning system, and supporting decision-making processes. While BI focuses on analyzing historical and real-time data, SF takes a forward-looking approach to anticipate future changes. Integrating BI and SF enhances an organization's ability to understand the current situation, identify risks and opportunities, and make informed decisions aligned with long-term goals (Kuosa, 2014).

Previous studies (Ratcliffe, 2019; Brandtner and Mates, 2021) found that effective planning requires the integration of customized BI systems that monitor and analyze the political environment and consumer trends. These systems play a vital role in assessing the impact of external changes, asking critical questions, and detecting early warning signals. By incorporating BI into the planning process, organizations can anticipate and address challenges, align with consumer needs, and make informed decisions. Also, Schmidt (2015) emphasizes the relationship between BI and SF in government organizations, highlighting the importance of integrating both for effective planning and decision-making.

It provides insights into how BI and SF can enhance the ability of government organizations to navigate complex and uncertain environments and

make informed decisions. Fleisher and Bensoussan (2003) note that BI must adopt a forward-looking approach, analyzing the future in-depth and broadly, despite its uncertain and indeterminate nature. Additionally, it should be imaginative and foresighted, as well as willing to take chances. According to experts, successful BI should concentrate on the future rather than the past. The "FAROUT system" is an explicit attempt to incorporate SF and BI; which is a methodology designed to combine elements of strategic foresight and business intelligence to create a forward-looking and innovative approach to decision-making.

BI and SF have a relationship to the study gap as they both contribute to informed decision-making and competitive advantage. BI analyzes historical and real-time data for insights into past performance, while SF anticipates and prepares for the future. Combining BI and SF allows organizations to understand their current situation, identify opportunities and risks, and make informed decisions aligned with long-term goals. BI provides inputs to SF by validating assumptions, analyzing trends, and supporting strategic planning. Integrating BI and SF enhances competitive advantage in a dynamic business environment (Brandtner & Mates, 2021).

That is why the authors can suggest the following:

Hypothesis 1: Business intelligence and its dimensions (OLAP, data mining, data warehouse) positively impact strategic foresight in the telecom companies in Jordan.

The first primary hypothesis may be divided into three sub-hypotheses based on the elements of business intelligence:

Hypothesis 1.1. Business intelligence and its dimensions (OLAP, data mining, data warehouse) positively influence method sophistication.
Hypothesis 1.2. Business intelligence and its dimensions (OLAP, data mining, data warehouse) positively influence people & networks.
Hypothesis 1.3. Business intelligence and its dimensions (OLAP, data mining, data warehouse) positively influence organizations.

3.2.4 Knowledge Management

The field of KM has experienced substantial growth over the past decade (Bootz *et al*., 2019). It can be difficult to define KM since it encompasses many different viewpoints, such as fundamental beliefs, strategies or goals, actions, and facilitators (Al-Tit *et al*., 2022), KM includes many facets of organizational operations and incorporates numerous disciplines; knowledge has been defined and categorized in a number of ways, both implicit and explicit (Akroush & Al-Mohammad, 2010).

KM serves as the foundational pillar for SF by capturing and organizing information, thereby fostering informed decision-making, sensemaking, learning, and adaptation. Furthermore, KM plays a pivotal role in supporting a long-term orientation for organizations by preserving institutional memory and aiding in strategic planning. As noted by Sujatha and Krishnaveni (2018), leveraging KM not only enhances SF capabilities but also equips organizations to make more informed decisions for the future.

The underpinnings of KM are influenced by two main theoretical frameworks: the resource-based view (RBV) and humanistic management theory. RBV underscores the strategic value of internal resources, particularly

knowledge, in securing a competitive advantage. It emphasizes the imperative for organizations to identify, develop, and effectively utilize their knowledge assets. Conversely, humanistic management theory places value on the dignity of individuals within organizations, advocating for a supportive and empowering work environment. This approach prioritizes personal development, collaboration, and ethical considerations (Despres & Chauvel, 1999).

In practical terms, this research delves into the role of KM, encompassing the identification and examination of both present and required knowledge assets and processes. This involves strategic planning and oversight measures aimed at enhancing the development of these assets and processes to effectively achieve organizational goals, as emphasized by Akroush and Al-Mohammad (2010). The seamless integration of KM principles, guided by RBV and humanistic management theory, not only establishes a robust knowledge foundation for SF but also cultivates an organizational environment poised for sustained success and adaptability in the face of future challenges.

It also refers to the process of creating, sharing, and utilizing knowledge within and between organizations (Ahmad *et al*., 2017; Darroch, 2003). Scholars and practitioners across different industries have recognized the importance of KM for a company's survival and success (Migdadi, 2020). Implementation, transformation, and acquisition are commonly used to evaluate KM (Rehman *et al*., 2022). Sharing the two explicit and implicit knowledge can improve a firm's financial performance, as suggested by Wang & Wang (2012). The four processes of organizational knowledge and procedure creation theory continuously produce KM dimensions that lead to knowledge creation (Andreeva & Kianto, 2011). KM and storage refer to the processes and tools used for performing so (Alegre *et al*., 2013), in contrast, knowledge diffusion deals with how an individual entity applies information that it has throughout a company (Gold &

Segras, 2001; Habegger, 2010).

To comprehend the cognitive characteristics of foresight Bootz *et al*., (2019) performed a study to examine its effects on KM Effective KM methods are crucial to fostering innovation and gaining a sustainable competitive edge in today's corporate climate, and there is a growing emphasis on building strategies for producing, using, and sharing knowledge inside firms (Garvin *et al*., 2008).

3.2.5 Impact of Business Intelligence on Strategic Foresight Through Knowledge Management

The intricate relationship between BI and SF is moderated by KM, a connection well-established in previous studies. KM serves as the knowledge foundation for SF, capturing and organizing information that facilitates informed decision-making, sensemaking, learning, and adaptation. It also plays a crucial role in supporting a long-term orientation by preserving institutional memory and aiding in strategic planning, thereby enabling organizations to enhance their SF capabilities and make better-informed decisions for the future (Sujatha & Krishnaveni, 2018).

In a study by Pouru *et al*. (2018), the focus shifted to the generation of knowledge on future scenarios within organizations and how practices can be enhanced. Analyzing empirical data from 110 Finnish firms, the study incorporated conceptual frameworks on the nature and utilization of future knowledge. Findings revealed shortcomings in current knowledge creation practices related to future knowledge, highlighting a need for comprehensive scope and alignment with best practices in foresight. To address these issues, the authors proposed strategies for improvement, such as leveraging knowledge

from diverse networks, reevaluating conceptual frameworks, and viewing foresight as an ongoing dynamic capability.

Similarly, Canongia's study in 2007 delved into the relationship between competitive intelligence, KM, and technological foresight in the development of biotechnology-based drugs for breast cancer. Emphasizing the importance of foresight studies to drive research and innovation, the study found that technological foresight relies on strategic data gathering, analysis, and interpretation. The prospecting strategy model, incorporating variables like trend analysis and stakeholder engagement, provides opportunities to understand future conditions and navigate the global market. The study suggests future avenues for investigation, including the exploration of prevention strategies, harnessing data mining for more efficient treatments, and applying the prospecting strategy model to enhance decision-making in research and development-focused industries.

Also, Djuricic and Bootz (2018) explore the relationship through a literature review and interviews with entrepreneurs and foresight experts, they find that both effectuation and foresight contribute to the formation of networks. These networks serve as valuable spaces for experiential learning, enabling participants to explore different actions, generate new ideas, and expand their knowledge. Pauget and Dammak (2019) explore the impact of BI and SF enabling data-driven insights through real-time data collection, enhancing foresight capabilities for anticipating trends and making informed decisions.

In the face of rapid and intricate changes, companies grapple with the challenge of anticipating and adapting to uncertainties, placing substantial pressure on top management to predict potential consequences and devise

appropriate actions (Payal *et al*., 2019; Zraqat, 2020). SF emerges as a crucial ally in this dynamic environment, supporting strategic thinking and decision-making by fostering learning, establishing connections and networks, enabling knowledge flows, and generating knowledge, ideas, and visions (Park *et al*., 2004).

The synergy between modern technologies for KM and the application of SF for future success is underscored by Park *et al*. (2004). Kaivo-oja and Laureus (2017) delve into the contribution of foresight tools to KM and knowledge collaboration, recognizing the pivotal role foresight plays in a knowledge-based economy. This relationship has been a subject of scholarly interest for some time, dating back to the early examination of the connection between KM and foresight at the "Probing the Future" conference in 2002. The growing attention to this topic is evident in the increased focus within the field, as showcased by previous special issues in the Technology Foresight and Social Change (TFSC) journal (Von der Gracht *et al*., 2015).

One of the key current issues in this domain revolves around investigating individual and group cognition to achieve desired goals (Rohrbeck *et al*., 2015). Scholars have delved into understanding the relationship between foresight and knowledge creation, employing models such as Nonaka and Takeuchi's classical model (Dufva & Ahlqvist, 2015) and cognitive learning methods (Bootz *et al*., 2019). Additionally, studies explore how foresight technologies or scenarios can influence cognitive processes, leading to the development of new techniques, gadgets, and tools for creating, exchanging, and disseminating information within these processes (Haeffner *et al*., 2012; Boe-Lillegraven & Monterde, 2015). The evolution of foresight processes in strategic foresight studies further exemplifies these changes (Bootz, 2010).

The widely recognized integration of foresight and KM signifies the robust relationship between these two fields of study, affirming the importance of their collaboration in navigating the complexities of the ever-evolving business landscape (Bootz *et al*., 2019).

Incorporating BI can be vital in preventing unintentional disclosure of confidential data while gathering necessary information about the partner. BI offers several methodologies and tools that can assist in managing the extensive amounts of data required for prompt and informed decision-making (Sallos *et al*., 2019). Kasemsap (2018) notes that there is a strong correlation between BI and KM because BI involves transferring and integrating crucial business information within an organization, while KM enables businesses to keep a framework of crucial abilities to optimize commercial opportunities. Employing BI as a KM tool enables companies to seamlessly discover, process, and share information, thereby enhancing their competitive edge (Bouaoula *et al*., 2019). This strategic integration of BI and KM proves especially beneficial for mature market companies, offering the capability to extend their offerings beyond the existing market boundaries.

By leveraging BI, these companies can conduct a comprehensive analysis of the industry landscape, identifying profitable opportunities and potential acquisition targets (Gilad & Gilad, 1988; Al-Gasawneh *et al*., 2022). This synergy not only streamlines information management but also empowers companies to strategically navigate their market, capitalize on growth prospects, and strengthen their market position.

That is why the authors can suggest the following:

Hypothesis 2: knowledge management moderates the relationship between

business intelligence and strategic foresight.

Hypothesis 2.1. Business intelligence and its dimensions (OLAP, data mining, data warehouse) positively impact the method of sophisticated knowledge management as a moderator variable.

Hypothesis 2.2. Business intelligence and its dimensions (OLAP, data mining, data warehouse) positively impact the people and network of the exit of knowledge management as a moderator variable.

Hypothesis 2.3. Business intelligence and its dimensions (OLAP, data mining, data warehouse) positively impact the organization of the exit of knowledge management as a moderator variable.

Now suggest the next theoretical model:

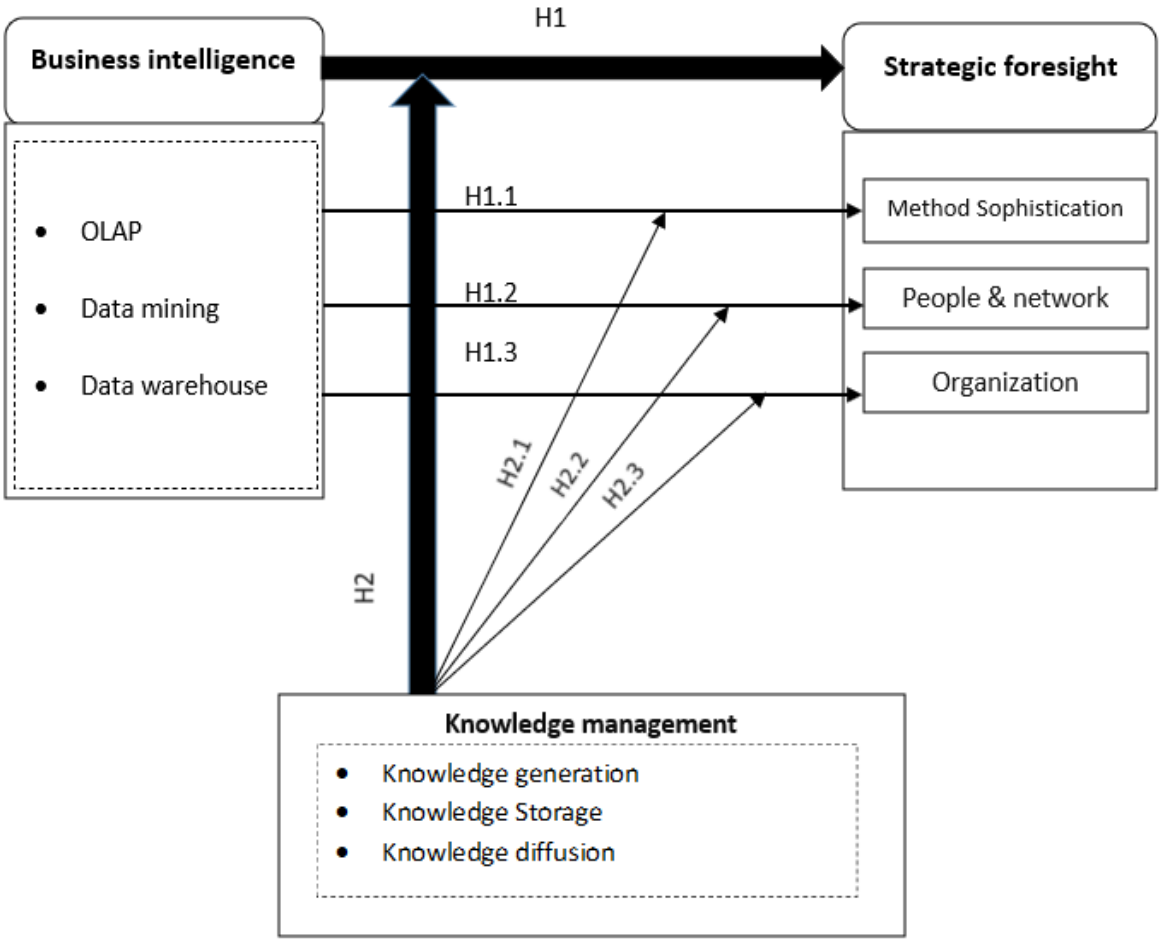


Figure 3.1: The study's Model

The model of this study is based on many previous literature reviews. Figure 3.1 shows the moderation of KM on the effect of BI on SF in Telecom Jordanian industries. The measurements of all the constructs were adopted from the previous studies.

3.3 Methodology

This section outlines the steps involved in administering the research instrument and ways of analyzing the results. The author targets the telecom sample and population for this research as follows:

3.3.1 Sample and procedure

To reach the goal of this study, investigating the moderating role of KM on the effect of BI on SF. This study had conducted on telecom companies in Jordan. Include sample description and design, validity, and reliability of the study sample, in addition to the procedures and statistical processes the researcher uses to reach the results. This study is a causal analysis, a descriptive-analytical approach to explore KM's moderating role on the effect of BI on SF.

The study population is Jordanian telecommunications companies. The 3885 employees of these companies who hold the following job titles (directors, general managers, team leaders, experts, and seniors) make up the study population. Also, the study was done through a questionnaire. The total number of recovered questionnaires was 350, of which 307 were suitable for statistical analysis after 43 surveys were excluded because they were unfinished. As shown in table 3.1.

Table 3.1: Study population

Company	Employees number
Umniah	1143
Zain	1055
Orange	1687
Total	3885

The study sample is stratified, proportionate, and drawn randomly. The 350 of sample size as shown in Table 3.2 included all employees making the sample representative of the population and allowing for the generalization of the findings (Sekaran & Bougie, 2016).

Table 3.2: Sample size from each telecom company

Company	Sample calculation	Sample by company
Umniah	1143/3885=0.294*350=103	103
Zain	1055/3885=0.272*350=95	95
Orange	1687/3885=0.434*350=152	152
Total	350	350

As stated in Table 3.3, the population was divided into groups based on job titles. A size sample was drawn randomly from each stratum for each telecom firm in the previous table. Table 3.4 below shows the positions and the number of workers in three firms; the sample taken from each position is 350 employees, and the total number of surveys utilized for analysis is 307.

Table 3.3: Sample size from each company according to the job title

Position	Total Employees	Sample per position	The Sample	Analysis samples
Director	144	144/3885=.0371*350=13	13	12
General Manager	355	355/3885=.0914*350=32	32	26
Team leader	711	711/3885=0.183*350=64	64	50
Expert	1110	1110/3885=0.286*350=100	100	79
Senior	1565	1565/3885=0.403*350=141	141	140
Total population	3885	350	350	307

A sample drawn from each position in each company is in the table below:

Table 3.4: Sample size from companies

Position	Zain company's sample	Umniah company's sample	Zain company's sample
Director	4	4	5
General manager	9	9	14
Team leader	17	19	28
Expert	27	29	44
Senior	38	42	61
Total	95	103	152

A dataset comprising 307 valid and complete questionnaires was generated for analysis. Prior to the analysis, a thorough examination of the dataset was conducted to ensure data completeness and adherence to a normal distribution. Descriptive statistics were employed to evaluate the data's completeness and validity. The skewness and kurtosis values for all observed variables were found to be within the acceptable range for a normal distribution (skewness <± 3 and kurtosis <± 10) (Kline, 2005). The demographic profile of the sample is detailed in Table 3.5. The descriptive measures reveal that 60.9% of the respondents were male, with the majority falling within the age range of 30–34 years 34.2%. In terms of education, 74.3% of the respondents held a first degree, and a substantial proportion occupied senior positions 57.8% with 5–10 years of experience 48.2%.

Table 3.5: Demographic characteristics of the sample

Variable	Category	Count	%
Gender	Female	120	39.1
	Male	187	60.9
	Total	307	100
Age	less than 30	32	10.4
	30 to less than 35	105	34.2
	35 to less than 40	104	33.9
	40 to less than 45	54	17.6
	more than 45	12	3.9
	Total	307	100
Educational level	Bachelor	228	74.3
	Diploma	8	2.6
	Higher Diploma	12	3.9
	Masters	57	18.6
	Ph.D.	2	.7
	Total	307	100
Nature of Work	Director of department or unit	12	3.9
	Expert in the department	79	25.7
	General Manager/ Assistant General Manager	26	8.5
	Seiner of the department	140	45.6
	Team leaders of the department	50	16.3
	Total	307	100
Experience	less than five years	97	31.6
	Five years to less than ten years	148	48.2
	Ten years to less than fifteen years	36	11.7
	more than fifteen years	26	8.5
	Total	307	100

3.3.2 Measures

The survey questionnaire was administered to employees in the upper and middle administrative levels of Jordanian telecom companies. The measurement scales used in the questionnaire were adapted from previous literature all items were rated on a seven-point Likert scale, with 1 indicating strongly agree and 5 indicating strongly disagree. The score for each variable was calculated by averaging the responses of the corresponding items. Prior to the main survey, the questionnaire underwent a pre-testing phase, where two academic experts it to ensure its face validity, refer to appendix (B).

According to Loeb *et al*. (2017), the study utilized a descriptive-analytical approach, employing stratified sampling to analyze and categorize the data, to accomplish the research objectives and identify the study variables. The BI was conceptualized in 3 items: Data warehouse, Data mining, and OLAP (Kok, 2006). Other researchers have suggested that decision-makers discuss BI and SF in-depth (Nascimento *et al*., 2021). These study items were combined and incorporated into this research purpose. That is, 3 items included: people & networks, method sophisticated, and organization (Amniattalab & Ansari, 2016). The measurement of KM was based on the generation, storage, and diffusion of knowledge using 3 items (Ode & Ayavoo, 2020).

3.3.3 Reliability and Validity

Structural equation modeling (SEM) was employed to evaluate the measurement model, which consisted of five latent variables measured by 45 observed indicators (Anderson & Gerbing 1988). According to Hair *et al*. (2010), and Cammarano *et al*. (2023), the model-building process of the measurement model was developed as the initial step. The measurement model demonstrated a satisfactory fit based on the recommended criteria (RMSEA <0.08, GFI ≥0.90, CFI ≥0.90, NFI ≥0.90, and IFI ≥0.90). CFA was subsequently conducted to validate the model, with convergent and discriminant validity indicators used to establish construct validity. According to Table 3.6, all measurement items exhibited factor loading above the acceptable threshold of 0.70.

Table 3.6: Factor loadings and reliability analysis results

Variables	Items			
	Code	Mean	Sd	Factor loadings
Business Intelligence	O1.1	4.03	0.68	0.739
	O1.2	4.13	0.64	0.829
	O1.3	4.12	0.70	0.746
	O1.4	4.03	0.70	0.739
	O1.5	4.09	0.66	0.708
	DM.1	4.12	0.63	0.717
	DM.2	4.01	0.68	0.713
	DM.3	4.06	0.65	0.886
	DM.4	3.98	0.73	0.729
	DM.5	3.96	0.66	0.704
	DW.1	4.06	0.62	0.844
	DW.2	4.04	0.58	0.728
	DW.3	4.07	0.62	0.753
	DW.4	4.06	0.65	0.760
	DW.5	4.10	0.63	0.716
Knowledge Management	KG.1	4.01	0.70	0.749
	KG.2	3.99	0.69	0.885
	KG.3	3.96	0.66	0.751
	KG.4	3.98	0.68	0.739
	KG.5	3.99	0.65	0.722
	KS.1	4.03	0.68	0.753
	KS .2	4.03	0.70	0.719
	KS .3	3.61	0.90	0.729
	KS.4	3.65	0.98	0.730
	KS.5	3.97	0.66	0.787
	KD.1	3.92	0.65	0.716
	KD.2	4.01	0.63	0.748
	KD.3	3.98	0.61	0.818
	KD.4	3.93	0.62	0.761
	KD.5	3.85	0.74	0.724
Method Sophistication	MS.1	4.02	0.71	0.819
	MS.2	3.96	0.68	0.875
	MS.3	3.95	0.67	0.841
	MS.4	3.97	0.69	0.748
	MS.5	3.93	0.66	0.832
People & Networks	PN.1	4.02	0.62	0.812
	PN.2	4.09	0.70	0.819
	PN.3	3.79	0.90	0.718
	PN.4	3.78	0.98	0.725
	PN.5	3.65	0.66	0.767
Organization	O.1	3.97	0.66	0.724
	O.2	4.06	0.67	0.767
	O.3	3.93	0.64	0.828
	O.4	3.91	0.63	0.752

	O.5	3.87	0.72	0.714

3.4 The Study Results

The measurement model was assessed first, and then afterward, the structural model was considered to report the findings of the hypothesis testing. Accordingly, confirmatory factor analysis (CFA) was used to validate the measurement model, followed by scale reliability and validity checks.

The researcher depended on the descriptive-analytical method (Loeb *et al*., 2017) and explained that descriptive analysis characterizes the world or a phenomenon, addressing WH questions and to what scope. Whether the goal is to recognize and describe trends and variation in populations, create new measures of critical phenomena, or describe samples in studies aimed at determining causal effects, description plays a crucial role in the scientific process method generally and education research in particular. Researchers describe the study variables and analyze the data obtained in different ways to identify the impact of BI on SF in the presence of KM as a moderator variable in Jordanian telecom companies.

The validity of the study tool is verified through structural validity; structural validity tests measure what it claims, or purports, to be measuring (Harrison, 1983). According to Guion (1980), construct validity is the appropriateness of inferences made based on observations or measurements (often test scores), precisely whether a test measures the intended construct. Constructs are abstractions that the researchers deliberately create to conceptualize the latent variable correlated with scores on a given measure. In construction validity, attention focuses on the

fact that each of the study variables is accurately represented by a group of paragraphs or phrases and that these paragraphs already measure this variable; in this study, the construct validity was measured through confirmatory factor analysis (CFA). The researchers then utilized structural equation modeling with AMOS 21.0 to validate and test the model.

3.4.1 Cronbach's Alpha

For all study variables, the researcher conducted internal consistency analyses to verify the stability of the survey, and the results show that the investigated tool has an acceptable level of stability during a Cronbach alpha value that is equal to or higher than 0.70 (Nunally, 1978). The Cronbach alpha indicates that the study tool is more reliable (Sekaran & Bougie, 2016). The stability test results are shown in Table 3.7:

Table 3.7: Cronbach's alpha coefficient-based dimensional stability of the variables (n = 307)

Dimensions	No. of Paragraph	Cronbach's Alpha Coefficient
Business Intelligence		
First Dimension: OLAP	5	0.766
Second Dimension: Data Mining	5	0.767
Third Dimension: Data Warehouse	5	0.708
Dependent Variable (Business Intelligence)	15	0.845
Strategic Foresight		
First Dimension: Method Sophisticated	5	0.755
Second Dimension: People & Networks	5	0.718
Third Dimension: Organization	5	0.806
Independent Variable (strategic foresight)	15	0.816
Knowledge Management		
First Dimension: Generation	5	0.757
Second Dimension: Storage	5	0.747
Third Dimension: Diffusion	5	0.727
Moderator Variable (knowledge Management)	15	0.848
All Variables	45	0.924

Cronbach's alpha coefficients for each dimension of the independent variable BI were 0.845, for every dimension of the variable that is dependent SF were 0.816, for every dimension of the moderator variable KM was 0.848, and for all variables were 0.924, according to Table 3.7. The stability of the paragraphs was shown by the fact each of the Cronbach alpha values was higher than 70%.

3.4.2 Statistical Techniques Employed Fit The Research Model.

By verifying the validity of the research data as well as its suitability for parametric tests, conducting a normal distribution examination, and a multiple linear correlation assessment, as well as an autocorrelation test, this section of

the study aims to confirm the suitability of the model under consideration to the statistical methods used. In statistics, normality tests are employed to assess whether a dataset can be accurately represented by a normal distribution and to calculate the probability of the underlying random variable conforming to a normal distribution (Dubey, 2019; Gupta *et al*. 2019).

3.4.3 Test For Normal Distribution

The Kolmogorov-Smirnov test was employed by the researcher to confirm that the data utilized in statistical analysis and testing of hypotheses had a normal distribution.

Table 3.8: Normal distribution using the Kolmogorov-Smirnov test

The Dimensions	Test Value	Significance Level
OLAP	0.137	0.127
Data Mining	0.110	0.132
Data Warehouse	0.144	0.229
Method Sophisticated	0.184	0.189
People & Networks	0.187	0.212
Organization	0.168	0.115
Generation	0.112	0.124
Storage	0.159	0.176
Diffusion	0.144	0.167

The distribution of the values of the variables and the results of the normal distribution did not statistically differ at the level of significance 0.05, according to Table 3.8, which demonstrates that the data for this research were collected using the normal distribution technique.

3.4.5 Multicollinearity Tests

One of the issues with independent variables is the issue of multiple linear correlations (multicollinearity). It manifests whenever there is a close-to-perfect high correlation between two independent variables. Due to its tendency to inflate the coefficient of determination's R^2 value beyond its true value, the existence of this strong correlation has a detrimental impact on measurement accuracy. To determine whether this issue exists, the Pearson correlation coefficient is calculated. According to the decision rule, the data is not affected by the multiple linear correlation issue if the Pearson correlation coefficient values between more than one independent variable are less than 0.80 (Gujarati, 2004).

The Pearson correlation coefficient was used to assess the multiple linear correlation issue among each of the dimensions of the variable that was independent.

Table 3.9: Results of utilizing the Pearson correlation coefficient to assess the multiple linear correlation issue among the dimensions of the variable that is independent

Dimensions	Data Warehouse	Data Mining	OLAP
OLAP	1.000	**0.571	**0.560
Data Mining	0.571**	1.000	**0.568
Data Warehouse	**0.560	**0.568	1.000

**Significant at (0.01) level

Table 3.9 demonstrates that the correlation coefficient between the independent variables' dimensions was less than 0.80. The problem is multiple linear correlations in the research data are therefore removed from the sample.

The Variance Inflation Factor & the Tolerance Factor measurements for

the dimensions of the independent variable served to support the earlier finding. The decision rule states that the data is not affected by the issue of high multiple linear correlations if the variance inflation factor (VIF) values fall within the range of 1.0 - 10.0 and the tolerance coefficient values fall within the range of 0.1 - 1.0 (Gujarati, 2004).

Table 3.10: The outcomes of the multiple linear correlation issue examine the relationships between the independent variable's dimensions employing the variance inflation factor & the factor of tolerance

Dimension	Variance Inflation Factor (VIF)	Tolerance
OLAP	1.690	0.592
Data Mining	1.712	0.584
Data Warehouse	1.679	0.596

Table 3.10 makes it clear that the values shown of the tolerance coefficient (Tolerance) and the coefficient of variance inflation (CVI) for each of the dimensions of the independent variable were both between 10.0 and 1.0, respectively. This proves that the data are free of the issue of multiple linear correlations. By calculating the averages and standard deviations of the answers they gave, the estimations of the sample's participants were determined. The results are displayed in the following tables, along with the t-test's value:

Table 3.11: The average & relative weight of the sample members' estimations of the dimensions of (BI)

The Dimension	Mean	Standard Deviation	t Value	Importance level
1st Dimension: OLAP	3.95	0.427	38.97**	High
2nd Dimension: Data Mining	3.97	0.453	37.43**	High
3rd Dimension: Data Warehouse	3.96	0.414	40.55**	High
Overall average	3.96		46.50**	High

** Significance at (0.01) level

Table 3.11 shows that the sample members' average estimates of the relative significance of the dimensions of BI ranged from 3.95 to 3.97, with the dimension of data warehouse coming in first with the highest mean and highest relative importance of 3.97, complied with by the dimension of data warehouse with mean and highest relative importance of 3.96, followed by the dimension of OLAP with the mean and highest relative importance of 3.9. The data from the preceding table also shows that it indicates a high level of BI in Jordanian telecommunications firms, with the mean of the sample estimations on each dimension of BI as a whole reaching 3.96 with high relative importance.

The t-test value, which was higher than the tabular value of 1.96 and statistically significant, was 46.50.

Table 3.12: The mean & relative weight of the sample members' estimations of the dimensions of (SF)

The Dimension	Mean	Standard Deviation	(t) Value	Importance Level
1St Dimension: Method Sophisticated	3.92	0.430	37.18**	High
2nd Dimension: People & Networks	3.74	0.511	25.39**	High
3rd Dimension: Organization	3.91	0.407	39.17**	High
Overall average	3.86		42.85**	High

** Significance at (0.01) level

Table 3.12 shows that the sample members' average estimates of the relative significance of the dimensions of SF varied from 3.74 to 3.92, with the dimension of methods sophisticated coming in first with the highest mean of 3.92 and a high relative significance, accompanied by the dimension of the organization, in a mean of 3.91 and high relative importance, and finally, with a mean of 3.74 and high relative importance, the dimension of people and

networks. The data from the preceding table also shows that there is a high degree of SF in Jordanian telecom firms, with the mean of the sample estimations on the dimensions of SF as an entire reaching 3.86 with high relative relevance.

The statistically significant result of the t-test was 42.85, which is higher than the value shown in Table 1.96.

Table 3.13: Mean & the proportional weighting of the sample members' estimations of the dimensions of (KM)

The Dimension	Mean	Standard Deviation	(t) Value	Importance level
1st Dimension: Generation	3.86	0.412	36.66**	High
2nd Dimension: Storage	3.93	0.448	36.67**	High
3rdDdimension: Diffusion	3.94	0.458	35.97**	High
Overall average	3.92		43.23**	High

** Significance at (0.01) level

Table 3.13 shows that the sample members' average estimates of the relative significance of the KM dimensions varied from 3.86 to 3.94. The dimension of diffusion came in first with the highest mean and highest relative importance of 3.94, then the dimension of storage with the second highest mean and highest relative importance of 3.93, and the dimension of generation with the third highest mean and highest relative importance of 3.86. The data from the preceding table also shows that it indicates a high level of KM in Jordanian telecom firms, with the mean of the sample's estimations on each dimension of KM as a whole reaching 3.92 with significant relevance. The t-test value was 43.23, which is higher than the tabular value of 1.96 and statistically significant.

3.4.6 The Multicollinearity Tests and Hypotheses Testing

3.4.6.1 The First Main Hypothesis

The researcher employed the Structural Equation Model (SEM) approach through the (AMOS) tool to test this hypothesis, as shown in Figure 3.2 testing the first main hypothesis and Figure 3.3 SEM for the first main hypothesis.

Figure 3.2: SEM for testing the first main hypothesis

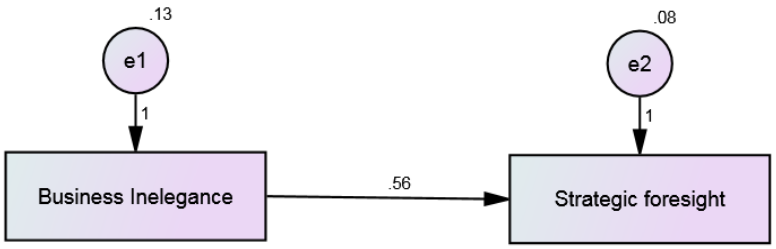
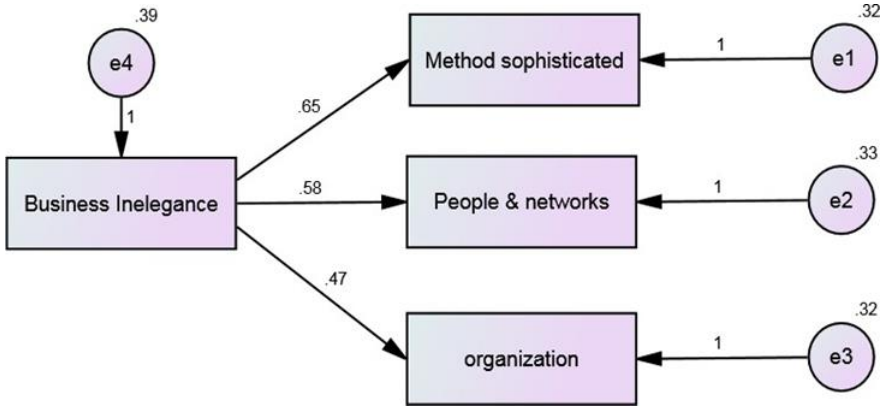


Figure 3.3: SEM for evaluating the first primary hypothesis's supporting hypotheses



The outcomes of the first primary hypothesis and its supporting sub-hypothesis are also displayed in Table 3.14.

Table 3.14: Analysis of the first main hypothesis & their sub-hypothesis

Impact Direction		(β)	S. E	T	(Sig)	(R^2)
Business Intelligence	Strategic Foresight	0.56	0.045	12.398	0.00	0.31
Business Intelligence	Method Sophisticated	0.65	0.052	12.618	0.00	0.42
Business Intelligence	People & Networks	0.58	0.053	10.995	0.00	0.34
Business Intelligence	Organization	0.47	0.052	9.089	0.00	0.22

The impact value of BI on SF was quantified by the standardized beta coefficient 0.56, according to the findings shown in Table 14. Given that the matching significance value (0.00) was less than 0.05, this effect value is statistically significant. The first major hypothesis was therefore accepted.

The sub-hypotheses were evaluated after the first major hypothesis, and the outcomes were as follows: The effect value of BI on the sophisticated approach was reflected through the standardized beta coefficient of 0.65, according to the findings in Table 3.14. Because the corresponding significance value (0.00) was less than 0.05, this impact value was deemed statistically significant. The first sub-main hypothesis was therefore approved.

The standardized beta coefficient of 0.58 was used to indicate the impact value of BI on individuals and networks, according to the findings shown in Table 3.14. Because the corresponding significance value (0.00) was less than 0.05, this impact value was deemed statistically significant. The second sub-main hypothesis was therefore approved.

The findings, as presented in Table 3.14, highlight the standardized beta coefficient of 0.47, serving as an illustrative measure of the impact of BI on the

organization. The significance value (0.00), which is less than 0.05, indicates statistical significance. Consequently, the verification of the third sub-main hypothesis confirms the significant influence of BI, affirming its noteworthy impact on the organization.

3.4.6.2 The Second Main Hypothesis

The results are provided in Table 15, and the researcher employed multiple hierarchical regression analysis to illustrate how KM may change how BI dimensions (OLAP, data mining, and data warehousing) affect the SF of telecom companies.

Table 3.15: Analysis using hierarchical regression of KM's moderating influence on the link between (BI) & (SF)

Dependent variable	Independent Variables	The First Step			The Second Step		
		β	(t) Value	Sig t	β	(t) Value	Sig t
Strategic Foresight	Business Intelligence	0.578	12.398	0.00	0.382	7.567	0.000
	knowledge Management				0.320	6.485	0.000
	The Coefficient of Determination (R^2)	0.334			0.415		
	Δ R^2	0.334			0.081		
	ΔF	153.202			42.054		
	Sig Δ F	0.000			0.000		

The findings of the hierarchical multiple regression using the two models are shown in Table 3.15 because the results of the first model depending on the first step indicated that the independent variables represented by BI had a statistically significant impact on the SF Where the level of significance (sig F = 0.000), which is less than 0.05, is equal to the value of F = 153.202. Additionally,

the determination factor's value R^2 = 0.334 shows that 33.4% of the variation in SF can be attributed to the dimensions of BI.

KM was incorporated into the regression model in the second stage, where the determination factor R^2 value developed by 8.1% and was statistically significant at the value of F = 153.202. The level of significance (sig Δ F = 0.000) is below 0.05. The rate of interpretation of the entire variance increased by 8.1%, moving from 33.4% to 41.5%, when the value of β = 0.320 was at KM, together with the value of t = 6.485 as well as the level of significance (sig. = 0.000). The second key hypothesis was therefore accepted.

The sub-hypotheses were evaluated following the second main hypothesis, and the outcomes were as follows:

Table 3.16: comprehensive hierarchical regression analysis study of the moderating impact of (KM) on the correlation between (BI) & method sophisticated

Dependent Variable	Independent Variables	The First Step			The Second Step		
		β	(t) Value	Sig t	β	(t) value	Sig t
Method Sophisticated	Business Intelligence	0.658	11.574	0.00	0.523	7.896	0.000
	knowledge Management				0.243	3.763	0.000
	The coefficient of Determination (R^2)		0.305			0.336	
	Δ R^2		0.305			0.031	
	ΔF		133.966			14.163	
	Sig Δ F		0.000			0.000	

The outcomes of the hierarchical multiple regression constructed from two models are shown in Table 3.16, as the findings of the first model depending on the first step indicated that the independent variables embodied in BI had a statistically significant impact on the sophisticated approach. Where the level of

significance (sig Δ F = 0.000), which is less than 0.05, is equal to the value of F= 133.966. Additionally, the value of the chosen factor R^2 = 0.305; shows that the sophisticated methods variance has been explained by the BI dimensions (30.5%).

KM was incorporated into the regression model in the second stage, where the determination factor R^2 value increased by 3.1% and was statistically significant F = 133.966. The level of significance (sig F = 0.000) is below 0.05. The rate of interpretation of the overall variance increased by 3.1%, from 30.5% to 33.6%, when the value of β= 0.243 was at KM, together with the value of t = 3.763 and the level of significance (sig. =0.000). The first sub-main hypothesis was therefore approved.

Table 3.17: The link between (BI) and people and networks, & the moderating impact of (KM) is the subject of a hierarchical regression analysis

Dependent variable	Independent Variables	The First Step			The Second Step		
		β	(t) Value	Sig t	β	(t) Value	Sig t
People & Networks	Business Intelligence	0.469	6.134	0.00	0.337	3.742	0.000
	knowledge Management				0.238	2.707	0.007
	The Coefficient of Determination (R^2)		0.110			0.131	
	Δ R^2		0.305			0.021	
	ΔF		37.631			7.327	
	Sig Δ F		0.000			0.007	

The results of the hierarchical multiple regression based on two models are shown in Table 3.17, in which the value of F = 37.631, and the level of significance (sig Δ F = 0.000), which is less than 0.05, reflecting the existence of a statistically significant impact of the independent variables represented by BI on the People and networks. Additionally, according to the determination

factor's value R^2 = 0.110, the dimensions of BI have contributed to the explanation of 11.0% of the variation in people & networks.

A variable KM was added to the regression model in the second stage, and as a result, the determination factor R^2 value increased by 2.1%. This increase was statistically significant, with a value of F = 37631. The level of significance (sig Δ F = 0.000) is below 0.05. Given the value of β = 0.238, the level of significance (sig. = 0.007), and the values of t = 2.707 and t = 2.707, the rate of interpretation of the total variance increased by 2.1%, from 11.0% to 13.1%. The second sub-main hypothesis was therefore approved.

Table 3.18: Analysis using hierarchical regression of (KM)'s moderating influence on the interaction between organizations & (BI)

Dependent Variable	Independent variables	The First Step			The Second Step		
		β	(t) value	Sig t	B	(t) Value	Sig t
Organizations	Business Intelligence	0.551	9.794	0.00	0.286	4.697	0.000
	knowledge Management				0.477	8.029	0.000
	The Coefficient of Determination (R^2)		0.239			0.372	
	Δ R^2		0.239			0.133	
	ΔF		95.928			64.468	
	Sig Δ F		0.000			0.00	

The results of the hierarchical multiple regression calculated using the two models are shown in Table 3.18, where the value of F = 95.928, which corresponds to the level of significance (sig Δ F = 0.000), which is less than 0.05, expressed the existence of a statistically significant impact of the independent variables indicated by BI on the organizations. Additionally, the dimensions of BI have contributed to the explanation of 23.9% of the variation in organizations,

according to the statistic of the determination factor R^2 = 0.239.

KM was included in a regression model in the second stage, where a 13.3% rise in the value of the identification factor R^2 indicated a statistically significant change F = 95.928. The level of significance sig Δ F = 0.000 is below 0.05. The rate of interpretation of the total variance increased by 13.3%, from 923.9% to 37.2%, when the value of β= 0.477, the value of t = 8.029, and the level of significance (sig. = 0.000) was at KM As a result, the third subsidiary hypothesis was verified.3.5

3.5 Discussion

The results indicate a significant influence of BI (Data warehouse, Data mining, and OLAP) on SF (people & networks, method sophisticated, and organization), which is indicated by the Theory of Effective Use (TEU), to provide a framework for understanding and improving the utilization of BI systems to gather, analyze, and present data to support decision-making in the effects of uncontrollable or unpredictable factors in the environment which enhance building future scenarios (Trieu *et al*., 2022). This research delves into the integration of BI and SF and underscores the significance of scenarios in offering a framework for agile and adaptable planning. Furthermore, it is crucial for organizations to cultivate foresight in comparison to their rivals and proactively respond based on insights and alerts to ensure their survival and ongoing operations (Ratcliffe, 2019; Brandtner & Mates, 2021; Suandi, 2022). By integrating BI into planning scenarios, organizations can anticipate and tackle challenges, align with customer demands, and make well-informed decisions to compete in the market. Schmidt (2015) further underscores the correlation between BI and SF, emphasizing the significance of integrating both approaches

for effective planning and decision-making.

Also, this study's results indicated that KM moderated the relationship between BI and SF. The concept of KM involves acquiring, creating, transferring, storing, and applying knowledge within organizations, both from within and outside the company (Costa & Monteiro, 2016). That aligns with the resource-based view (RBV) theory and humanistic management theory by emphasizing the strategic value of internal resources, including knowledge, to discover future trends and gain a competitive advantage.

It promotes a supportive environment, and collaboration to identify, develop, and effectively use their knowledge assets (Despres & Chauvel, 1999). KM provides a structured approach for capturing and disseminating knowledge, fostering learning, and promoting innovation. It equips organizations with the capability to anticipate, monitor, and respond to changes in the market environment, thereby enhancing their competitive advantage (Akroush & Al-Mohammad, 2010). Pouru *et al*. (2018) suggest leveraging the knowledge of diverse networks in knowledge creation, reevaluating the conceptual framework used to discuss future scenarios, and viewing foresight as an ongoing dynamic capability. Moreover, technological foresight relies on strategic data gathering, analysis, and interpretation (Canongia, 2007).

3.6 Implications, Conclusions, and Limitations

3.6.1 Theoretical Implications

This study makes a substantial theoretical contribution by delving into the intricate dynamics between BI, KM, and SF within the unique context of the Jordanian telecommunications sector. A key theoretical stride is the integration of these components, coupled with the introduction of KM as a moderator shaping their relationship. The study establishes a theoretical framework that accentuates the strategic significance of internal resources and the principles of humanistic management, particularly in the realm of knowledge management. Furthermore, it underscores the pivotal role of SF as a navigational tool in grappling with environmental uncertainties, ultimately bolstering an organization's adaptability. The theoretical findings enrich existing frameworks by showcasing the positive impact of BI on SF and, crucially, the moderating influence of KM, thereby amplifying this impact. Additionally, the study illuminates the theoretical interplay between BI and SF, especially in the context of constructing scenarios through modern technology, aligning seamlessly with the ever-evolving landscape of data-driven decision-making.

The alignment with established theories, such as the Theory of Effective Use, reinforces the imperative of integrating BI and SF for astute decision-making in dynamic environments (Trieu *et al.*, 2022). The theoretical implications extend to the moderating role of KM, shedding light on the strategic value inherent in internal resources and humanistic management principles (Despres & Chauvel, 1999). This nuanced theoretical exploration provides a robust foundation for understanding the symbiotic relationship between these critical elements in the telecommunications sector.

3.6.2 Practical Implications

The practical contributions of the study are twofold. Firstly, SF enables organizations to enhance their awareness of potential dangers, leading to more effective emergency preparedness and the development of resilience strategies. Organizations utilizing foresight become more adaptable to change, positioning themselves to navigate uncertainties effectively. Secondly, KM plays a pivotal role in fostering employee expansion and development, boosting organizational agility, accelerating innovation, enhancing business processes, sharing expert knowledge, and facilitating quicker problem-solving. BI, as a component of KM, organizes efforts to gather, process, and disseminate information, thereby enhancing the competitiveness of the business.

The firms need to consider emerging challenges, trends, and technologies by employing mathematical forecasting, econometric modeling, and developing scenarios of potential futures. Hosting future workshops and gathering signals and trends within and outside the industry challenges conventional ways of thinking. SF establishes a focal point for examining potential futures and desired outcomes, providing a strategic framework and structure for organizational planning. BI, in this context, assists in positioning the organization conveniently, identifying consumer habits and trends, investigating new opportunities in unpredictable settings, and contributing to strategic planning and modifications in the business environment. However, it is crucial for businesses to prevent inappropriate technology usage both internally and externally, limiting access to specific knowledge sources for effective knowledge management. The practical implications extend beyond traditional business operations, emphasizing the importance of foresight, knowledge management, and business intelligence in shaping organizational strategies and responses to a dynamic and unpredictable business landscape.

3.6.3 Conclusions

The research results of hypothesis testing related to the impact of BI and KM on SF in a telecoms company. The first main hypothesis was the impact value of BI on SF was statistically significant with a standardized beta coefficient of 0.56. Therefore, the first main hypothesis was accepted. Subsequently, the sub-hypotheses were tested, and the impact value of BI on sophisticated methods, people and networks, and organizations was also statistically significant, each sub-hypothesis was accepted in agreement with previous studies, BI primarily concentrates on examining historical and real-time data, while SF adopts a proactive approach to predict forthcoming changes.

The integration of BI and SF augments an organization's capacity to comprehend the present circumstances, recognize potential risks and opportunities and make well-informed decisions that align with long-term objectives (Kuosa, 2014). Additionally, Bensoussan (2003) emphasizes the need for BI to adopt a proactive perspective, thoroughly and comprehensively analyzing the future, even in the face of its uncertain and unpredictable nature. Finally integrating BI and SF enhances competitive advantage in a dynamic business environment (Brandtner & Mates, 2021; Schmidt, 2015).

The second main hypothesis testing related to the impact of KM in modifying the impact of BI on the SF The results showed that the value of F was 153.202, indicating that the dimensions of BI have explained 33.4% of the variance in SF After introducing KM to the regression model, moreover, the value of the determination factor R^2 increased by 8.1%. The value of β was 0.320, indicating a statistically significant impact of KM on the relationship between BI and SF Therefore, the second main hypothesis was accepted. Subsequently, the sub-hypotheses were tested, and the impact of KM on sophisticated methods

was also statistically significant, and the sub-hypothesis was accepted. This result is aligned with previous studies, through the utilization of KM, organizations improve their ability to engage in SF, resulting in enhanced decision-making for future endeavors (Sujatha & Krishnaveni, 2018; Payal *et al*., 2019).

Pauget and Dammak (2019) explore the impact of BI and SF enabling data-driven insights through real-time data collection, enhancing foresight capabilities for anticipating trends, empowering proactive decision-making, and making informed decisions. Additionally, studies have explored how foresight technologies or scenarios can influence knowledge cognitive processes (Haeffner *et al*., 2012; Boe-Lillegraven & Monterde, 2015).

Finally, Advancements in foresight processes have led to the development of novel techniques, devices, and mechanisms for generating, sharing, and distributing information. These changes are evident in research focusing on strategic foresight (Bootz, 2010).

Statistically, the results indicate that BI's independent variable has a significant impact on the dependent variable SF moderated by the KM variable. Theoretically, BI improves SF practices for future trends and decreases uncertainty (Nascimento *et al*., 2021; Fergnani, 2022; Hammouri & Altaher, 2020). Moreover, KM enhanced these practices (Brandtner & Mates, 2021; Rafiuddin *et al*., 2023; Charina, 2022; Nascimento *et al*., 2021).

The aim of this study was to test the impact of BI (OLAP, data mining, and data warehouse on SF (method sophistication, people & network, and organizations) through KM (generation, storage, and diffusion). The results show

that KM significantly mediates the impact of BI on SF. Therefore, the study concluded that BI is vital for SF.

3.6.4 Limitations and Suggestions For Future Research

The research suggests implementing data analysis methods and reports on the performance of the present organization over time to provide further operational solutions on its capacity for forward-looking analysis to better comprehend internal opportunities or dangers in the company. Also, the business needs a place to hold enormous volumes and simple access to data. Additionally, the data warehouses must include details about the company's external environment (suppliers and competitors). They provide comprehensive information to fulfill the beneficiaries' demands and assist stakeholders in reaching emergency response decisions. Finally, the study advises benchmarking performance, getting market information, and sharing knowledge with business partners. Systems for sharing information, looking for novel methods to complete tasks, and reacting to relevant technological activity and unanticipated rival moves should be in place at the organization. In the end, this study's concentration on the telecom industry makes it difficult to extrapolate its results to other kinds of industrial enterprises.

The limitations of this study are geographical, this study had limitations as it focused solely on three Jordanian companies (Umniah, Orange, and Zain). To obtain more comprehensive results, it would be beneficial to expand the study sample to include companies from other industries. Additionally, the findings of this research are specific to Jordan, and it is important to note that the results may vary in different countries.

Chapter 4: Adopting Business Intelligence towards Strategic Ambidexterity as Digital Marketing Matters

Abstract

To survive in a dynamic and fiercely competitive environment, companies are forced to simultaneously offer digital tools and solutions to thrive, although the literature indicates the value of business intelligence on companies, but no studies on how to combine business intelligence and digital marketing in improving strategic ambidexterity. The strategy of ambidexterity is crucial to accommodating long-term and structural environmental changes, drawing upon dynamic capabilities to retain their customers, provide the best services, and achieve sustainability. In this study, we examine the impact of business intelligence on strategic ambidexterity and analyze the moderator role of digital marketing in the relationship between them with qualitative data collected through surveys, from 3 companies of managerial levels in the telecom sector.

The study highlights the correlation between business intelligence and strategic ambidexterity, emphasizing the potential for organizations to differentiate themselves through service innovation initiatives. Integrating business intelligence at both strategic and operational levels is crucial for achieving service innovation. Additionally, the study identifies a significant relationship between digital marketing and strategic ambidexterity, suggesting that organizational ambidexterity is achievable through effective management of exploitation and exploration processes. Furthermore, the study underscores the importance of combining digital marketing activities and business intelligence for increased productivity and profit maximization.

Keywords: business intelligence, strategic ambidexterity, digital marketing, exploration, exploitation.

4.1 Introduction

The telecom sector is an essential driver of technological and entrepreneurial endeavors and plays a vital role in the growth of the national economy. Therefore, improving the performance and growth of telecom will significantly affect the economic development of the country (Emami *et al*., 2022). Environments have a major impact on businesses (Roehrich *et al*., 2019), therefore, additional study and analysis are required in this field to offer useful answers to problems relating to survival and expansion. Additionally, evidence emphasizes the numerous issues that telecom firms must overcome to thrive, including a lack of money, a shortage of resources, and inadequate networking capabilities (Pannone, 2001). Besides these challenges COVID-19 epidemic has had a major effect on a large scale of Jordanian companies; (Shraah *et al*., 2022; Lutfi *et al*., 2022; Atlam *et al*., 2022; Kutieshat & Farmanesh, 2022; Al-Gasawneh *et al*., 2022a) and in telecom companies particularly (Emami *et al*., 2022). As well, restrictions imposed by the COVID-19 pandemic have heightened fear of operational and performance vulnerabilities (Misra *et al*., 2022; Almajal *et al*., 2021). Resulting in the persistence of the COVID-19 pandemic has accelerated the unprecedented and large-scale digitization of modern society (Grover & Lyytinen, 2022; Almajali & Hammouri, 2021).

One of the methods that can assist organizations in transforming and increasing their resilience to resist major challenges and crises is Strategic Ambidexterity (SA) (Stokes et.al, 2019). So, companies must be flexible, and independent and experiment to compete in robust technologies and markets through efficiency, control, and incremental improvement (Birkinshaw & Gupta, 2013; Almajali *et al*., 2021). Huang *et al*., (2020) explain the importance of SA for

firms as a way to expand their product knowledge in the market by experimenting with new alternatives. On the other hand, exploitation enhances efficiency through existing routines and experiences, in general ambidexterity supports the quality, speed, flexibility, and costs of companies (Tamayo-Torres *et al*., 2017). In this context, SA is a strategic option for accessing and diversifying markets for many companies.

Also is an organization's ability to explore and exploit to compete in new technologies and markets that require flexibility, autonomy, and experimentation (Birkinshaw & Gupta, 2013; Hanandeh *et al*., 2023). Consequently, many businesses began to devise strategies that understand that applying Business Intelligence (BI) tools which are increasingly vital to the competitiveness of companies of all sizes, modern businesses are surrounded by data and use data science and have to solve various business issues (Cybulski & Scheepers, 2021). Another challenge encountered by marketing managers relates to the rapid digitalization that has revolutionized the marketing landscape. It is more challenging for marketers to draw clients through conventional marketing efforts since the media landscape has gotten more fragmented and media consumption patterns have changed to make more use of digital media (Webster & Ksiazek, 2012).

As a result, marketers need to come up with new, creative strategies to affect consumer behavior (Lingqvist, Plotkin, & Stanley, 2015). Moreover, Osmundsen and Bygstad (2022) confirmed the continuous development of digital infrastructure evolution and exploring ongoing development of Digital Marketing (DM) has significantly improved both usage and profitability (Tiago & Veríssimo, 2014) and led to a digital ecosystem connected with customers' behavior continuously (Mayer-Schönberger & Cukier, 2013).

March (1991) confirmed significant components to improve organizational performance and strengthen competitive advantage include learning, analysis, regeneration, and technological changes. Innovation ambidexterity positively impacts profitability-based company performance indicators (Jansen *et al*., 2006). Other studies highlighted the importance of a delicate trade-off between exploration and exploitation to prevent failure in underdeveloped ideas, competencies, and success traps (Junni *et al*., 2013; Jansen *et al*., 2006). Ambidexterity allows companies to develop unique capabilities and competencies by venturing into areas beyond the companies' existing knowledge base (Ferreira *et al*., 2020; Hammouri & Altaher, 2020). Also, innovation ambidexterity in responding quickly to changes in the business environment (Soto-Acosta & Martinez-Conesa, 2018). Exploration introduces companies to diverse market areas and product knowledge to contribute to new product development and market knowledge through exploitation (Huang *et al*., 2020; Ahmad *et al*., 2020).

Adding BI tools in different areas will be better for decision-making. According to the report that needs it, it provides an extra level of information to stakeholders and an integrated set of tools to convert data into knowledge to support decision-making. BI software provides the ability to monitor a business's performance and operation and assist business managers in developing competitive business strategies (Aruldoss *et al*., 2014). Also, Fast *et al*. (2021) link a company's access to big data and long-term competitive advantages in digital marketplaces.

Eidizadeh *et al*. (2017) mentioned that BI positively and significantly impacts knowledge sharing and gaining a competitive advantage. The companies must exploit opportunities for growth and development by increasing their market share

and expanding the business. (Foroudi *et al*., 2017). Big data analytics provides value by using the holistic dynamics of people, processes, and technologies to transform data for better decision-making and solutions to business problems to create a competitive advantage (Akter & Wamba 2016). Božič & Dimovski (2019) indicated a positive relationship between BI, innovation ambidexterity, and firm performance.

The advantage of DM, it is considered one of the modern methods that will improve the relationship between BI and SA by increasing the possibilities for faster experimentation with product or service offerings and improved performance predictability of new products or services (Božič & Dimovski, 2019). As Bhosale *et al*., (2020) indicated that BI tools would positively affect DM's performance by improving productivity and increasing gains. Levinthal & March (1993) confirmed the need to increase the exploration of digital technology and exploitation of marketing capabilities. As Mufadhol *et al*., (2020) showed that digital business applications could help facilitate customer service to market new products and services. Also, apply BI in digital advertising by creating reports that lead to more intelligent and cost-effective decision-making, then visualize results using Python to be more visually appealing (Mehanović & Durmić, 2022). And, DM impacts the SA in the technology sector, has a positive impact on data content infrastructure, the integration of customers with employees, and performance improvement (Tariq *et al*., 2022). Huang *et al*. (2020) indicated that SA is sufficient to produce superior new product performance.

Moreover, the results suggest that the dimensions of SA enhance recent product performance and deliver outstanding new product performance under the disorderly market environment. The field of electronic markets examines the many

social, economic, and societal effects that information technology has on business-customer interaction processes. Jansen & Volberda (2006) found that following exploratory innovation is more functional in dynamic environments, whereas exploitative innovation is more valuable to financial performance in competitive environments. Yu *et al*. (2016) identified that exploration and exploitation are essential in proactive and reactive environmental performance. Moreover, the effect of exploitation increases when technological dynamism is high, and the impact of exploration increases when the company is significant.

Further research recommends implementing BI which is beneficial for enhancing the likeliness of success in the performance of BI (El-Adaileh & Foster, 2019). Another study suggests further research on SA to reduce uncertainty and highlights areas of confusion, competition in mature technologies and markets through exploitation and exploration, where efficiency, control, and incremental improvement are valued, and competition in new technologies and markets where flexibility and independence experimentation are needed (O'Reilly III, Tushman, 2013). The importance of ambidexterity by identifying new opportunities and developing new strategies to exploit them, including the information that helps to know the market circumstances, and the organization can explore opportunities and identify threats for the exploration of new opportunities (Aljumah *et al*., 2021). Dabas & Manaktola (2021) recommend further research using technology and digital tools to reach customers and create value for them.

4.1.2 Research Question

This study mainly aims to answer two questions. First, Does BI impact SA? We focus on clarifying the positive effects of BI dimensions (OLAP, data mining, data warehouse) on SA dimensions (exploration and exploitation). Second, is there an impact of BI on SA in the presence of DM as a moderator variable? Identifying the positive effect of DM to increase the positivity of a relationship between BI impact SA.

This study highlights two gaps in BI and SA, DM literature. First, we explore the impact of BI on SA from a strategic perspective. Existing research emphasizes Ahmad & Akbar (2021) studying the effect of BI and ambidexterity on firm performance, Mehanović & Durmić (2022) studied BI on digital advertising but doesn't examine DM systems to improve the organizational ambidexterity (Tariq et at., 2022), or how the digital tools would be creating value to customers (Dabas & Manaktola, 2021). Moreover, Husien et.al, 2020 stressed that SA focuses further on some parts of it that have not yet been completely understood. Our study examines the relationship between BI and SA, as companies face a high level of environmental unpredictability for development and continuity because of the swift advancement of technology. This study is the first to adopt studying the relationship between BI and SA and considering DM as a moderator variable to enhance the effectiveness and continuity in Jordanian Telecom companies.

The second gap is because of the rapid advancement of technology improvement and openness of local markets to international competition, Jordanian enterprises must cope with a high degree of environmental changes, and due to rapid improvements in numerous fields, information regarding the internal and external environments of the business has quickly become increasingly

complex and renewable in Jordanian companies (Zraqat, 2019). So, each company should be aware of the importance of dynamic capabilities as companies have to adapt quickly to competition, so applying dynamic capabilities is one effective strategy to swiftly respond to rivalry and environmental changes (Barreto, 2010). Its advantages are providing a firm's competitive edge, especially during times of uncertain environments, and differentiating itself from the competitors (Eisenhardt and Martin, 2000; Schwarz *et al*., 2020). Dynamic capabilities include new capabilities to enhance efficiency and competitiveness and help managers acquire capabilities, transform the base, and integrate them to add value to the company. (Donbesuur *et al*., 2022).

This study differs from other research; it is based on previous studies, recommendations, and interview results on the presence of this competition within Jordanian telecom companies. We need to conduct additional research to examine the relationship between BI and SA, considering DM as a moderator variable to enhance the companies' continuity in Jordanian Telecom companies.

In the following section, literature is reviewed regarding BI, SA, and DM. This is followed by the methodological approach outlined, followed by the presentation and discussion of findings. Finally, theoretical and practical contributions and research limitations are presented.

4.2 Theoretical Framework and Hypothesis

In navigating the demands of a dynamic and highly competitive business landscape, companies find themselves compelled to not only embrace digital tools and solutions but also to thrive in this environment. While existing literature underscores the value of BI for companies, there is a notable absence of studies

exploring the synergies between BI and DM in the enhancement of strategic ambidexterity. This study seeks to fill this gap by investigating the impact of business intelligence on SA and, subsequently, unraveling the moderating role of digital marketing in this relationship.

The positive association between BI and digital marketing is pivotal, influencing both explorative and exploitative activities within organizations. This, in turn, contributes to heightened performance, increased competitiveness, elevated productivity, and the maximization of profits. Companies leveraging strategic ambidexterity effectively manage the delicate balance between exploitation and exploration processes, propelling them toward a future characterized by new technologies and markets. This study delves into these intricate dynamics, shedding light on how the convergence of BI and DM shapes SA, offering valuable insights for companies seeking to navigate the evolving landscape and secure a competitive edge.

4.2.1 Strategic Ambidexterity

SA emerges as a crucial element in navigating and accommodating long-term and structural environmental changes. By leveraging dynamic capabilities, organizations can not only retain their customer base but also excel in providing top-notch services. Achieving sustainability is key, and having access to resources that are rare, distinctive, and irreplaceable becomes a strategic advantage. This competitive edge, when sustained over time, contributes to improved overall performance (Schwarz *et al*., 2020). Teece and Pisano (1997) define dynamic capabilities as competencies and abilities that a business needs to develop new goods and adapt to changing market dynamics.

Markets effectively distribute resources to their optimum use, and enterprises should have the management skills to turn those resources into outputs that have the potential to add value over the long run. Thus, companies should work toward developing some degree of ambidexterity to handle the conflicts and inconsistencies between exploitation, and exploration (Birkinshaw & Gupta, 2013). SV was originally used by Duncan in 1976. However, in the field's groundbreaking work by March (1991), he mentioned that exploitation and exploration are two distinct learning processes that businesses should split. SA is the ability of an organization to explore and exploit to compete in sophisticated technologies and markets where efficiency, control, and incremental increase are valued, as well as to compete in new technologies and markets where flexibility, independence, and experimentation are required (O'Reilly III & Tushman, 2013).

Also, SA is the continuous search for harmony between the appropriate exploitation of present ones and the necessary exploration of new possibilities, this pursuit can be accomplished by employing contextual, structural, cyclical, or a mix of these approaches (Taródy, 2016). The ambidexterity perspective shares the exact characteristics of complexity and dynamism in that it combines exploitative and explorative activities. However, it is more concerned with routine optimization or change, indicating a firm's internal focus. As a result, the two methods focus on distinct aspects of the adaptive viewpoint; ambidexterity provides the ability to optimize this value proposition via exploitation or create new ones through exploration (Lapersonne *et al*., 2015).

Adopting an exploitative attitude implies that the organization possesses a thorough understanding of external possibilities and internal capabilities. Exploitative strategies thrive in well-established problem-solving frameworks, where challenges and solutions are clearly defined, resulting in minimal uncertainty

and a high success rate. This approach anticipates operating within known parameters, emphasizing efficiency and refinement (March 1991).

Conversely, exploratory business ventures into new enterprises or methods, present novel opportunities but often lead to early failures and temporary performance dips (March, 1991). The exploratory mindset involves a higher degree of uncertainty and a lower success rate, prompting organizations to focus efforts on initiatives that generate immediate value, sometimes at the expense of endeavors with less predictable outcomes (Chen, 2017).

In this context, exploitation is defined as involving refinement, efficiency, selection, and implementation, while exploration is characterized by search, variation, experimentation, and discovery (March 1991, p. 102). This distinction underscores the contrasting approaches organizations take in refining existing processes for efficiency and reliability versus venturing into uncharted territories in pursuit of innovative possibilities.

Balancing between exploration and exploitation is a significant difficulty that is especially difficult for smaller, emerging firms without the resources, talents, and experience required to adopt ambidexterity properly (Tamayo-Torres *et al*. 2017). These challenges are as follows: first, advanced strategies that incorporate product exploration with market exploration or product exploitation with market exploitation have on profits; second, cross-functional ambidexterity combining product exploitation with market exploration affects profits; third, product ambidexterity has positive impacts on profits for older and larger firms but not for medium and small firms; and fourth market ambidexterity has positive effects on profits for more prominent firms but not for medium and small or older firms (Voss & Voss, 2013).

4.2.2 Business Intelligence

BI systems have evolved since they initially emerged in the middle of the 1950s, structured data systems, frequently in the form of data warehouses that enable a variety of functions including reporting, data analysis, ad hoc query, and dashboards (Božič & Dimovski 2019), and the first use was 1985 (Luhn, 1958), Business intelligence was employed to enhance the effectiveness of the decision-making (Negash & Gray, 2008). Over time, other applications including data warehousing, data mining, and online analytical processing (OLAP) became significant (Negash & Gray, 2008; Wixom & Watson, 2010).

BI is defined as the technology, apps, and methods for collecting, storing, obtaining, and analyzing data to support users in making better decisions (Davenport *et al*., 2010). According to Olszak & Ziemba 2006 and Jourdan *et al*., 2007, BI has both organizational and technological components. From a technical perspective, BI refers to a collection of tools, technologies, and software platforms that work together to collect incompatible data from many sources, combine it, and then analyze it to make it accessible, from an organizational view, BI represents a comprehensive and sophisticated strategy for across organizational decision support (Isik *et al*., 2011; Zamil *et al*., 2021).

BI has been used in various fields to help decision-makers plan for the future, giving numerous levels of information to stakeholders based on their information needs and enabling top executives and stakeholders to create a competitive strategic plan. As Aruldoss *et al* (2014) defined the BI collecting data from various sources and then transforming raw data into information through people, processes, and analytical tools to make better decisions that will improve the company's or organization's performance perceptions of BI features like a relative advantage, complexity, interoperability, and observability are also crucial in

assuring BI success (Ahmad, 2015).

4.2.3 Impact of Business Intelligence on Strategic Ambidexterity

The application of BI has been used in various domains to make decisions or offer input. For example, it has been used to make better judgments in higher education, e-learning, strategy formulation, crime-fighting, finance, and other disciplines. The power of BI is integrating data at many levels, giving the relevant information for decision-making at the appropriate time (Aruldoss *et al*., 2014). The data created by corporate operations have expanded significantly due to the wave of informatization, pushing the intelligent evolution of enterprise warehousing systems. Using big data technology to create BI warehousing systems can encourage the rapid growth of BI warehousing systems**.** Data warehouses are databases designed to assist decision-makers in obtaining and evaluating meaningful information from diverse data sources (Bimonte *et al*., 2021). Data Warehouse is a collection of data oriented for a specific subject, incorporated, not variable, and has disparity time to support decision-making for the company's plans (Efendi & Krisanty, 2020; Gray & Watson, 1998).

The analysis of information network data covers several technological areas, among them OLAP (Online Analytical Processing) technologies. OLAP is a technology that enables multi-dimensional and multi-level analysis of a large volume of data, providing aggregated data visualizations with different perspectives (Queiroz-Sousa & Salgado, 2019). OLAP tools are primarily intended for interactive report production using user-defined criteria and for enhancing the searching of enormous data sets using generated SQL queries, they conduct intricate assessments of business performance, customer interactions, and profitability analysis (Olszak & Ziemba, 2006). Data mining is used in conjunction with machine learning, pattern

recognition, and knowledge extraction to refer to the automated/algorithmic processing of data to extract knowledge (Cao, 2018). A data mining approach searches and analyzes massive amounts of unstructured data to extract potentially usable information and model it (Zhang, 2020; Ahmad *et al*., 2022), Data mining is the process of exploring patterns, trends, consistencies, and standards in data sources (Kantardzic, 2002).

Ahmad (2015) indicates a relationship between BI and SA by using BI strategies that help to understand their internal and external environment through systematic acquisition, collation, analysis, interpretation, and exploitation of information in their business domains to support their organizational business goals for sustainable competitive advantage. Fink *et al*. (2017) highlighted the importance of BI and the ambidexterity of the companies that use BI both strategically and operationally to explore and exploit opportunities for creating service innovations that have the potential to impact organizational performance. The firms must install new business intelligence systems to analyze the changed data by doing a high level of exploring a new market and developing new products (Yan *et al*., 2021). Moreover, stored data warehouse enables future forecasting, trend spotting, customer behavior analysis, and competitor analysis, and also allows organizations to identify weaknesses, risks, and hidden opportunities and chances when they are effectively realized (Olszak & Ziemba, 2003).

That is why we can suggest the following:

Hypothesis 1: Business intelligence and its dimensions (OLAP, data mining, data warehouse) are positively related to strategic ambidexterity.

Based on the components of Business intelligence, the first main hypothesis divides into two sub-hypotheses:

Hypothesis 1.1. Business intelligence and its dimensions (OLAP, data mining, data warehouse) are positively related to exploration.

Hypothesis 1.2. Business intelligence and its dimensions (OLAP, data mining, data warehouse) are positively related to exploitation.

4.2.4 Digital Marketing

In recent years, the surge in Internet usage has prompted a thorough examination of DM from various perspectives. The Internet's profound impact on contemporary company interactions has reshaped how information is disseminated and significantly influenced marketing strategies, creating a dynamic landscape where companies compete in both traditional and virtual markets.

The definition of DM remains a subject of debate, with some asserting that there is no consensus on its elements (Ahmed, 2020). However, others propose the incorporation of the classic 4Ps (product, price, place, and promotion) (Kotler, 1994; Hunt & Morgan, 1995), amalgamated with the marketing mix and segmentation, targeting, and positioning (STP) strategies. Promotion encompasses a range of activities, including website utilization, email campaigns, social media marketing, online advertisements, and search engine advertising. Meanwhile, the analytical process of defining STP and creating an ideal product and price can be categorized as the remaining elements.

Arthur (1996) emphasizes the relatively low marginal costs of DM, highlighting its potential to expand and diversify markets. Broadly defined as the use of internet technologies or activities such as internet marketing, digital channels, platforms, e-commerce, social media, and mobile marketing (Hammouri *et al*., 2021; Pandey & Rathore, 2020; Rabaai *et al*., 2022; Hammouri *et al*., 2022), DM is viewed as a method to establish and sustain client connections through online interactions. This involves promoting the exchange of ideas, goods, and services,

ultimately generating, delivering, trading, and promoting services aligned with the needs of both consumers and sellers (Imber and Betsy-Ann, 2000; Wilkie & Moore, 2007).

One of the core objectives of DM is to comprehend how customers utilize new technologies, leveraging this understanding to enhance engagement with target customers more efficiently (Peter & Lindeque, 2020). The escalating use of digital technology has not only spurred significant studies but also practical considerations. Evaluating companies' maturity, strengths, and weaknesses in the realm of DM becomes a valuable tool for competitive analysis. Crucially, technology plays a pivotal role in enhancing transactions, providing customer services, and streamlining operational processes (Misra *et al*., 2022). The driving forces behind digital transformation include new technologies, digital business development, supported by digital leadership and culture, data, customers, and, notably, Digital Marketing (Peter & Lindeque, 2020; Nusairat *et al*., 2021).

4.2.5 Moderating the Role of Digital Marketing on the Relationship between Business Intelligence and Strategic Ambidexterity

Businesses have to rapidly adapt to the highly competitive business environment. The use of dynamic capability is one suitable strategy to rapidly deal with competition and environmental changes (Teece *et al*., 1997; Barreto, 2010). Where digital transformation affects marketing and sales, thus the overall organizational performance (Hauer *et al*., 2021; Al-Gasawneh *et al*., 2022b). Ritz & McQuitty (2019) highlighted that the way marketers engage with today’s consumers has been revolutionized by digital; a significant proportion of the world’s customers possess and utilize computers and mobile devices, which adds to the explosive development of digital ad expenditure. To adapt to changing market

conditions the business must be able to integrate, expand, and reconfigure internal and external competencies as well as generate, extend, or alter its resource base (Helfat *et al*., 2007; Mohammad *et al*., 2021), this capability routine company can gain new resources by modifying its operational procedures to attain effectiveness in a systematic way (Zollo & Winter, 2002).

The role of DM brought trends to shift and companies can see emerging a chance to grow their markets as a result of the changes in business environments (ABI & Arief, 2017), by increasing revenue, improving communication, and improving customer service (Cowley *et al*., 2021). Bhosale *et al*., (2020) indicated data has more value in administration, it is critical to route every corporate effort through a logical channel to reasonably measure and expect results; as a result, BI will improve the situation through DM. BI is a collection of technologies, architectures, individuals, processes, and methodologies that convert raw data into valuable business information that is used in marketing reporting, online analytical processing, analytics (past and forecasting), data, and text mining (Stone & Woodcock, 2014).

In order to assist businesses in taking advantage of the benefits of DM without wasting money or time, BI will assist businesses in making intelligent decisions in DM without wasting extra resources. (Mehanović & Durmić, 2022), because DM's strategies depend on the business model within the big data environment (Johnson *et al*., 2019; Ahmad *et al*., 2023). Tilak (2020) stated BI assists in identifying customer needs and values, which is useful when designing campaigns of marketing. Also, BI helps marketing in improving quality and generating real-time reports to analyze customer behavior and identify customized targeting. Stone & Woodcock (2014) suggested that companies need to pay close attention to BI, as self-service, because BI is increasingly used by customers.

Talaoui and Kohtamäki (2020) encourage researchers to adopt a comprehensive view of BI. Mehanović and Durmić (2022) confirmed the relationship between BI and DM and the role of the web in communication and sales channels by using tabular reports and Python and the study recommends future research to analyze traffic data such as keywords and topics.

A comprehensive approach to operations, consumer engagement, and supplier relationships is encapsulated in technology infrastructure, aiming to elevate the quality of decision-making, organizational image, and service delivery (Wells & Hess, 2002; Nusairat *et al*., 2021). Despite the significance of this approach, there is a lack of convention in the demonstration of organizational ambidexterity activities, encompassing both the exploration and exploitation of opportunities (Tariq *et al*., 2022), thus the new technology of DM will improve exploration and exploitation practices (Marchese & Dollar, 2015; Montealegre *et al*., 2019) indicated a strong relationship between the in-between exploration and exploitation activities and the evolution of digital infrastructure

Akesson *et al*. (2018), considers ambidexterity as a way for the organization to adapt strategic goals toward the available technology; also, organizational ambidexterity is a future state of new technology and new markets through management of exploitation and exploration.

Josephson *et al*., (2016) indicated the importance of combining the exploitation of current competencies and the exploration of future potential in marketing activities. Ambidexterity includes how a company configures its present capabilities in light of its available resources and competencies (exploitation), as well as how it develops its potential future abilities (exploration) (Cenamor *et al*., 2019). Exploitation, in the context of marketing, refers to the process of extracting value from opportunities and solutions found in present marketing opportunities,

marketing-based exploitation frequently requires advertising and promotion techniques (Reinartz *et al*., 2005).

Exploration, on the other hand, focuses on developing products and solutions to address anticipated market demands. The market search entails experimentation, as well as the generation of new opportunities and knowledge (Vorhies *et al*., 2011). Tariq et at. (2022) highlighted a positive relationship between DM capabilities and organizational ambidexterity in the information technology sector. It also recommends that managers realize their firm work procedures through DM systems to improve their organizational ambidexterity and enhance performance.

That is why we can suggest the following:

Hypothesis 2: Digital Marketing moderates the relationship between business intelligence and strategic ambidexterity.

Hypothesis 2.1. Business intelligence and its dimensions (OLAP, data mining, data warehouse) are positively related to the exploration of the exit of digital marketing as a moderator variable.

Hypothesis 2.2. Business intelligence and its dimensions (OLAP, data mining, data warehouse) are positively related to exploitation in the exit of digital marketing as a moderator variable.

Now we can suggest the next theoretical model:

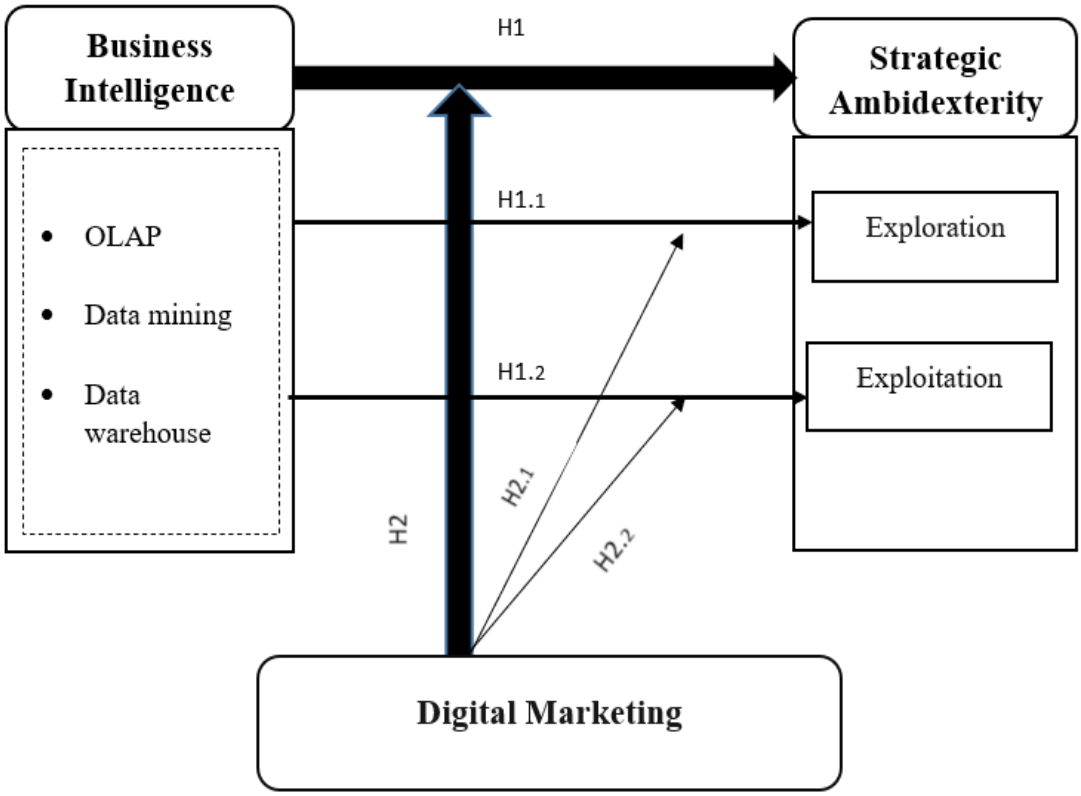


Figure 4.1: The study's Model

The model of this study is based on many previous literature reviews. Figure 4.1 shows the moderation of DM on the effect of BI on SA in Telecom Jordanian industries. The measurements of all the constructs were adopted from the previous studies.

4. Methodology

This section outlines the steps involved in administering the research instrument and ways of analyzing the results. The author targets the telecom sample and population for this research as follows:

4.1 Sample and Procedure

The present study utilized a random, stratified, and proportional sampling method based on job titles. The sample comprises employees holding positions such as directors, general managers, team leaders, experts, and seniors within Jordanian telecom companies. The sample size is 350 individuals. The selection of these strata was deliberate to ensure a representative depiction of the community, given the diverse responsibilities these roles entail, encompassing both internal and external organizational aspects, and active involvement in decision-making processes. Population stratification was carried out according to job titles, as detailed in Table 4.1, and specific samples were drawn from each telecom company, as indicated in Table 4.2. The sample, extracted randomly from each stratum, effectively mirrors its broader community, allowing for the generalizability of results (Sekaran & Bougie, 2016). Data collection involved managerial employees occupying various roles, including directors, general managers, team leaders, experts, and seniors, across three telecom companies in Jordan (Orange, Umniah, and Zain).

The researcher personally distributed the questionnaire to the designated sample via both physical distribution and email. Out of the distributed questionnaires, 350 were obtained, with 307 deemed valid for statistical analysis,

resulting in a response rate of 87.7% after excluding 43 incomplete submissions. The positions and corresponding employee numbers in the three companies are detailed in Table 4.3, with a uniform sample size of 350 employees drawn from each position, and 307 surveys were considered for analysis. The study employed two primary sources for data collection. Secondary sources encompassed documentary materials such as books, articles, periodicals, university theses, and publications relevant to the study's subject. Primary data collection involved an interview to identify the study's problem, featuring open-ended questions on the three variables under investigation. Additionally, a meticulously designed questionnaire was utilized to align with the study's objectives, research questions, and the specific focus of inquiry, aiming to gather comprehensive data and information across all aspects addressed by the study.

Primary data collection involved conducting interviews to identify the study's problem, featuring a set of open-ended questions covering the three study variables. Additionally, a meticulously designed questionnaire was used, aligning with the study's objectives, research questions, and the specific subject of investigation. This questionnaire aimed to gather pertinent data and information across all aspects addressed by the study.

Table 4.1: Study population

Company	Employees number
Umniah	1143
Zain	1055
Orange	1687
Total	3885

Table 4.2: Sample size from each telecom company

Company	Sample calculation	Sample by company
Umniah	1143/3885=0.294*350=103	103
Zain	1055/3885=0.272*350=95	95
Orange	1687/3885=0.434*350=152	152
Total	350	350

The population has been categorized into groups based on job titles, as indicated by the figures in Table 4.2. The sample corresponds to each telecom company mentioned in the preceding table, with a random selection taken from each category.

The positions and employee counts for each role across the three companies are presented in Table 4.3. The sample size for each position is 350 employees, and the surveys considered for analysis amount to 307.

Table 4.3: Sample size from each company according to the job title

Position	Total Employees	Sample per position	The Sample	Analysis samples
Director	144	144/3885=.0371*350=13	13	12
General Manager	355	355/3885=.0914*350=32	32	26
Team leader	711	711/3885=0.183*350=64	64	50
Expert	1110	1110/3885=0.286*350=100	100	79
Senior	1565	1565/3885=0.403*350=141	141	140
Total population	3885	350	350	307

The sample was drawn from each position in each company in the table below.

Table 4.4: Sample size from companies

Position	Zain company's sample	Umniah company's sample	Zain company's sample
Director	4	4	5
General manager	9	9	14
Team leader	17	19	28
Expert	27	29	44
Senior	38	42	61
Total	95	103	152

4.2 Measures

The survey questionnaire was administered to employees in the upper and middle administrative levels of Jordanian telecom companies. The measurement scales used in the questionnaire were adapted from previous literature were adapted to capture the research variables. Particularly, BI was assessed using three dimensions, including Data warehouse, Data mining, and OLAP, and a total of 15 items were borrowed from different studies (Kok, 2006), to cover the aforementioned dimensions. SF was evaluated using 10 items related equally to Risk-taking and proactive adapted from (Mom et al., 2007). Finally, DM was operationalized using 5 items which were adapted from Järvinen (2016). The questionnaire was translated by back-translating technique, which involved two business professors proficient in both languages (English & Arabic), refer to appendix (C).

All items were rated on a seven-point Likert scale, with 1 indicating strongly agree and 5 indicating strongly disagree. The score for each variable was calculated by averaging the responses of the corresponding items. Prior to the main survey, the questionnaire underwent a pre-testing phase, where academic experts and company experts examine it to ensure its face validity.

4.3 Analysis and Results

Data analysis was analyzed using SPSS version (23) software programs, CA, and testing the research hypotheses were used to check for model validation and reliability. SPSS was used to evaluate: means, standard deviations, skewness, and kurtosis in addition to the frequencies and percentages pertaining sample's description and testing the research hypothesis.

Table 4.5 is the description of the sample's essential demographic characteristics:

Table 4.5: Demographic characteristics of the sample

Variable	Category	Count	%
Gender	Female	120	39.1
	Male	187	60.9
	Total	307	100
Age	less than 30	32	10.4
	30 to less than 35	105	34.2
	35 to less than 40	104	33.9
	40 to less than 45	54	17.6
	more than 45	12	3.9
	Total	307	100
Educational level	Bachelor	228	74.3
	Diploma	8	2.6
	Higher Diploma	12	3.9
	Masters	57	18.6
	Ph.D.	2	.7
	Total	307	100
Nature of work	Director of department or unit	12	3.9
	Expert in the department	79	25.7
	General Manager/ Assistant General Manager	26	8.5
	Seiner of the department	140	45.6
	Team leaders of the department	50	16.3
	Total	307	100
Experience	less than five years	97	31.6
	Five years to less than ten years	148	48.2
	Ten years to less than fifteen years	36	11.7
	more than fifteen years	26	8.5
	Total	307	100

Consistent reliability for each scale and subscale was checked using the Cronbach method. Table 4.6 indicates the reliability analysis using the Cronbach alpha method. After inspecting the results, it can be seen that the mentioned reliability reflected high-reliability levels noting that the minimum achieved value was assigned to the data warehouse subscale 0.692.

Table 4.6: The results of reliability analysis using the method of CA

Sub-Factor	No. of indicators	CA.
Data warehouse	5	0.692
Data mining	5	0.915
OLAP	5	0.772
Business Intelligence	15	0.701
Exploration	5	0.700
Exploitation	5	0.700
Strategic ambidexterity	10	0.883
Digital Marketing	5	0.763

Table 4.7 indicates the values of means and standard deviation means, standard deviations normality, and multi-collinearity indicators factors. The normality was examined by the skewness and kurtosis indicators; the values of skewness ranged between -1.61 to -0.25; these results suggest an approximate normal data distribution as the values lay within the range -3 to +3. The kurtosis indicator maximum value being observed was 4.74 in BI; this value was less than the critical value of 8, so the values reflected no concern about normality issues. (Hair *et al*., 2010; Kline, 2005).

Table 4.7: Means, standard deviations normality, and multi-collinearity indicators

Sub Factor	Means	S. D	Skewness	Kurtosis	Multi collinearity	
					VIF	Tolerance
Data Warehouse	3.68	0.60	-1.18	2.43	1.468	.681
Data Mining	3.07	0.97	-0.26	-1.25	1.199	.834
OLAP	3.41	0.71	-0.49	0.11	1.652	.605
Business Intelligence	3.39	0.44	-1.61	4.74	-	-
Digital Marketing	3.96	0.37	-0.24	1.67	1.280	.781
Exploration	4.00	0.47	-0.25	0.55	1.124	0.890
Exploitation	3.84	0.51	-0.60	1.97	1.124	0.890
Strategic Ambidexterity	3.92	0.40	-0.28	1.24	-	-

The collinearity was checked using the VIF (variance inflation factor) and tolerance of the reciprocal of VIF. Generally, multi-collinearity is the degree of linear association among the predictors. It is assumed to have a minimum degree of association of less than 10 (Brace, Kemp, & Snelgar, 2003). As can be noticed, the maximum value of VIF was 1.468 for the Data warehouse, which was less than 10; in the same context, this value corresponds to a tolerance value of 0.681, such that this obtained tolerance value was >0.05 concluding no multicanonicity issues can be related to the data (Brace *et al*., 2003; Diamantopoulos & Siguaw, 2000).

Table 4.8: Correlations among the construct variables

	Data warehouse	Data mining	OLAP	Exploration	Exploitation	Business Intelligence	Digital Marketing
Data Warehouse	1						
Data Mining	-.116*	1					
OLAP	.560**	-.284**	1				
Exploration	.114*	-.020	.174**	1			
Exploitation	.095	-.031	.066	.489**	1		
Business Intelligence	.667**	.529**	.580**	.130*	.055	1	.
Digital Marketing	.244**	-.370**	.374**	.136*	.112	.039	1
Strategic Ambidexterity	.121*	-.029	.137*	.854**	.872**	.106	.143*

Table 4.8 presents the magnitudes of correlation among the research variables. A general look at the figures declares that the correlations are not high, except between exploration 0.845 and SA and exploitation and SA 0.872, which reflects reasonable since they must be strongly related to ambidexterity. The other correlation values did not exceed the ceiling value 0.80. These results support clothe linearity diagnosis in the preceded table.

4.4.1 Results of Testing the First Main Hypothesis

According to the results provided in table 4.9, the impact value of BI on SA was expressed by the standardized beta coefficient 0.240. This impact value was considered statistically significant as the corresponding probability value (0.000) was <0.05. Consequently, the first main hypothesis was accepted. According to the results provided in Table 4.9, the impact value of BI on exploitation was expressed by the standardized beta coefficient 0.256. This impact value was considered statistically significant as the corresponding probability value (0.000) was <0.05.

Table 4.9: Standardized impact values effects with the statistical significance relevance

Hypothese		Impact statistics				Model's indicators		
		β	Se	T	Prob	R2	F	Prob
H1	BI ---> SA	0.240	0.050	4.31	0.000	0.057	18.59	0.000
H1.1	BI---> Exploration	0.130	0.060	2.29	0.023	0.017	5.25	0.023
H1.2	BI---> Exploitation	0.256	0.063	4.62	0.000	0.066	21.41	0.000

The second hypothesis was tested using Process macro suggested by Andrew Hays (version 3.5) and provided under SPSS software (version 23).

4.4.2 Results of testing the second main hypothesis

According to the results provided in Table 4.10, the moderation effect value of DM on SA was assessed by the beta coefficient of 0.366. This value was considered statistically significant as the corresponding probability value (0.000) was <0.05.

Table 4.10: Moderation effect of DM on the relationship between BI and SA

Impact statistics					Model's R^2 Statistics			
Direction	β	Se	T	prob	Model's R^2	ΔR^2	F	Prob
BI ---> SA	-1.236	0.375	-3.29	0.001	0.1261	0.00436	15.12	0.000
DM ---> SA	-1.005	0.307	-3.27	0.001				
Moderation effect on SA	0.366	0.094	3.88	0.000				

Further, the results illustrate that an increase in R^2 of about 0.00436 had been achieved. The model's R^2 was 0.1261. This increase was due to adding the moderator variable DM and the moderation effect interaction between DM and BI

This increased amount of R^2 was subjected to statistical significance using f statistics. The results informed that this increase ΔR^2 was considered to be statistically significant as the probability of the f test (0.000) was < 0.05. It is clear that the effect of the moderator had increased the impact of the magnitude of BI on the SA, and it converted the impact direction from negative to positive.

Consequently, the second main hypothesis was accepted.

According to the results submitted in Table 4.11, the relationship between BI and exploration was moderated by DM This moderation was expressed by the beta coefficient 0.300. This value was considered statistically significant as the corresponding probability value 0.009 was < 0.05.

Table 4.11: Moderation effect of DM on the relationship between BI and strategic exploration

Impact statistics					**Model's R^2 statistics**			
Direction	**β**	**Se**	**t**	**Prob**	**Model's R^2**	**ΔR^2**	**F**	**Prob**
BI ---> SA	-1.052	0.458	-2.29	0.022	0.2353	0.00212	7.99	0.009
DM ---> SA	-0.787	0.375	-2.12	0.034				
Moderation Effect on Exploration	0.300	0.115	2.60	0.009				

Furthermore, the results demonstrate that an increase in R^2 of about 0.00212 was revealed. The model's R^2 was 0.2353. It can be assumed and justified that this increase was due to adding the moderator variable DM and the moderation effect interaction between DM and BI This increased amount of R^2 was subjected to statistical significance using F statistics. The results depicted that this increase ΔR^2 was considered to be statistically significant as the probability of the F test 0.009 was <0.05. It was clear that the effect of the moderator had increased the impact of the magnitude of BI on strategic exploration, and it converted the impact

direction from negative to positive. Based on this result, the first sub-main of the second hypothesis was accepted.

The results presented in table 4.12 show the relationship between BI and exploitation, and how DM moderates this relationship. The moderation magnitude was expressed by the beta coefficient 0.433. This value was considered statistically significant as the corresponding probability value (0.000) was < 0.05.

Table 4.12: Moderation effect of DM on the relationship between BI and strategic exploitation

Impact statistics					**Model's R^2 statistics**			
Direction	**B**	**SE**	**t**	**prob**	**Model's R^2**	**ΔR^2**	**F**	**Prob**
BI ---> SA	-1.419	0.479	-2.95	0.003	0.1192	0.00374	0.000	0.000
DM ---> SA	-1.213	0.393	-3.08	0.002				
Moderation effect on Exploitation	0.433	0.120	3.58	0.000				

Furthermore, the results illustrate that an increase in R^2 of about 0.00374 was revealed. The model's R^2 was 0.1192. It can be justified that this increase was because of adding the moderator variable DM and the moderation effect interaction between DM and BI This increased magnitude of R^2 was tested for statistical significance using F statistics. The results indicated that this increase ΔR^2 was considered to be statistically significant as the probability of the F test (0.000) was < 0.05. It was clear that the effect of the moderator had increased the impact magnitude of BI on strategic exploration, and it converted the impact direction from negative to positive. Based on this result, the second sub-main of the second hypothesis was accepted.

4.5 Discussions

This study is considered a causal study, and a descriptive analytical approach was used to investigate DM's moderating role on the effect of BI on SA In a comparative study among Jordanian telecom companies, the study sample included 350 employees (directors, general managers, team leaders, experts, and seniors), and the population was 3885.

The discussion part of the academic results indicates that the first main hypothesis was accepted. The results of testing the first main hypothesis showed that there was a statistically significant impact of BI on SA and exploitation. The impact value of BI on SA was expressed by the standardized beta coefficient, which was 0.240. Similarly, the impact value of BI on exploitation was expressed by the standardized beta coefficient, which was 0.256. The corresponding probability value was less than 0.05, which indicated statistical significance.

The second main hypothesis was also accepted. The results showed that the relationship between B. and SA was moderated by DM The moderation effect was expressed by the beta coefficient, which was 0.366. This value was considered statistically significant as the corresponding probability value was less than 0.05. An increase in R^2 of about 0.00436 had been achieved, and this increase was statistically significant as the probability of the f-test was less than 0.05. It was observed that the effect of the moderator had increased the impact of the magnitude of BI on the SA, and it converted the impact direction from negative to positive.

Furthermore, the results showed that the relationship between BI and strategic exploration was moderated by DM The moderation effect was expressed by the beta coefficient, which was 0.300. This value was considered statistically significant as the corresponding probability value was less than 0.05. An increase in R^2 of about 0.00212 was revealed, and this increase was statistically significant as the probability of the F test was less than 0.05. The effect of the moderator increased the impact of the magnitude of BI on strategic exploration and converted the impact direction from negative to positive.

Finally, the results showed that the relationship between BI and exploitation was moderated by DM The moderation effect was expressed by the beta coefficient, which was 0.433. This value was considered statistically significant as the corresponding probability value was less than 0.05. An increase in R^2 of about 0.00374 was revealed, and this increase was statistically significant as the probability of the F test was less than 0.05. The effect of the moderator increased the impact of the magnitude of BI on exploitation and converted the impact direction from negative to positive.

In summary, the results of this study indicate that BI has a significant impact on SA. The results also suggest that DM moderates the relationship between BI and SA, strategic exploration, and exploitation. The findings indicate that DM enhances the positive impact of BI on these variables. This study contributes to the existing literature by shedding light on the moderating effect of DM on the relationship between BI and SV.

4.6 Implications, Conclusions, and Limitations

4.6.1 Theoretical Implications

This study, designed as a causal and comparative investigation within Jordanian telecom companies, unfolds significant theoretical insights. By adopting a descriptive-analytical approach, the study probes the moderating role of DM on the influence of BI on SA. The theoretical underpinnings advance the understanding of the interplay between BI, DM, and SA, particularly in a comparative context. It delves into the nuanced dynamics and reveals pivotal relationships that contribute to the broader discourse on organizational adaptability and decision-making effectiveness.

The study's exploration of the first main hypothesis enriches theoretical frameworks by confirming a statistically significant impact of BI on SA and exploitation. The standardized beta coefficients elucidate the magnitude of this impact, offering insights into the intricate dynamics. Moreover, the study delves into the second main hypothesis, unraveling how DM moderates the relationship between BI and SA, strategic exploration, and exploitation. The observed shifts from negative to positive impact directions, under the influence of the moderator, provide theoretical nuances to the understanding of decision-making dynamics within organizations.

As the study navigates through the exploration of research questions, it establishes theoretical links between BI and SA dimensions, emphasizing the significance of strategic exploitation over exploration in the telecom industry. The findings contribute to the strategic discourse by delineating the importance of DM in shaping organizational agility, emphasizing its positive impact on content infrastructure, customer integration, and overall performance enhancement.

Furthermore, the study theorizes the role of DM as a crucial moderator, enhancing the impact of BI dimensions (OLAP, data mining, data warehouse) on SA The theoretical implications suggest that DM, as a moderating force, facilitates adaptive strategic goal alignment, thereby influencing the exploitation and exploration processes. This theoretical framework elucidates the potential of DM technologies in amplifying BI performance, fostering productivity, and augmenting organizational profits.

The study contributes significantly to theoretical perspectives by unveiling the intricate relationships between BI, DM, and SA in the context of Jordanian telecom companies. The nuanced findings add layers to existing theories, offering theoretical foundations for comprehending the multifaceted nature of decision-making and strategic adaptability within organizations.

4.6.2 Practical Implications

The practical contribution of the study is twofold. First, the application of BI has been used in various domains to make decisions or to offer input to decision-

making. For example, it has been utilized in higher education, e-learning, strategy formulation, crime-fighting, finance, and other disciplines to make better judgments. The power of BI It lies in its ability to integrate data at multiple levels and provide relevant information for decision-making at the appropriate time (Aruldoss *et al*., 2014).

Second, the study highlights the importance of organizational ambidexterity (O'Reilly III & Tushman, 2013) in exploring and exploiting opportunities to compete in sophisticated technologies and markets where efficiency, control, and incremental increase are valued, as well as in new technologies and markets where flexibility, independence, and experimentation are required.

4.6.3 Conclusions

Two research questions were explored in this study. The first question sought to determine whether there is a relationship between BI and SA with its dimensions (OLAP, data mining, data warehouse). The findings showed a significant relationship between BI and SA and revealed that BI seeks and exploits opportunities for producing service innovations that have the potential to enhance organizational performance. Strategic exploitation was found to be more important than strategic exploration for the telecom company in this study.

The second research question analyzed whether DM has an impact on SA. TheSA The study found a significant relationship between DM and SA and highlighted the positive impact of DM on content infrastructure, customer integration with workers, and performance enhancement. The study also

emphasized the importance of developing both exploitation and exploration to improve marketing skills. Companies that are ambidextrous in terms of DM exploration and exploitation are likely to have a competitive advantage over those that are not.

The study showed that DM plays an important role as a moderator in the impact of the dimensions of BI (OLAP, data mining, data warehouse) on SA. DM improves ambidexterity by enabling organizations to adapt strategic goals to accessible technology and to manage the exploitation and exploration process. DM technologies can also enhance BI's performance, boost productivity, and increase profits. By leveraging BI technologies, organizations can make better decisions in DM without wasting additional resources.

Overall, the study suggests that companies should focus on developing both exploitation and exploration to improve marketing skills and gain a competitive advantage in the market. Additionally, companies should leverage BI technologies to enhance their DM capabilities and improve organizational performance.

The findings indicate that Jordanian telecom companies can enhance their use of BI by developing models and tools that predict customer behavior and align strategic planning with changing business environments. The availability of data analysis systems is crucial for reflecting current company performance. Additionally, exploring new products, services, processes, or markets is essential for growth and continuity, and exploitation can improve the learning experience required to keep up with the latest technology and improve current work.

Companies must measure the results of DM's analytical tools to improve decision-making and plan for the company's future.

4.6.4 Limitations and Suggestions For Future Research

The study recommends that companies strategically and operationally use BI and ambidexterity to explore and exploit opportunities for creating service innovations, improve organizational performance, and use DM to strengthen competitive advantage through learning, analysis, regeneration, and technological changes. It is worth noting that DM is fast-changing, and everything surrounding the term needs to be flexible and adaptable to the customer's needs. Ambidexterity helps companies to be flexible and is an excellent way to get new processes or improve existing ones. The research shows the managers how they can achieve competitive advantage through the implementation of BI and the influence of some of its dimensions.

As a final step, it is essential to explain the limitations of this research. This study was designed to be applied to the top, middle, and supervision levels in telecom companies. However, generalizing the results to other industrial or service companies may be difficult. The study was applied in Jordan, and its results depend on the responsiveness of the individual samples and their objectivity.

Chapter 5: Conclusion

In summary, this comprehensive discussion and conclusion encompass multiple facets of the telecom industry in Jordan and its critical role in the country's economic development. It highlights the challenges faced by telecom businesses, especially in the context of the COVID-19 pandemic, aiming to address existing gaps in telecom we examine variables to improve their performance, growth, and long-term sustainability.

The study intricately examines the dynamics of SV, EO, and TI within the Jordanian telecom sector, aiming to address the mediating role of TI in enhancing the operational effectiveness of these companies. The empirical evidence strongly supports the research hypotheses, highlighting the pivotal significance of SV and TI in amplifying EO and overall firm performance. The explore advocates for strategic investments in SV by telecom companies, enabling them to flexibly detect internal and external signals, thereby maintaining competitiveness and improving overall performance. Practical implications extend to stressing the pivotal role of SV in acquiring new technologies and knowledge, while also emphasizing EO's contribution to fostering innovation, agility, and competitiveness. Additionally, a call is made for fostering a culture of curiosity and openness as a strategic approach to navigating uncertainties effectively.

SV is crucial for maintaining competitiveness and identifying early signals of threats and opportunities. TI is essential for growth and expansion. Entrepreneurs in less developed economies can benefit from adopting successful practices, facilitated by EO. SV helps organizations gain a favorable market position. The research addresses gaps in SV and EO literature in Jordan's telecom sector, proposing TI as a mediator to enhance effectiveness. The research provides insights

into leveraging SV, EO, and TI for sustainable growth.

The results highlight the significant impact of both SV and TI on EO. The nuanced findings regarding the specific dimensions of SV's impact on EO underscore the complexity of these relationships. Additionally, the confirmed moderating role of Technological Innovation emphasizes its importance in enhancing the connection between SV and EO. These insights provide valuable practical implications for stakeholders involved in organizational strategy and innovation.

In the twenty-first century's unstable environments, firms must develop competencies to adapt to customers' needs. SV positively influences TI, highlighting its importance for telecom companies. The exploration, a causal and descriptive-analytical approach, investigates TI's mediating role in SV's impact on EO in Jordanian telecom companies (Orange, Umniah, Zain). Telecom companies face adaptability and competition challenges, necessitating vigilance. Adopting SV is a competitive advantage, reducing environmental risks. Companies must be proactive, adopt planned risks, and analyze the organizational environment.

Jordanian telecom companies can enhance EO through inclusive environments that encourage innovation. SV's lack of impact on EO proactiveness indicates caution in being the first mover due to intense competition. Adaptation to changes, improvement of products and services, flexible strategies, and continual assessment are crucial. The detective work emphasizes leadership in TI and a five-year investment plan.

The research highlights EO and SV's importance in crises like the COVID-19 pandemic. TI is vital for telecom companies in Jordan to expand and compete. Environmental and structural factors impact firm performance. Nurturing a culture of curiosity, openness, and tolerance for ambiguity fosters vigilance.

Entrepreneurship generates opportunities for economic growth. Telecom companies can benefit from adopting SV and EO for long-term success, filling literature gaps.

SV plays a crucial role in acquiring technologies, enhancing competitiveness, and improving production methods. EO significantly influences firm performance. Companies should focus on SV, understand influential factors shaping EO, and make informed decisions. Telecom companies should prioritize competitive vigilance, adopt EO during crises, and invest in TI. SV investment provides flexibility in anticipating threats and opportunities. Adopting EO, SV, and TI enhances growth, expands markets, and protects against threats.

The suggestion hiring committees with SV expertise and providing necessary resources. SV and innovative technology are crucial for EO, supporting service practices, customer retention, sustainability, and continuity. Proactiveness is critical for an EO. Limitations include the focus on telecom companies in Jordan, potentially limiting generalizability. Participant responsiveness impacts research outcomes. Future research should diversify the sample population for broader applicability and enhance result reliability.

The research explores the integration of BI, SF, and KM in the context of the Jordanian telecommunications sector. Results indicate a significant influence of BI on SF, supporting the Theory of Effective Use (TEU). The integration enhances organizational capacity to comprehend present circumstances, identify risks and opportunities, and make informed decisions. KM moderates the relationship between BI and SF, emphasizing the strategic value of internal resources and knowledge for competitive advantage. The research aligns with established theories and emphasizes the correlation between BI and SF for effective planning.

Transitioning to the examination of BI, SF, and KM, and their interconnected dynamics within the Jordanian telecommunications sector, the analysis underlines the mediating role of KM in the impact of BI on SF. The conclusion accentuates the indispensable role of BI in facilitating SF within organizations and underscores the practical contributions of SF and KM in enhancing organizational adaptability, innovation, and problem-solving. The research emphasizes that SF enables organizations to enhance awareness of potential dangers, fostering effective emergency preparedness and resilience strategies. Additionally, KM plays a crucial role in fostering employee development, organizational agility, innovation, and improved business processes.

Hypothesis testing supports the impact of BI on SF in telecom companies. BI's focus on historical and real-time data complements SF's proactive approach to predicting future changes. Integrating BI and SF enhances an organization’s understanding of the present, recognition of potential risks and opportunities, and facilitates well-informed decisions for long-term objectives. KM significantly moderates the impact of BI on SF, underlining the importance of internal resources for future trend engagement and competitive advantage.

The analysis contributes theoretically by exploring the dynamics between BI, KM, and SF in the Jordanian telecom sector. It integrates these components, highlighting KM's moderating role, and enriches existing frameworks. The alignment with established theories emphasizes the need for integrating BI and SF in the data-driven decision-making landscape. The examination provides a robust foundation for understanding the symbiotic relationship between these critical elements.

Practically, SF enhances organizations' awareness of potential dangers and fosters adaptability. KM contributes to employee expansion, organizational agility,

innovation, and knowledge sharing. BI, as part of KM, enhances business competitiveness. Firms need to consider emerging challenges, trends, and technologies by employing mathematical forecasting and developing scenarios. SF establishes a strategic framework for organizational planning, while BI assists in identifying consumer habits and trends. Preventing inappropriate technology usage is crucial, emphasizing the importance of foresight, knowledge management, and BI in shaping organizational strategies.

Limitations include a focus on the telecom industry, and limiting generalizability. Future research could expand the sample to include companies from other industries. The geographical focus on Jordanian companies may limit applicability to other countries. Suggestions for future research include implementing data analysis methods, benchmarking performance, and sharing knowledge with business partners. Expanding the scope beyond the telecom industry would provide more comprehensive insights. The concentration on three specific companies calls for broader industry representation for more nuanced results.

This research, employing a causal and descriptive-analytical approach, investigates the moderating role of DM on the relationship between BI and SA in Jordanian telecom companies. It includes a sample of 350 employees across various roles. The results support the acceptance of the main hypotheses, revealing a statistically significant impact of BI on SA and its dimensions—exploitation and strategic exploration. Moreover, the results identify DM as a moderator, transforming the impact direction from negative to positive.

The research confirms the significant impact of BI on SA and its dimensions, with DM identified as a crucial moderator, enhancing the positive impact of BI on SA. The findings suggest that companies should focus on developing both

exploitation and exploration to improve marketing skills and gain a competitive advantage. Leveraging BI technologies to enhance DM capabilities is recommended for improving organizational performance. Moreover, the examine on BI, DM, and SA within Jordanian telecom companies unfolds significant findings that contribute to both theoretical understanding and practical applications in organizational decision-making and adaptability.

The analysis addresses the significant relationship between BI and SA and emphasizes the importance of exploitation over exploration in the telecom industry. And explores the impact of DM on SA, revealing a significant relationship and highlighting DM's positive influence on content infrastructure, customer integration, and overall performance enhancement. It concludes that companies should focus on developing both exploitation and exploration for a competitive advantage and leverage BI technologies to enhance DM capabilities.

The searching unfolds significant theoretical insights by exploring the interplay between BI, DM, and SA. It enriches existing frameworks by confirming a statistically significant impact of BI on SA and highlighting the moderating role of DM. The findings provide nuanced perspectives, elucidating the magnitude and direction of impact, and contributing to a deeper understanding of decision-making dynamics within organizations.

Theoretical implications extend to the examination of BI's influence on SA dimensions, emphasizing strategic exploitation's importance. Moreover, it establishes DM as a crucial moderator, shaping adaptive strategic goal alignment, enhancing BI performance, and fostering productivity.

The practical contribution emphasizes the wide applicability of BI in various domains for improved decision-making. BI's power lies in integrating data at

multiple levels to provide relevant information at the right time. Also highlights the practical importance of organizational ambidexterity in exploring and exploiting opportunities in evolving technologies and markets.

The research recommends strategic and operational use of BI and ambidexterity for service innovation and organizational performance enhancement. Acknowledging the fast-changing nature of DM, flexibility, and adaptability to customer needs are crucial. Limitations include the difficulty in generalizing results to other industries and potential bias based on the individual samples' responsiveness. Future research should consider diverse industrial or service companies and explore the broader applications of BI and DM.

Theoretical implications of the thesis contribute significantly by delving into the nuanced dynamics between variables enriching existing frameworks and establishing theoretical links between dimensions. Despite acknowledging limitations, including geographical and industry-specific focus, these studies collectively underscore the importance of SV, EO, TI, BI, SF, KM, SA, and DM in enhancing organizational performance and competitiveness.

However, it is important to note that the geographical and industry-specific focus limits the generalizability of its findings to other contexts. The limitations are acknowledged, and it calls for further research to explore these concepts in a broader range of industries and regions. Finally, the acknowledges its limitations, including its focus on a specific geographical region and industry, and the potential for biases in participant responses. Despite these limitations, it provides valuable insights for telecom companies in Jordan and sets the stage for future research to expand and generalize the findings to a broader context.

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Appendixes

Appendix A1

Questionnaire details

The questionnaire has three sections containing 30 questions, with five questions for each variable. Shows the measurement scale for SV, EO, and TI: Each item was accompanied by a five-point Likert-type scale (1 strongly disagree – 5 strongly agree).

Demographic data

Age (years):

□ 18-Less 25 □ 25-Less 32 □ 32-Less 39 □ 39 and above

Gender:

□ Female □ Male

Education:

□ Secondary School□ Diploma□ Bachelor□ Master □ Doctorate

Nature of work:

□ Director □ Expert □ General Manager □ Seiner □ Team leader

Years of Experience:

□ 0 - 4 years □ 5 - 9 years □ 10 - 14 years □15+ years

Strongly agree	Agree	Natural	Disagree	Strongly disagree
1	2	3	4	5

Strategic vigilance (Environmental)					
1. The company monitors and follows up on changes in its surrounding environment through data collection. تقوم الشركة برصد ومتابعة التغيرات في البيئة المحيطة بها من خلال جمع البيانات	1	2	3	4	5
2. The company monitors its surroundings and obtains information about the external environment through interviews and the Internet to keep up with them. تعتمد الشركة على مراقبة محيطها والحصول على معلومات حول البيئة الخارجية مثل المقابلات والإنترنت	1	2	3	4	5
3. The company seeks to adapt to various changes and emergencies, such as epidemics. تسعى الشركة للتكيف مع مختلف المتغيرات وحالات الطوارئ و مواكبتها مثل الأوبئة	1	2	3	4	5
4. The company adopts an effective communication and media network between its divisions, branches, and customers. تتبنى الشركة شبكة اتصال وإعلام فعالة بين أقسامها وفروعها ومع عملائها	1	2	3	4	5
5. The company trains employees continuously in the practical application of new technology. تدرب الشركة الموظفين بشكل مستمر في التطبيق العملي للتكنولوجيا الجديدة	1	2	3	4	5
Strategic vigilance (Marketing/ commercial)					
1. The company promotes its services through social media and media networks. تقوم الشركة بالترويج لخدماتها من خلال وسائل التواصل الاجتماعي والشبكات الإعلامية	1	2	3	4	5

2. The company works to attract the best workers in the labor market. تعمل الشركة على استقطاب أفضل العاملين في سوق العمل.	1	2	3	4	5
3. The company monitors the progress of the relationship between the customer and employee to be distinct in the customer's mind. تهتم الشركة بتطوير العلاقة بين العميل وموظف لتكوين صورة ذهنية مميزة.	1	2	3	4	5
4. The company seeks to partner with competing companies in neighboring countries and connect land transport lines. تسعى الشركة للدخول في شراكة مع الشركات المنافسة في الدول المجاورة وربط خطوط النقل البري بها.	1	2	3	4	5
5. The company adopts a flexible and adaptive strategy-making process with “outside-in thinking” and “future-back” approaches. تتبنى الشركة إستراتيجية مرنة وقابلة للتكيف تتميز بالتفكير "الخارجي للداخل" ونهج "العودة إلى المستقبل"	1	2	3	4	5
Strategic vigilance (Competitive)					
1. The company knows the current production process and the possibility of developing it to create a competitive advantage in the target market. الشركة على معرفة بعملية الإنتاج والخدمات الحالية وإمكانية تطويرها لخلق ميزة تنافسية في السوق المستهدف	1	2	3	4	5
2. The company continuously measures the threat posed by competitors in the market. تقوم الشركة بالقياس المستمر لدرجة التهديد الذي يشكله المنافسون في السوق	1	2	3	4	5
3. The company keeps tracking the developments in information systems and technological opportunities	1	2	3	4	5

to compete. تقوم الشركة بتتبع التطورات في مجال نظم المعلومات والتكنولوجيا لفتح فرص للمنافسة					
4. The company ensures the possibility of producing a new product better than competitors to create a competitive advantage. تقوم الشركة بضمان إمكانية إصدار منتج جديد من المنافسين يفتح الباب أمام خلق ميزة تنافسية	1	2	3	4	5
5. The company knows more about the research and development of competitors, allowing the organization to create a competitive advantage. تعرف الشركة المزيد عن مجالات البحث والتطوير الخاصة بالمنافسين يتيح للمؤسسة خلق ميزه تنافسية	1	2	3	4	5
Entrepreneurial orientation (Risk-taking)					
1. The company systematically invests in foresight activities with flexible, authentic options to help navigate uncertainty. تستثمر الشركة في أنشطة الاستشراف بطرق منهجية وخيارات مرنة وحقيقية للمساعدة في تجاوز حالة عدم اليقين	1	2	3	4	5
2. The company continually judges the quality of its decisions and activities over time. تحكم الشركة على جودة القرارت وأنشطة المتخذة باستمرار بمرور الوقت	1	2	3	4	5
3. In general, the company's top managers tend to invest in high-risk projects. يميل كبار المديرين في الشركة بشكل عام إلى الاستثمار في المشاريع عالية المخاطر	1	2	3	4	5
4. The company acts opportunistically to shape the business in its environment. تعمل الشركة بشكل انتهازي لتشكيل الأعمال في بيئتها	1	2	3	4	5

5. The company seeks to exploit anticipated changes in the target market ahead of our rivals. تسعى الشركة لاستغلال التغييرات المتوقعة في السوق المستهدف قبل منافسينا	1	2	3	4	5
Entrepreneurial orientation (Proactiveness)					
1. The company explores weak signals demonstrating openness to diverse inputs. تستكشف الشركة الإشارات الضعيفة التي تدل على الانفتاح على المدخلات المختلفة	1	2	3	4	5
2. The company works according to a clear strategy that reduces time at the lowest cost and possible duration in the best conditions. تعمل الشركة وفق إستراتيجية واضحة تختصر الوقت بأقل تكلفة وأقل مدة ممكنة وفي أفضل الظرو	1	2	3	4	5
3. The company collects information and monitors changes in competitors' strategies. تجمع الشركة المعلومات وتراقب التغييرات في استراتيجيات المنافسين	1	2	3	4	5
4. The company initiatives are geared towards our target market operations whenever possible. تتخذ الشركة المبادرات كلما أمكن ذلك في عمليات السوق المستهدف	1	2	3	4	5
5. All company levels, functions, and divisions agree on the organizational vision. بالشركة هناك اتفاق كامل على الرؤية التنظيمية عبر جميع المستويات والوظائف والأقسام	1	2	3	4	5
Technological innovation					
1. The company is the first to market with new and modern ideas, products, and services. شركتك هي الأولى في السوق بالافكار والمنتجات والخدمات الجديدة والحديثة	1	2	3	4	5

2. The competitors in the market recognize the employees as leaders in technological innovation.يعرفك المنافسون في السوق كرائد في الابتكار التكنولوجي	1	2	3	4	5
3. The company provides problem-solving with creative solutions more than solutions that rely on conventional wisdom. تقدم الشركة حل المشكلات مع حلول إبداعية أكثر من الحلول التي تعتمد على الحكمة التقليدية	1	2	3	4	5
4. In general, the top managers of the firm favor a strong emphasis on R&D, technological leadership, and innovations. بشكل عام ، يفضل كبار المديرين في الشركة التركيز القوي على البحث والتطوير والقيادة التكنولوجية والابتكارات	1	2	3	4	5
5. The company invested in providing new technological innovation ideas in the past five years. استثمرت الشركة في تقديم أفكار ابتكارات تكنولوجية جديدة في السنوات الخمس الماضية	1	2	3	4	5

Appendix B1

The questionnaire has three sections containing 45 questions, each variable five questions. Shows the measurement scale for BI, SF, and KM: Each item was accompanied by a five-point Likert-type scale (1 strongly disagree – 5 strongly agree).

The Questionnaire

Demographic data

Age (years):

□ 18-Less 25 □ 25-Less 32 □ 32-Less 39 □ 39 and above

Gender:

□ Female □ Male

Education:

□ Secondary School□ Diploma□ Bachelor□ Master □ Doctorate

Nature of work:

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Years of Experience:

□ 0 - 4 years □ 5 - 9 years □ 10 - 14 years □15+ years

Strongly agree	Agree	Natural	Disagree	Strongly disagree
1	2	3	4	5

Business Intelligence (Data warehouse)

1. Data warehouses in the company can store large amounts and have easy access to data. تمتلك مستودعات البيانات في الشركة القدرة على تخزين كميات كبيرة من البيانات والوصول اليها	1	2	3	4	5
2. Data warehouses contain information on the company's external environment (suppliers, competitors). تحتوي مستودعات البيانات على معلومات عن البيئة الخارجية للشركات (الموردون ، المنافسون)	1	2	3	4	5
3. Data warehouses provide comprehensive information to meet the needs of the beneficiary. توفر المستودعات البيانات معلومات شاملة لتلبية احتياجات المستفيد	1	2	3	4	5
4. Data warehouse assists in reaching a consensus among stakeholders on making business decisions. يساعد مستودعات البيانات في الوصول إلى إجماع من أصحاب المصلحة بشأن اتخاذ قرارات	1	2	3	4	5
5. The Data warehouse matches the interest of all stakeholders to reach a cognitive consensus on responding measures. يطابق مستودعات البيانات مصلحة جميع أصحاب المصالح للوصول إلى إجماع معرفي بشأن تدابير الاستجابة	1	2	3	4	5
Business Intelligence (Data mining)					
1. Data mining helps in creating models and new relationships previously unknown. يساعد التنقيب عن البيانات في إنشاء نماذج وعلاقات جديدة لم تكن معروفة من قبل.	1	2	3	4	5
2. Contribute to Data mining in the process of predicting the future. المساهمة في التنقيب عن البيانات في عملية التنبؤ بالمستقبل.	1	2	3	4	5
3. Data mining contributes to predicting customer behavior and trends. يساهم التنقيب في البيانات في التنبؤ بسلوك	1	2	3	4	5

العميل واتجاهاته.					
4. Data mining assists in setting a favorable position and exploring new opportunities in a turbulent environment. يساعد التنقيب عن البيانات في تحديد موقع ملائم واستكشاف فرص جديدة في بيئة مضطربة.	1	2	3	4	5
5. Data mining can align strategic planning and changes in a business environment. استخراج البيانات يعمل على مواءمة التخطيط الاستراتيجي والتغييرات في بيئة الأعمال	1	2	3	4	5
Business Intelligence (OLAP)					
1. Data analysis systems Reports are available to measure the organization's performance for different periods. توفر أنظمة تحليل البيانات تقارير عن أداء المؤسسة لفترات مختلف	1	2	3	4	5
2. Data analysis systems display information in clear and explicit ways that are easily understood. تعرض أنظمة تحليل البيانات المعلومات بطرق واضحة ومفصلة يسهل فهمها	1	2	3	4	5
3. Data analysis generates more operational solutions in terms of its forward-looking analysis ability. يولد تحليل البيانات المزيد من الحلول التشغيلية من حيث قدرته على التحليل التطلعي	1	2	3	4	5
4. The availability of data analysis systems helps instantaneous information about the organization’s current performance. يساعد توافر أنظمة تحليل البيانات في الحصول على معلومات فورية حول الأداء الحالي للمنظمة	1	2	3	4	5
5. Data analysis systems assist in better understanding internal opportunities or threats. يساعد نظام تحليل البيانات في فهم أفضل للفرص أو التهديدات الداخلية في الشركة.	1	2	3	4	5

Strategic foresight (People and networks)					
1. The company has an active network of contacts with the scientific and research community. تمتلك الشركة شبكة اتصالات نشطة مع المجتمع العلمي والبحثي	1	2	3	4	5
2. The company collects information on patents or external information. تقوم الشركة بجمع معلومات عن براءات الاختراع او معلومات خارجي	1	2	3	4	5
3. The company surveys experts' opinions using questionnaires, panels, focus groups, workshops, interviews, and one-to-one meetings. تقوم الشركة باستطلاع آراء الخبراء حول آرائهم ، على سبيل المثال باستخدام الاستبيانات ، واللجان ، ومجموعات التركيز ، وورش العمل ، والمقابلات والاجتماعات الفردية	1	2	3	4	5
4. The company is scanning in all areas (technological, political, competitor, customer, and sociocultural environment). تقوم الشركة بالمسح في جميع المجالات (التكنولوجية ، السياسية ، المنافسة ، العملاء ، البيئة الاجتماعية والثقافية).	1	2	3	4	5
5. The company considers new issues, trends, and technologies whose relevance to our business cannot yet be assessed. تنظر الشركة في القضايا والاتجاهات والتقنيات الجديدة التي لا يمكن بعد تقييم صلتها بأعمالنا.	1	2	3	4	5
Strategic foresight (Organization)					
1. Regular incentives exist for a more comprehensive vision (recognition by senior management and financial rewards). هناك حوافز مستمره لرؤية أوسع للعمل (الاعتراف من قبل الإدارة العليا و/ أو المكافآت المالية).	1	2	3	4	5
2. In our company, information is shared freely across functions and hierarchical levels. في شركتنا ، تتم مشاركة المعلومات بحرية عبر الوظائف والمستويات الهرمية.	1	2	3	4	5

3. Continued organizational learning is encouraged, and there is time/opportunity to improve skills and capabilities. يتم تشجيع التعلم التنظيمي المستمر وهناك وقت / فرصة لتحسين المهارات والقدرات	1	2	3	4	5
4. Foresight activities can be triggered top-down in the company (e.g., by the top management). يمكن بدء بأنشطة التبصر من أعلى إلى أسفل في الشركة (على سبيل المثال من قبل الإدارة العليا)	1	2	3	4	5
5. Future-related information rapidly diffuses through formal communication channels in the company. يتم نشر المعلومات المتعلقة بالمستقبل بسرعة من خلال قنوات الاتصال الرسمية بالشركة.	1	2	3	4	5
Strategic foresight (Sophisticated methods)					
1. The company uses econometric modeling or other mathematical forecasts. تستخدم الشركة النمذجة الاقتصادية أو غيرها من التوقعات الرياضية.	1	2	3	4	5
2. The company does scenario building of possible futures.تقوم الشركة ببناء سيناريو للعقود الآجلة المحتملة	1	2	3	4	5
3. The company does simulations of future conditions.تقوم الشركة بمحاكاة الظروف المستقبلية.	1	2	3	4	5
4. The company collects signals and trends within /outside our field of business. تقوم الشركة بجمع الإشارات والاتجاهات في مجال اعمالنا وخارجها.	1	2	3	4	5
5. The company does future workshops to open up traditional thinking patterns. تقوم الشركة بعمل ورش عمل مستقبلية لفتح أنماط التفكير التقليدية	1	2	3	4	5
Knowledge management (Knowledge generation)					

1. The company has processes for exchanging knowledge with our business partners. للشركة عمليات لتبادل المعرفة مع شركائنا في العمل	1	2	3	4	5
2. The company has processes for acquiring knowledge about competitors within our industry. تملك الشركة عمليات لاكتساب المعرفة عن المنافسين داخل صناعتنا.	1	2	3	4	5
3. The company has processes for inter-company collaboration. تقوم الشركة بعمليات للتعاون بين الشركات	1	2	3	4	5
4. The company has processes for benchmarking performance.تمتلك الشركة عمليات لقياس الأداء	1	2	3	4	5
5. The company has gotten information from the market survey. توليد المعرفة من خلال الحصول على المعلومات من خلال مسح السوق	1	2	3	4	5
Knowledge management (Knowledge storage)					
1. Knowledge storage has processes to protect knowledge from theft from within and outside the organization. الشركة تعمل على عمليات لحماية المعرفة من السرقة من خارج المنظمة وداخلها	1	2	3	4	5
2. The company has incentives that encourage the protection of knowledge. لدى الشركة حوافز تشجع على حماية المعرفة	1	2	3	4	5
3. The company has processes to protect knowledge from inappropriate use inside/ outside the organization. تقوم الشركة بحماية المعرفة من الاستخدام الغير المناسب داخل المنظمة وخارجها.	1	2	3	4	5

4. The company has the existence of tools to access stored knowledge.الشركة لديها أدوات للوصول إلى المعرفة المخزنة.	1	2	3	4	5
5. The company has technology that restricts access to some sources of knowledge. الشركة لديها تكنولوجيا تعمل على تقيد الوصول إلى بعض مصادر المعرفة	1	2	3	4	5
Knowledge management (Knowledge diffusion):					
1. The company has employee participation techniques such as multidisciplinary teams, quality circles, and improvement groups. لدى لشركة تقنيات مشاركة الموظفين مثل الفرق متعددة التخصصات ، ودوائر الجودة ، ومجموعات التحسين ، وما إلى ذلك.	1	2	3	4	5
2. The company has information distribution systems for employees, customers, and suppliers, as effective systems for disseminating knowledge. لدى لشركة أنظمة توزيع المعلومات للموظفين والعملاء والموردين بطرق فعالة لنشر المعرفة.	1	2	3	4	5
3. The company has a system of explicit knowledge codification that uses technology to disseminate knowledge. تمتلك الشركة نظامًا واضحًا لتدوين المعرفة باستخدم التكنولوجيا لنشر المعرفة	1	2	3	4	5
4. The company seeks out new ways to do the work. تبحث شركتنا عن طرق جديدة للقيام بالأعمال.	1	2	3	4	5
5. The company can respond to related technology activities and unexpected activities created by competitors للشركة القدرة على نشر المعرفة للاستجابة لأنشطة التكنولوجيا ذات الصلة والأنشطة غير المتوقعة التي أنشأها المنافسون.	1	2	3	4	5

Appendix C1

Questionnaire Details

The questionnaire has three sections containing 30 questions, with five questions for each variable. Shows the measurement scale for BI, SA, and DM: Each item was accompanied by a five-point Likert-type scale (1 strongly disagree – 5 strongly agree).

Demographic data

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□ 18-Less 25 □ 25-Less 32 □ 32-Less 39 □ 39 and above

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Strongly agree	Agree	Natural	Disagree	Strongly disagree
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Business intelligence (Data warehouse)

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2. Data warehouses contain information on the company's external environment (suppliers, competitors. تحتوي مستودعات البيانات على معلومات عن البيئة الخارجية للشركات (الموردون ، المنافسون)	1	2	3	4	5
3. Data warehouses provide comprehensive information to meet the needs of the beneficiary. توفر المستودعات البيانات معلومات شاملة لتلبية احتياجات المستفي	1	2	3	4	5
4. Data warehouse assists in reaching a consensus among stakeholders on making business decisions. يساعد مستودعات البيانات في الوصول إلى إجماع من أصحاب المصلحة بشأن اتخاذ قرارات	1	2	3	4	5
5. The Data warehouse matches the interest of all stakeholders to reach a cognitive consensus on responding measures يطابق مستودعات البيانات مصلحة جميع أصحاب المصالح للوصول إلى إجماع معرفي بشأن تدابير الاستجابة	1	2	3	4	5
Business intelligence (Data mining)					
1. Data mining helps in creating models and new relationships that were previously unknown يساعد التنقيب عن البيانات في إنشاء نماذج وعلاقات جديدة لم تكن معروفة من قبل	1	2	3	4	5
2. Contribute to data mining in the process of predicting the future. المساهمة في التنقيب عن البيانات في عملية التنبؤ بالمستقب	1	2	3	4	5
3. Data mining contributes to predicting customer behavior and trends. يساهم التنقيب في البيانات في التنبؤ بسلوك	1	2	3	4	5

العميل واتجاهاته					
4. Data mining assists in setting a favorable position and exploring new opportunities in a turbulent environment. يساعد التنقيب عن البيانات في تحديد موقع ملائم واستكشاف فرص جديدة في بيئة مضطربة	1	2	3	4	5
5. Data mining can align strategic planning and changes in a business environment استخراج البيانات يعمل على مواءمة التخطيط الاستراتيجي والتغييرات في بيئة الأعمال	1	2	3	4	5
Business intelligence (OLAP)					
1. Availability of data analysis systems reports on the organization's performance for different periods. توفر أنظمة تحليل البيانات تقارير عن أداء المؤسسة لفترات مختلف	1	2	3	4	5
2. The data analysis systems display information in straightforward and clear ways that are easily understood. تعرض أنظمة تحليل البيانات المعلومات بطرق واضحة ومفصلة يسهل فهمها	1	2	3	4	5
3. Data analysis generates more operational solutions in terms of its forward-looking analysis ability. يولد تحليل البيانات المزيد من الحلول التشغيلية من حيث قدرته على التحليل التطلعي	1	2	3	4	5
4. The availability of data analysis systems helps instantaneous information about the organization's current performance. يساعد توافر أنظمة تحليل البيانات في الحصول على معلومات فورية حول الأداء الحالي للمنظمة	1	2	3	4	5
5. A data analysis system assists in better understanding the internal opportunity or threats. يساعد نظام تحليل البيانات في فهم أفضل للفرص أو	1	2	3	4	5

التهديدات الداخلية في الشركة

Strategic ambidexterity (Exploration)					
1. Our activities search for new possibilities concerning products/services, processes, or markets. تبحث أنشطتنا عن إمكانيات جديدة فيما يتعلق بالمنتجات / الخدمات أو العمليات أو الأسوا	1	2	3	4	5
2. Our activities try to evaluate diverse options concerning products/services, processes, or markets. تحاول أنشطتنا تقييم الخيارات المتنوعة فيما يتعلق بالمنتجات / الخدمات أو العمليات أو الأسواق	1	2	3	4	5
3. Our activities focus on the solid renewal of products/services or processes. تركز أنشطتنا على التجديد القوي للمنتجات / الخدمات أو العمليات	1	2	3	4	5
4. Our activities require quite some adaptability of ourselves.تتطلب أنشطتنا بعض القدرة على التكيف مع أنفسنا	1	2	3	4	5
5. Our activities require us to learn new skills or knowledge.تتطلب أنشطتنا تعلم مهارات أو معرفة جديدة	1	2	3	4	5
Strategic ambidexterity (Exploitation)					
1. The company develops activities in which the employees have accumulated much experience. نقوم بتطوير الأنشطة التي اكتسبت فيها الكثير من الخبرة بنفسك	1	2	3	4	5
2. The company develops activities that serve existing (internal) customers with existing services/products. نقوم بتطوير الأنشطة التي تخدم العملاء الحاليين (الداخليين) بالخدمات / المنتجات الحالي	1	2	3	4	5
3. The company develops activities of which it is clear to us how to conduct them. نقوم بتطوير الأنشطة التي من	1	2	3	4	5

الواضح لنا كيفية القيام به					
4. The company develops activities primarily focused on achieving short-term goals. نقوم بتطوير أنشطة تركز بشكل أساسي على تحقيق الأهداف قصيرة المدى	1	2	3	4	5
5. The company develops activities we can adequately conduct using our present knowledge. نقوم بتطوير الأنشطة التي يمكننا إجراؤها بشكل صحيح باستخدام معرفتنا الحالية	1	2	3	4	5
Digital Marketing					
1. The company measures the results of digital marketing against objectives. تقيس شركتنا نتائج التسويق الرقمي مقابل الأهداف	1	2	3	4	5
2. The use of digital marketing has changed the measurement.أدى استخدام التسويق الرقمي إلى تغيير القياس	1	2	3	4	5
3. The company has obtained measurable benefits from the use of digital marketing. حصلت شركتنا على فوائد قابلة للقياس من استخدام التسويق الرقمي	1	2	3	4	5
4. The company utilizes web analytics (e.g., Google Analytics, Snoobi) to acquire new customers. الشركة نستخدم تحليلات الويب مثل Google Analytics) و (Snoobi لاكتساب عملاء جدد	1	2	3	4	5
5. The company uses a tool (e.g., Google Alerts, Hootsuite, Radian6, Meltwater, m Brain) to follow online news and discussion.الشركة تستخدم أداة (مثل Google لمتابعة الأخبار والمناقشات عبر الإنترنت Alerts و Hootsuite و Radian6 و Meltwater و (m Brain	1	2	3	4	5


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