STRATEGIC FORESIGHT AND CRISIS MANAGEMENT OF ENERGY SECURITY IN JORDAN: THE MEDIATING ROLE OF STRATEGIC AGILITY

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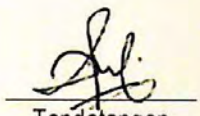

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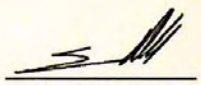

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ABSTRACT

Energy security is a critical national priority that underpins economic and social stability, yet it remains a persistent challenge in Jordan due to limited energy resources and political instability in the Middle East and North Africa (MENA) region. Despite its strategic importance, the role of organizational foresight in managing energy crisis has received limited scholarly attention, particularly in non-Western, regulated contexts. Grounded in the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), this study investigates how strategic foresight and agility enhance crisis management in Jordan's energy sector. Specifically, it examines the effects of four dimensions of strategic foresight technology foresight, competitive intelligence, political environment foresight, and consumer foresight on key aspects of crisis management, including early warning, preparedness, damage containment, restoration, and organizational learning. Strategic agility is further analyzed as a mediating capability, encompassing strategic insight, internal and external response orientation, human resource capability, and information technology capability, which translates foresight into actionable responses. A quantitative survey was conducted with 200 managerial respondents in Jordan's energy sector, and data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) via SMART-PLS 4. The findings validate eleven of thirteen hypotheses, revealing that political environment foresight and consumer foresight significantly enhance crisis management, while technology foresight and competitive intelligence exert no direct effect. Importantly, strategic agility is confirmed as a critical mechanism that strengthens crisis management both directly and indirectly, illustrating the complementary interplay of sensing (foresight) and reconfiguration (agility) capabilities. Theoretically, this study extends RBV and DCT by demonstrating that foresight and agility generate organizational value only when effectively mobilized in a dynamic, high-risk environment. Practically, the results provide actionable insights for energy-sector leaders and policymakers to institutionalize foresight systems, strengthen agile decision-making, and enhance national energy resilience. The study also identifies limitations and proposes directions for future research.

Keywords: Energy security, Energy sector, Jordan, Strategic foresight, Crisis management, Strategic agility

ABSTRAK

Jaminan tenaga merupakan keutamaan nasional yang kritikal kerana ia menyokong kestabilan ekonomi dan sosial sesebuah negara. Di Jordan, sektor tenaga, khususnya elektrik, telah memacu pertumbuhan ekonomi sepanjang dekad yang lalu, namun masih menghadapi cabaran besar akibat sumber tenaga yang terhad dan ketidakstabilan politik di wilayah Timur Tengah dan Afrika Utara (MENA). Walaupun penting, peranan peramalan strategik dalam pengurusan krisis tenaga masih kurang mendapat perhatian akademik, terutamanya dalam konteks Jordan dan wilayah MENA secara lebih luas. Berdasarkan Pandangan Berasaskan Sumber (Resource-Based View, RBV) dan Teori Keupayaan Dinamik (Dynamic Capabilities Theory, DCT), kajian ini meneliti kepentingan peramalan strategik dalam memperkukuh pengurusan krisis keselamatan tenaga di Jordan. Secara khusus, ia menilai bagaimana empat dimensi peramalan strategik peramalan teknologi, risikan persaingan, peramalan persekitaran politik, dan peramalan pengguna mempengaruhi aspek utama pengurusan krisis, termasuk amaran awal, kesiapsiagaan dan pencegahan, pengawalan kerosakan, pemulihan, serta pembelajaran organisasi. Selain itu, kajian ini mengkaji kelincahan strategik sebagai pembolehubah perantara yang menghubungkan peramalan strategik dengan pengurusan krisis, dengan lima komponen utama: wawasan strategik, orientasi tindak balas dalaman dan luaran, keupayaan sumber manusia, serta keupayaan teknologi maklumat. Data kuantitatif diperoleh daripada 200 responden pengurusan dalam sektor tenaga Jordan dan dianalisis menggunakan Pemodelan Persamaan Struktur (SEM) melalui SMART-PLS 4. Penemuan mengesahkan sebelas daripada tiga belas hipotesis, menekankan pengaruh signifikan peramalan politik dan peramalan pengguna, serta menunjukkan bahawa kelincahan strategik memperkukuh pengurusan krisis secara langsung dan tidak langsung. Secara teori, kajian ini memperluaskan RBV dan DCT dengan menunjukkan bahawa peramalan strategik dan kelincahan menjadi sumber nilai apabila digabungkan dan dimobilisasi secara efektif untuk menangani krisis. Secara praktikal, ia memberikan panduan bagi penggubal dasar dan pemimpin sektor tenaga untuk memperkukuh keselamatan tenaga Jordan dan menyokong pertumbuhan ekonomi nasional. Batasan kajian dan cadangan untuk penyelidikan masa depan turut dibincangkan.

Kata kunci: Jaminan tenaga, Sektor tenaga, Jordan, Ramalan strategik, Pengurusan krisis, Ketangkasan strategik

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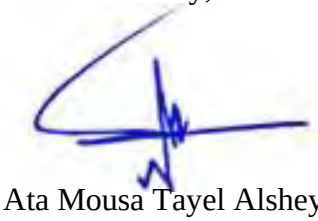
Yours sincerely,



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LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
CM	Crisis Management
CMV	Common Method Variance
CR	Composite Reliability
DCT	Dynamic Capability Theory
HRC	Human Resource Capability
MV	Million Volt
MENA	Middle East North Africa
NEPCO	National Electric Power Company
PhD	Doctor of Philosophy
PLS	Partial Least Squares
Q^2	Construct Cross Validated Redundancy
R^2	R-Squared Values
RBV	Resource Based View Theory
SCM	Supply Chain Management
SEM	Structural Equation Modelling
SPSS	Statistical Package for the Social Sciences
UUM	Universiti Utara Malaysia

CHAPTER 1 – INTRODUCTION

1.1 Overview

The global energy landscape has been undergoing rapid transformation, characterized by volatility in fuel markets, escalating environmental challenges, and disruptive technology innovations. These dynamics have intensified the need for strategic foresight and effective crisis management capabilities within national energy systems. Recent studies indicate that energy security in developing economies, particularly in the Middle East, remains highly vulnerable to policy uncertainty and resource dependency (Komendantova, 2021; Hunaiti & Huneiti, 2024). In the Jordanian context, the government has undertaken initiatives to diversify energy sources, promote digitalization, and integrate renewable energy as part of the Updated Master Strategy of Energy 2020–2030. Nevertheless, persistent regional instability, fluctuating energy prices, and increased exposure of critical infrastructure continue to place substantial pressure on electricity companies to strengthen risk awareness and develop agile response mechanisms (Hamed & Bressler, 2019; Bresciani, Shams, & Vrontis, 2024).

Contemporary literature conceptualizes strategic foresight as a dynamic capability that enables organizations to anticipate uncertainty and proactively respond to emerging threats and opportunities, rather than relying solely on traditional planning mechanisms (Buehring & Bishop, 2020; Rohrbeck & Heger, 2023). Similarly, strategic agility has emerged as a critical determinant of organizational resilience and sustained performance, reflecting an organization's capacity to sense, seize, and adapt effectively in turbulent environments (Doz & Kosonen, 2021; Teece, Peteraf, & Leih, 2023). Recent

crisis management research further underscores the critical role of integrating dynamic capabilities to strengthen organizational preparedness, response, and recovery mechanisms, especially within highly sensitive and interdependent sectors such as energy infrastructure (Kumar et al., 2022; Haase, 2023).

Despite the growing body of literature on strategic foresight, strategic agility, and crisis management, empirical evidence examining the integrated effects of these capabilities within the context of national energy sectors in developing economies remains limited. There is a paucity of studies that investigate how strategic foresight translates into effective crisis management outcomes through the mediating role of strategic agility under conditions of regulatory rigidity and resource constraints. Within Jordan's energy sector characterized by strong regulatory control and limited operational flexibility this gap is especially pronounced. Accordingly, this study seeks to examine the roles of strategic foresight and strategic agility in enhancing crisis management within Jordan's energy sector, thereby contributing to both theoretical advancement and practical policy formulation.

1.1.1 Jordanian Scenario

Jordan, officially known as the Hashemite Kingdom of Jordan, is strategically situated at the intersection of Asia, Africa, and Europe. It shares borders with Syria to the north, Iraq to the east, Saudi Arabia to the south, and Israel along with the occupied Palestinian territories to the west. With a population approaching 11.5 million, Jordan's economy is predominantly driven by the services sector, particularly trade, finance, communications, tourism, and public administration. Like many developing nations, Jordan faces increasing energy demands across its industrial, commercial, and residential sectors. In response, the country has prioritized enhancing the integration, diversification,

and efficiency of its energy production to support sustained economic growth and long-term national development (Hamed & Bressler, 2019; Komendantova, 2021).

However, Jordan faces challenging problems when it tries to plan for energy generation that is reliable, productive, and decent for the environment. Jordan has trouble getting enough energy, especially energy to meet its growing needs, just like many other developing countries in the Middle East North Africa (MENA) region (i.e., Algeria, Bahrain, Lebanon, Jordan, Kuwait, Oman, Morocco, UAE, Tunisia, Syria, Qatar, Yemen, etc.). This is because there are not enough primary energy sources in the area, and it is highly dependent on fossil fuel imports. The country's conventional energy resources are inadequate to fulfill its requirements, supplying a maximum of 10% of the necessary amount. Consequently, Jordan is dependent on the Arab Gulf nations, Iraq, and the Arab Republic of Egypt for its gasoline supplies (Malkawi & Azizi, 2017; Abu-Rumman et al., 2020; Shaltout et al., 2020).

Meanwhile, the country’s growing population has significantly contributed to the escalating demand for energy supply, while the influx of refugees from neighboring countries, particularly Syria and Iraq, has further intensified pressure on Jordan’s already strained energy system. Jordan’s complex and dynamic socio-economic conditions, coupled with diminishing domestic energy resources and steadily increasing energy demand, underscore the urgency of stabilizing the national energy infrastructure to avert potential crisis in this critical sector (Hussein et al., 2021).

In January 2019, Jordan’s electrical system reached a peak load capacity of 3,380 MW, reflecting an increase from 3,205 MW in January 2018 equivalent to a growth rate of approximately 5.5%. This represents a substantial rise compared to the average annual growth rate of about 2.7% recorded

between 2010 and 2019. Consequently, adapting the national power system to accommodate an annual load growth of approximately 3% to 5% remains a significant challenge for Jordan's energy sector.

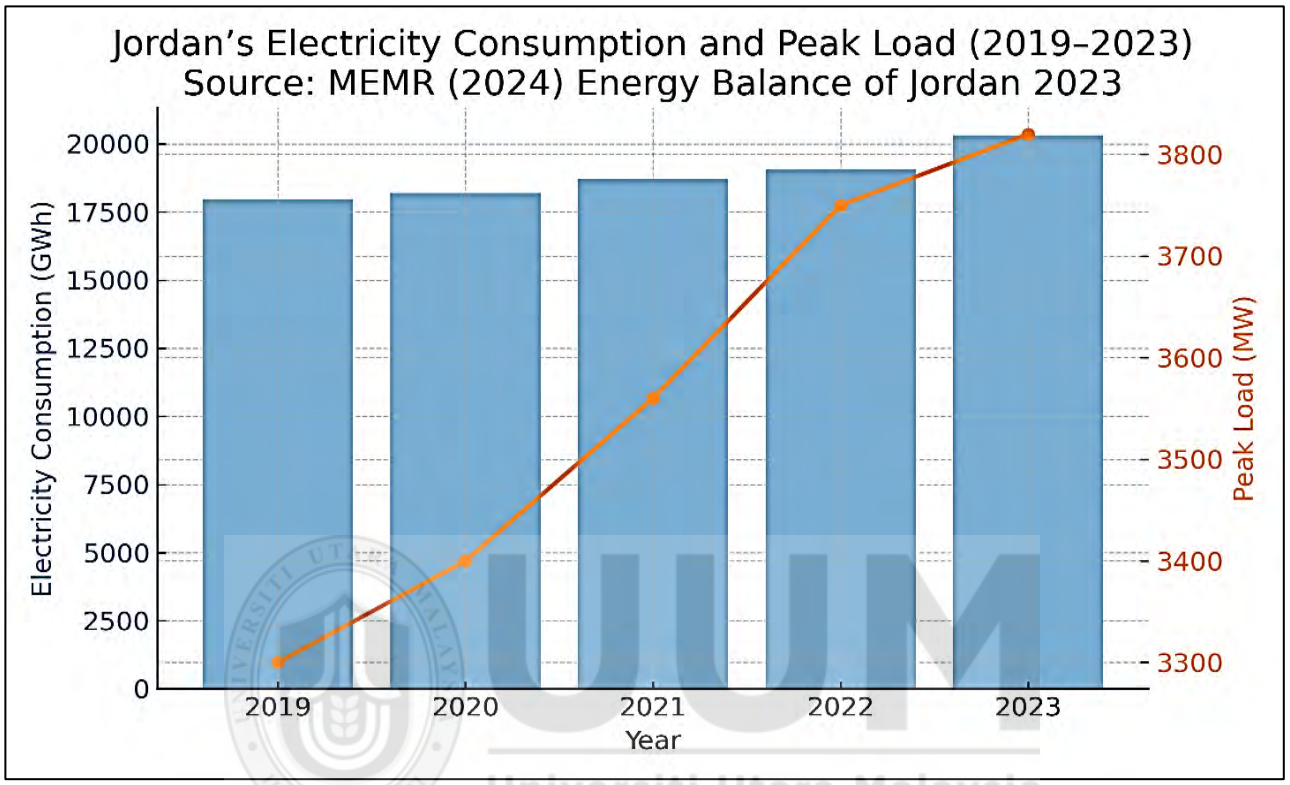

Figure 1.1: Jordan's Electricity Consumption and Peak Load (2019 - 2023)

Figure 1.1 illustrates Jordan's total electricity consumption and peak load for the period 2019–2023. As depicted, total national electricity consumption increased steadily from 17,980 GWh in 2019 to 20,310 GWh in 2023, reflecting a cumulative growth of approximately 12.9% over five years. In parallel, the peak electrical load reached 3,820 MW in 2023, representing the highest level recorded to date. These figures, obtained from the official Energy Balance 2023 report published by the Ministry of Energy and Mineral Resources (MEMR, 2024), indicate mounting pressure on Jordan's electricity system and raise concerns regarding the sector's capacity to ensure sustained energy security under increasing demand conditions.

The persistent upward trend in electricity demand suggests that Jordan's energy system will continue to face escalating operational and strategic challenges. Forecasts further indicate that electricity demand is expected to grow at an average annual rate of approximately 3% through 2040, as illustrated in Figure 1.2. This projected growth, when combined with regional instability, fuel price volatility, and infrastructural vulnerability, exposes significant limitations in the current planning and response mechanisms within the energy sector. Consequently, reliance on conventional planning approaches alone may be insufficient to address future disruptions and crisis.

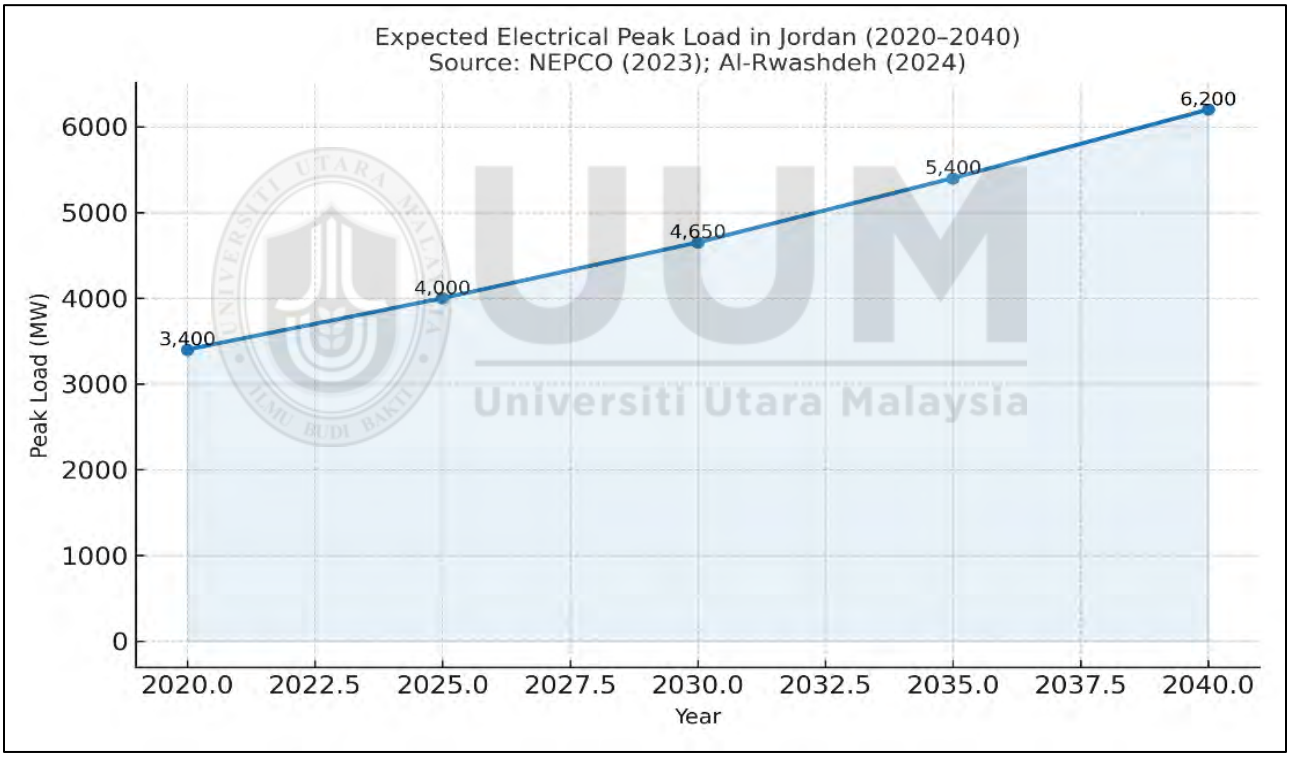

Figure 1.2: Expected Electrical Peak Load In Jordan (MW), 2020 - 2040
Data Source: National Electric Power Company (NEPCO, 2023)
Annual Report 2022; Al-Rwashdeh (2024), Energy Reports

Against this backdrop, the absence of integrated strategic foresight and strategic agility within crisis management practices represents a critical gap in Jordan's energy sector. The increasing complexity

and uncertainty surrounding energy supply and demand necessitate proactive capabilities that enable organizations to anticipate emerging risks, respond effectively to crisis, and adapt to rapidly changing conditions. This situation underscores the need for a systematic examination of how strategic foresight and strategic agility can enhance crisis management effectiveness within Jordan's energy sector, thereby forming the central problem addressed in this study.

1.1.2 Energy Security and Crisis Management

Energy is a scarce commodity; thus it must be strategically managed to prevent the risks of energy shortages that could lead to a crisis (Strojny et al., 2023, Smal & Wieprow,2023). Jordan has faced several energy crisis in the past. It is dependent on oil from neighboring countries makes Jordan vulnerable when the conflicts present in MENA region. The country has undergone two significant challenges in terms of energy supplies. Firstly, it lost access to oil at preferential prices from Iraq after the 2003 war. After Saddam Hussein's regime fell in 2003, Jordan was no longer able to reliably meet its oil needs through Iraqi exports, so it began petroleum imported from Saudi Arabia at current market rates. As the price of oil rose steadily on global markets, so did the cost of energy which subsequently strained its economy. Second, it experienced a disruption in the import of natural gas from Egypt following the events that occurred after January 2011 (Sandri et al., 2020). The National Energy Company, owned by the government, incurred losses exceeding six billion dollars in 2021, as stated in its annual report. These losses were primarily attributed to the government's agreements to procure energy from the private sector over the past decade.

Following the threats and uncertainty in the energy issue, energy security has risen to the forefront of discussions about public policy in Jordan. The government of Jordan has taken strategic measures to

anticipate the energy crisis in the country. The first National Energy Efficiency Strategy was developed by the government in 2005 to be implemented between 2005 and 2020 because of these improvements. Tariffs and pricing mechanisms, as well as subsidies for investments in energy-saving technologies and reduced customs and duties on electric vehicles, were planned to improve efficiency. The plan indicated the need to issue a renewable energy law, to attract private sector investment, and to establish a fund to support renewable energy projects to promote renewable energy resources. In 2012, a law called "Renewable Energy and Energy Efficiency Law" (RE & EE) was enacted (Law No. 13 of 2012). The major purpose of this law is to "increase the energy supply security in Jordan," and these scenarios help get us closer to that goal. For the years 2015 - 2025, and again for the years 2020–2030, policymakers have developed new National Strategies for the Energy Sector. The 2007-2020 document's primary goals of increasing energy security through diversifying energy sources to lessen dependence on external development and price fluctuations, increasing renewable energy and efficiency, increasing local energy production, and exploring alternative energy options are central to both strategies. Both plans are geared toward lowering the energy sector's reliance on (imported) oil fuels. One method is to enhance the dependability and eco-friendliness of the power system by augmenting on renewable energy sources, because Jordan can leverage greatly from its plentiful and excellent wind and solar resources (Al-Omary et al., 2018; Alrwashdeh, 2022).

In 2020, the Ministry of Energy and Mineral Resources (MEMR) published a report emphasizing the urgent need to revise Jordan’s energy strategy due to the sudden and substantial increase in energy demand, which has created challenges in securing the necessary funding to meet this demand. Hamed and Bressler (2019) highlighted that prioritizing national objectives, plans, and strategies through effective crisis management is essential for ensuring the sustainability of Jordan’s energy sector.

Crisis management provides a systematic framework to anticipate and respond to changes and uncertainties in energy security. This framework encompasses key components such as mitigation, preparedness, response and recovery, including the identification of early warning signals, preventive measures, damage containment, restoration activities, and organizational learning (Al Thani & Obeidat, 2020). In the context of energy security, crisis management involves the strategic coordination of these activities to ensure that energy remains available, affordable, accessible, and acceptable. By integrating mitigation, preparedness, response, and recovery measures, the energy sector can better withstand disruptions, maintain operational stability, and contribute to the country's sustainable development. Therefore, effective crisis management is not merely a reactive tool but a proactive mechanism that supports long-term stability and resilience in Jordan's energy sector.

1.2 Problem Statement

Crisis management within Jordan's electricity generation, transmission, and distribution companies has traditionally been reactive, relying on emergency and contingency responses rather than proactive, forward-looking capabilities (Komendantova et al., 2021; Bresciani et al., 2024). In high-uncertainty environments such as the energy sector, effective crisis management requires anticipating emerging risks, detecting weak signals, and adapting organizational structures and processes to evolving threats. However, Jordan's energy sector has struggled to embed these capabilities, leaving it vulnerable to recurring crisis.

A critical example is the 2021 energy-contract crisis, in which Jordan incurred nearly USD 6 billion in losses due to rigid take-or-pay agreements that obligated payment for unused energy (Al Batayneh, 2024). This event exposed deficiencies across all dimensions of crisis management: early signal

detection, preparedness, damage containment, restoration, and learning. Weaknesses in scenario planning, demand forecasting, and environmental scanning hindered early detection (Komendantova et al., 2021; Bresciani et al., 2024; Al Batayneh, 2024). Centralized governance and inflexible regulatory frameworks limited preparedness, while restricted strategic agility impeded timely renegotiation and adaptive responses, prolonging recovery. Furthermore, the absence of structured learning mechanisms prevented institutionalization of lessons, leaving the sector exposed to similar vulnerabilities in the future (Buehring & Bishop, 2020; Doz & Kosonen, 2021; Rohrbeck & Heger, 2023; Teece et al., 2023).

These shortcomings highlight the importance of integrating strategic foresight and strategic agility into crisis management. Strategic foresight enables organizations to detect weak signals, envision future scenarios, and convert them into actionable strategies, thereby enhancing readiness and resilience (Buehring & Bishop, 2020; Rohrbeck & Heger, 2023). Strategic agility allows organizations to adapt rapidly, reorganize resources, and respond effectively to uncertainty (Doz & Kosonen, 2021; Teece et al., 2023). Combined, these capabilities can transform reactive crisis management into proactive resilience. Yet, empirical research examining the integrated role of foresight and agility in energy sectors of developing economies remains limited, particularly where decision-making is centralized and constrained by rigid regulations (Hunaiti & Huneiti, 2024).

Several research gaps emerge from the existing literature. First, the majority of energy security studies concentrate on technology innovation, renewable energy integration, or policy development, while giving limited attention to the strategic and managerial capabilities necessary for anticipating and navigating crisis an omission that is particularly salient in developing country contexts such as Jordan.

Second, although strategic foresight and strategic agility have been examined in relation to organisational performance and competitive advantage (Arokodare & Asikhia, 2020; Fakunmoju et al., 2020), their specific contributions to crisis management remain insufficiently explored. Third, prior research has often captured only narrow dimensions of foresight (e.g., human resource foresight) or agility (e.g., IT capability), overlooking their inherently multidimensional characteristics. These dimensions span technology intelligence, competitive intelligence, political foresight, consumer foresight, internal and external response orientation, and human resource capabilities (Rastegari et al., 2020; Fakunmoju et al., 2020). Finally, the potential mediating role of strategic agility in linking strategic foresight to crisis management outcomes has received minimal empirical attention, leaving a crucial mechanism how foresight translates into actionable and effective crisis responses largely unexamined (Christofi et al., 2021).

Consequently, there is a clear need for a comprehensive and multidimensional investigation within the Jordanian energy sector that examines the interrelationships among strategic foresight, strategic agility, and crisis management. This study responds to this gap by analyzing how foresight and agility jointly contribute to strengthening crisis management capabilities, and by assessing the mediating role of strategic agility in the relationship between foresight and crisis management. Focusing on the perceptions of managers across electricity generation, transmission, and distribution companies, the study seeks to provide empirical evidence on how strategic planning practices and adaptive organizational capabilities can enhance proactive crisis management within a critical national infrastructure sector.

1.3 Research Questions

The study seeks to answer four main questions according to the following:

(a) Does strategic foresight, through its four dimensions (technology intelligence, competitive intelligence, political environment foresight, and consumer foresight), influence on crisis management in the Jordanian energy sector?

(b) Does strategic foresight, through its four dimensions (technology intelligence, competitive intelligence, political environment foresight, and consumer foresight), influence strategic agility in the Jordanian energy sector?

(c) Does strategic agility influence on crisis management in the Jordanian energy sector?

(d) Does strategic agility mediate the relationship between strategic foresight through its four dimensions (technology intelligence, competitive intelligence, political environment foresight, and consumer foresight), and crisis management in the Jordanian energy sector?

1.4 Research Objectives

The primary aim of this study is to examine the roles of strategic foresight, strategic agility, and crisis management within the Jordanian energy sector and to empirically test the interrelationships among these constructs. In line with this aim, the specific objectives of the study are as follows:

(a) To determine whether strategic foresight through its four dimension (technology intelligence, competitive intelligence, political-environment foresight, and consumer foresight) influences crisis management in the Jordanian energy sector.

(b) To determine whether strategic foresight through its four components (technology intelligence, competitive intelligence, political environment foresight, and consumer foresight) influences strategic agility in the Jordanian energy sector.

(c) To determine whether strategic agility influences crisis management in the Jordanian energy sector.

(d) To examine the mediating role of strategic agility on the relationship between strategic foresight through its four dimensions (technology intelligence, competitive intelligence, political environment foresight, and consumer foresight), and crisis management within the Jordanian energy sector.

1.5 Research Scope

To achieve the research objectives, this study focuses on the energy sector in Jordan. Although the investigation centres on organisational constructs such as strategic foresight, strategic agility, and crisis management, the unit of analysis is the individual manager. Each manager functions as a knowledgeable informant, offering insights into how these strategic processes are enacted within their organisational units. The study targeted managers from the key departments of the Energy Sector Regulatory Commission (ESRC) across the three primary subsectors of the industry generation, transmission, and distribution. These managers were purposively selected to complete the survey questionnaire due to their direct involvement in strategic planning, adaptive capability development, and crisis management activities, thereby ensuring the relevance and accuracy of the data collected.

Three main inclusion criteria were established for respondent selection. First, only managers working in transmission, generation, or distribution units were included, as they are responsible for system

planning, crisis response, and strategic oversight. Second, participants needed to be actively involved in functions related to strategic foresight, strategic agility, or crisis-management processes, ensuring they possessed relevant knowledge and experience in anticipating disruptions, planning responses, and maintaining energy-system continuity. Third, managers were required to have sufficient familiarity with organizational processes such as early-warning signal identification, crisis preparedness, damage containment, restoration activities, and learning mechanisms, enabling them to provide informed and accurate responses. Respondents not meeting these criteria were excluded. This approach ensures that the measurement of strategic practices and crisis-management capabilities is grounded in the experiences and judgments of those directly involved in decision-making.

Furthermore, this study examines crisis management within the energy-security context rather than general organizational crisis. The analysis focuses on the preparedness, containment, recovery, and learning mechanisms that enable Jordanian electricity organizations to anticipate, respond to, and recover from energy-related disruptions. Although the findings are grounded in the specific context of Jordan's energy-security sector, the theoretical framework and the relationships among strategic foresight, strategic agility, and multidimensional crisis management offer broader conceptual relevance for other critical-infrastructure sectors. Accordingly, the model may be cautiously generalized to countries or industries that share similar characteristics, including strategic vulnerability, energy dependence, and stringent crisis-management requirements. Nonetheless, contextual variations such as regulatory structures, cultural norms, and geopolitical dynamics should be considered when applying the findings beyond the Jordanian context.

1.6 Research Significance

This section presents both the theoretical and practical significance of the current study, which examines one model, consists of different constructs in a developing country context, which also did not examine before as a whole in a single conceptual framework in a particular context. Besides, it will present practical implications and recommendations for interested and stakeholder parties.

1.6.1 Theoretical Significance

In the new era of unexpected changes and revolutions, there is a growing interest in energy crisis management to effectively confront and adjust to unanticipated and unexpected developments. This study seeks to contribute to the literature of crisis management in the energy context, particularly from the view of strategic foresight which remains underexplored. Existing studies in energy crisis management tend to focus more on technology and policy reform, without adequate attention to the organizational strategic development in managing the issues. Therefore, the study offers perspective of strategic foresight and strategic agility as effective strategies that can anticipate and handle crisis by identifying early warning signs, so preparing in advance, containing and managing the situation, and reducing its adverse impact the study that will provide significant theoretical knowledge by examining the strategic foresight dimensions on the crisis management and strategic agility as mediator in the Jordanian electric sector.

1.7 Organization of Thesis

This thesis is organized into five main chapters, each comprising several sections designed to provide a systematic and coherent understanding of the research topic. Chapter One introduces the study and outlines its foundational elements, including the introduction, background of the study, problem

statement, research objectives, research questions, scope of the study, and the significance of the study. The chapter concludes with the definition of key terms used throughout the thesis.

Chapter Two presents a comprehensive review of the relevant literature pertaining to the study. This chapter discusses the dependent construct, crisis management, and independent constructs, namely strategic foresight, which is conceptualized through technology intelligence, competitive intelligence, political environment foresight, and consumer foresight. In addition, the literature related to the mediating construct, strategic agility, is critically examined. The chapter further reviews prior empirical studies on the relationships between the independent constructs and crisis management, as well as the mediating role of strategic agility in the relationship between strategic foresight and crisis management. The chapter concludes with the development of the proposed theoretical framework derived from relevant theoretical and empirical studies.

Chapter Three describes the research methodology adopted in this study. It details the research design, research approach, sampling procedures, and data collection methods. This chapter also explains the pre-test and pilot study conducted prior to the main field study, the measurement of the study constructs, and the data analysis techniques employed to test the proposed research model.

Chapter Four focuses on the analysis of the data collected from the study sample. This chapter presents the statistical techniques used, including Structural Equation Modeling (SEM) by employing SmartPLS version 4.0. The results are reported through tables and figures, highlighting the direct and indirect relationships among the study variables, the mediating effect of strategic agility, and the outcomes of hypothesis testing.

Finally, Chapter Five provides a comprehensive discussion of the study's findings in relation to the research objectives and prior literature. This chapter also outlines the theoretical and practical implications of the findings, the contributions of the research, and recommendations for future research.

1.8 Practical Significance

Several efforts have been made by researchers to examine the relationship between strategic foresight and crisis management in foreign countries. However, these studies and efforts are still very confined to MENA region, particularly Jordan. Also, the present study is conducted on a ground of great importance in the Jordanian economy, which is the energy sector. Furthermore, this sector is confronting a high demand with very limited energy powers to operate this sector; therefore, the energy sector needs to strengthen its strategic view side by conducting an advanced step towards the strategic foresight to manage the unexpected crisis in this sector, the energy sector is considerable and worthy in the Jordanian economic, political and social areas, there are minimal efforts, examining the strategic foresight in Jordan.

Accordingly, the current study attempts to fill this gap by concentrating on this vital sector. From a more practical perspective, this study provides real-world advantages to practitioners by setting a benchmark that businesses may use to optimize strategic foresight and achieve better crisis management through the application of strategic agility. Also, the findings of the present research study contribute to organizations' strategic management and decision by providing great tools in strategic management; strategic foresight, and strategic agility to improve crisis management.

1.9 Theoretical Contribution

This study contributes to the crisis management literature by integrating strategic foresight and strategic agility within the organizational-level frameworks of the Resource-Based View (RBV) and Dynamic Capability Theory (DCT). By combining these perspectives, the research elucidates how energy organizations develop, reconfigure, and deploy strategic capabilities to enhance crisis

preparedness and organizational resilience. A key theoretical contribution of this study lies in the empirical validation of strategic agility as a mediating capability that facilitates the translation of strategic foresight into effective crisis-management practices. This mediating relationship, which is central to the dynamic capability process, has been rarely examined quantitatively in developing-country contexts, particularly within the energy-security sector.

The study also advances the literature by operationalizing strategic foresight as a four-dimensional construct technology intelligence, competitive intelligence, political–environmental foresight, and consumer foresight thereby improving the precision, measurability, and practical applicability of foresight-based capabilities. Overall, the proposed integrative model bridges a theoretical gap between foresight and dynamic capability mechanisms, offering a multidimensional framework that is particularly relevant for public utilities and energy organizations operating in volatile, uncertain, complex, and ambiguous (VUCA) environments such as Jordan. This framework not only contributes to theory but also provides actionable insights for policymakers and managers seeking to strengthen crisis preparedness and adaptive capacity in critical infrastructure sectors.

1.10 Definition of Key Terms

The following are explanations of the most important terminology used in this research:

(a) Crisis Management - Stated according to Al Thani and Obeidat (2020) as a combination of management strategies, which start with the preparation of the crisis before it arises, are performed to handle the crisis at hand, and ends with recovery and learning activities.

(b) Learning to Detect Alarm Signals - Al Thani and Obeidat (2020) define this as an organization’s capability to identify early warning signs that may lead to a crisis and to

implement preventive measures aimed at reducing or eliminating the likelihood of a crisis occurring.

(c) Preparedness and Prevention - According to Al Thani and Obeidat (2020), this refers to an organization's ability to proactively prevent, prepare for, and adequately respond to a crisis in order to minimize its potential impact.

(d) Containment of Damages - Al Thani and Obeidat (2020) describe this as the process of controlling a crisis at its peak by making timely decisions and optimally allocating resources to minimize damage.

(e) Restoration Activity - The active organizational activity according to Karsantik (2025) is restoring an organizational system and forming its structure, relational and operational disturbances following a crisis and thus restoring organizational functionality and enhancing its future resilience.

(f) Learning - According to Evenseth and colleagues (2022), it is the systemic-level way to reflect on the past crisis events to develop knowledge, optimize processes, and increase preparedness, thereby increasing organizational resilience.

(g) Strategic Foresight - According to Vecchiato (2023), it is an organizational ability to strategically investigate the uncertainties and weak signals of the future to find strategic opportunities and threats and thus make sound and adaptive decisions within dynamic environments.

(h) Technology Intelligence - Based on the definitions provided by Garcia-Granero and Rojas (2022), this can be defined as the methodical process of determining, assessing, and leveraging technology data to inform the management of innovation and maintain competitive edge.

(i) Competitive Intelligence - According to Hughes, Peyrot and Zhang (2021), the inquiry of the competitor and market analysis that is organized and systematically gathered that allows an organization to make strategic choices proactively and increase its flexibility and competitiveness.

(j) Political-Environment Foresight - According to Burt and van der Heijden (2022), political, regulatory, and policy changes that can affect the course of strategy and organizational readiness are a capability that can be defined.

(k) Consumer Foresight - This is the definition of Chakraborty and Ghosh (2023) that means the systematic anticipation and interpretation of changing consumer values, lifestyles, and sociocultural trends, which defines long-term strategic market positioning.

(l) Strategic Agility - According to Arokodare and Asikhia (2020), the capability to detect changes in the market and swiftly realign resources, processes, and strategies based on the competitive environment to remain relevant. It has five dimensions namely internal response orientation, strategic insight, external response orientation, human-resource capability and information-technology capability.

(m) Strategic Insight - According to Arokodare and Asikhia (2020), strategic insight is the capability of the organization to extract profound knowledge out of complex strategic circumstances to make future-oriented decisions.

(n) Internal Response Orientation - According to Arokodare and Asikhia (2020), this is the ability of the organization to respond to the environmental change by adjusting internal resources and procedures in a timely manner.

(o) External Response Orientation - External response orientation is defined in terms of Felipe, Roldan, and Leal-Rodriguez (2023), as the proactive ability of an organization to observe,

interpret, and react to the external environment by involving customers, partners, and other market stakeholders in creating adaptive strategic responses to become more competent.

(p) Human-Resource Capability - The capability or flexibility of the employees to perform organizational roles under changing circumstances as defined by Arokodare and Asikhia (2020).

(q) Information-Technology Capability - According to Arokodare and Asikhia (2020), the ability of the firm enhanced performance by using IT infrastructure and digital materials effectively.

1.11 Summary of Chapter

This chapter serves as the introductory chapter of the study and comprises several key sections, including the introduction, background of the study, problem statement, research objectives, research questions, and the significance of the study. It also presents the key terms and the overall organization of the thesis. The subsequent chapter provides a comprehensive review of the relevant literature pertaining to the subject of the study.

CHAPTER 2 - LITERATURE REVIEW

2.1 Introduction

This section illustrates a brief overview of the research that has been done on similar, subdivided themes in the past. The initial part is devoted to the dependent variable of this research, crisis management, and the various facets of this aspects (i.e., discovering alarm signals, preparedness and prevention, containment of damages, restoration activity and learning). Strategic foresight is broken down into its constituent parts, technology intelligence, competitive intelligence political environment foresight and consumer foresight. In the second phase of this study, the chapter provides examples from the prior literature that shed light on the dimensions of the mediating variable in this investigation, strategic agility (i.e., strategic insight, internal response orientation, external response orientation, human resource capability and information technology capability). Also, this section will converse about how the study's development of theoretical framework and the hypotheses themselves were formulated in relation to one another.

2.2 Crisis Management (CM)

2.2.1 Crisis Management History

Focusing on current research in academia as well as the insights and experiences of many companies and agencies, the body of knowledge surrounding the development of crisis management has been enhanced by the wisdom and insights of past human societies. Throughout history, many civilizations have developed methods to deal with different types of crisis, considering the unique circumstances of each era (Burden, 2020). Study of Kimmel (2018) illustrated six characteristics that all crisis situations have in common such as rarity, importance, impact, ambiguity, urgency and high stakes.

In a time of crisis, leaders must make split-second decisions to preserve the organization's or system's most fundamental values. Pearson and Mitroff (1993) and Kao et al. (2020) categorize CM's phases into five distinct stages, each with its own requirements and priorities. Insights like these equip the company to complete the task at hand effectively. The following are the steps involved: The first stage is the identification of pre-crisis indicators, which depends on the organization's preparedness to respond to potential threats. The term "early warnings" refers to the process of identifying a potential crisis before it happens, making sure you're ready for it, and then taking steps to either stop the crisis from happening altogether or lessen its impact if it does (Brinks & Ibert, 2020). Organizational settings start to show small warnings at the signal detection stage. Some have speculated that in the 2010, the BP oil spill in the Gulf of Mexico could have been averted if several early warnings had been picked up. However, contractors and workers disregarded these warnings, leading to a horrific ecological disaster (Al Eid & Arnout, 2020).

The second stage involves the organization's capacity to prevent and respond to crisis and its readiness to deal with them. Based on the indicators of impending danger, possible crisis scenarios are created. Reducing its negative consequences while maintaining the necessary preventative measures is the objective (Coccia, 2021). Moreover, phase two follows crisis response and includes systematic preparation for the organization to handle a crisis, including key persons, resources, and actions to be distributed in such a scenario (Smith, 2018; Bhaduri, 2019). At this point, avoiding crisis should be the top priority, so it's important for the organization or management to stick to a regular routine. One of the worst industrialized disasters could have been avoided if they had recognized this operational signal sooner (De Rooij et al., 2020).

The next stages are the peak crisis stage; efforts are focused on containing the crisis (limiting damage). The company now uses its available resources to implement its crisis response strategies, which aim to mitigate the impact of the crisis and fix whatever harm it may have caused (Khamitov et al., 2020). The third stage is the containment of damage, which aims to mitigate the ill effects of the crisis. To keep a localized crisis from spreading to unaffected areas of the organization or the environment, "effective management of this phase would detail plans for doing so" (Pearson & Mitroff, 1993; Burgner et al., 2021). As a result, less harm will be done to the company. The 2011 disaster at Japan's Fukushima Daiichi nuclear plant is one such instance. Although the leaking reactors have not yet been fixed, management and government officials moved swiftly to try to do so. The fourth stage, restoring an organization, entails taking the required actions to adjust to its losses. that occurred because of the crisis. These losses can be at any level, from structural to psychological to financial. Furthermore, restoring an organization's worth is the goal by recouping the money it spent on its physical and immaterial assets.

This is accomplished by rolling out training plans that have already been developed and evaluated to ensure they will produce the desired results (Al Thani & Obeidat, 2020). The ability of an organization to recover its activity and carry on its work as usual prior to the crisis depends on a few factors, one of which is the existence of an internal communication system that aids decision-makers in swiftly acquiring the essential data (Otair et al., 2022). The fifth stage is learning, which entails internalizing the lessons learned from past crisis and using those lessons to build resilience in the face of future ones. That means taking stock of one's flaws, coming up with plans to fix them, and generally improving one's character (Bundy, Pfarrer, Short & Coombs, 2017). In the end, crisis management is all about looking back and teaching lessons learned (Pearson & Mitroff, 1993).

This stage entails analyzing the effects on primary and secondary system processes, reflecting on the crisis experience, and making changes to procedures and procedures to enhance the organization's crisis management techniques (Hutchins & Wang, 2008; Wang, 2019). Rather than being treated as an afterthought, Wang (2008) argued that learning should be integrated into each of the five phases of crisis management. In other words, education is best achieved through a never-ending cycle of self-reflection and critical analysis (Wang, 2008). The management of some companies has decided to shut down because of their inability to effectively learn from past crisis. Lehman Brothers and Merrill Lynch are two companies that collapsed after the 2008 economic crisis. Blame games, problems with information handling (i.e., disregarding signal detection stage warnings), and organizational politics and cover-ups are some of the most significant impediments to organizational learning (Pidgeon & O'Leary, 2000; Mostafanezhad, 2020).

2.3 Strategic Foresight (SF)

Strategic foresight is situated within the broader domain of strategic thinking, which, together with strategy development and strategic planning, constitutes the core components of organizational strategy (Rastegari et al., 2021). According to Van der Laan (2021), strategy development bridges strategic thinking and strategic planning, facilitating informed organizational decision-making. Within this process, foresight forms a critical element of strategic thinking, as it enhances decision quality during planning by enabling organizations to anticipate future developments (Conway, 2016).

Foresight has been widely defined as a structured, participatory, future-intelligence process that guides present-day decisions and mobilizes collective action through medium to long term vision building (Izadi, Seiti & Jafarian, 2022). Meantime, Berger, Bourbon-Busset, and Massé (2008) highlight three foundational tenets of foresight: the existence of alternative futures, the capacity to track changes, and

the ability to shape the future. Unlike traditional forecasting, which is often unable to predict outcomes in periods of high uncertainty, foresight provides a platform for envisioning multiple plausible futures (Buehring & Bishop, 2020).

2.3.1 Strategic Foresight in Crisis Management Context

The role of strategic foresight becomes particularly critical in volatile environments where organizations must respond to rapid changes and emerging threats. In increasingly globalized and competitive markets, firms must remain flexible and innovative, making strategic foresight vital for organizational adaptation and survival (Greenblott et al., 2019; Canyon, 2021). Strategic foresight assists organizations in recognizing moments of change, formulating appropriate strategies, and executing plans that support continuity and resilience. As Burrow and Gnad (2018) argue, the ability to cultivate a clear vision of the future is essential for addressing organizational challenges in highly complex and competitive environments, especially as crisis intensify and their impacts become more severe.

In the context of crisis management, strategic foresight offers a suite of tools and procedures that enable organizations to avoid, prepare for, respond to, and recover from crisis (Al-Omari, Alomari & Aljawarneh, 2020). This positions crisis management as a central priority of strategic foresight, emphasizing its significance for leaders tasked with navigating periods of disruption. However, crisis environments are characterized by heightened complexity and uncertainty, particularly in relation to technology systems. Nishant et al. (2020) note that professionals face challenges due to fragmented or incomplete information, interdependent decision-making across actors, and constraints in time and resources. Enhanced data availability can support more coordinated and rapid crisis responses, while

emerging technologies such as artificial intelligence to hold promise for managing this complexity (Gadekar et al., 2022).

Strategic foresight incorporates several key components. Sarpong and Meissner (2018) identify technology intelligence, competitive intelligence, political environment foresight, and consumer foresight as central dimensions. Technology intelligence involves detecting and interpreting weak signals related to emerging technologies; competitive intelligence concerns the evaluation of competitors and market dynamics; political environment foresight focuses on anticipating political or social shifts; and consumer foresight concerns predictions of evolving customer needs. Collectively, these dimensions support organizations in navigating complex and dynamic environments.

2.3.2 Technology Intelligence (TI)

Technology intelligence refers to the systematic process through which organizations monitor, interpret, and anticipate technology changes that may influence their competitive position. As noted by Dwivedi et al. (2021), technology intelligence enables firms to understand how rapid shifts in technology and the broader business environment can affect their strategic standing. Its effective implementation requires deliberate organizational effort, including the use of advanced tools for data collection and analysis, mechanisms for disseminating intelligence to decision-makers, and personnel equipped with the requisite skills and experience to manage technology insights. Because information varies in quality, evaluating the reliability and accuracy of technology data becomes essential for detecting potential issues and minimizing errors (Sacks et al., 2020).

A central aspect of technology intelligence is the prediction and monitoring of technology trends, which helps organizations connect technology progress with market demand. This enables firms to

distinguish between technologies already in use and emerging technologies with potential future application, even when their trajectories remain uncertain. Leone et al. (2021) emphasize that the core function of technology intelligence lies in gathering and disseminating information that allows organizations to assess both risks and opportunities associated with technology developments. Similarly, Sader et al. (2022) define technology intelligence as a systematic approach to collecting, interpreting, and distributing information about the technology environment to uncover untapped opportunities. The intelligence process includes identifying information needs, sourcing relevant data, acquiring and processing this information, and translating it into actionable insights (Chamoso et al., 2018).

Past studies noted that technology intelligence plays an increasingly vital role in crisis management. As Sacks et al. (2020) highlight, assessing the consistency and integrity of information is crucial for reducing errors during crisis preparedness and response. When paired with structured collection and interpretation processes, technology intelligence helps organizations make informed decisions under uncertainty (Chamoso et al., 2018; Sader et al., 2022). It also supports the identification of alternative technology solutions, mitigation of risks associated with emerging technologies, and exploitation of new opportunities that may arise during a crisis. Additionally, technology-intensive and knowledge-based industries benefit from technology intelligence during crisis, as it enhances their capability to remain innovative and resilient in volatile environments (Khan & Waseem, 2022).

Collectively, these studies demonstrate that technology intelligence is a strategic tool that strengthens organizational resilience by improving the capacity to anticipate, interpret, and respond to technology-driven disruptions.

2.3.3 Competitive Intelligence (CI)

Competitive Intelligence (CI) is widely defined as the systematic and ethical process of collecting, analyzing, and managing information about markets, competitors, and technologies to support strategic decision-making. According to McLeana and Woodsb (2019), the Society of Competitive Intelligence Professionals (SCIP) describes CI as a programmatic and ethical process of gathering and analyzing data, information, and knowledge about a company's business environment that provides competitive advantage and enables sound decision-making. In this sense, CI functions as a strategic early warning system. Seebacher (2021) situates CI within the broader domain of Business Intelligence (BI) and Knowledge Management, noting that it is sometimes referred to as strategic or corporate intelligence. Importantly, CI is not equivalent to industrial espionage; rather, its purpose is to ethically collect and analyze diverse information that offers a holistic picture of competitors' organizational structures, cultures, behaviors, strengths, and weaknesses (Ali & Anwar, 2021). Madureira et al. (2021) further emphasize that CI culminates in actionable intelligence essential insights about markets and rivals used to forecast outcomes and make strategic recommendations.

The role of CI in crisis management has been increasingly recognized in recent studies. Guan (2012) highlights CI's contribution to strategic foresight by detecting potential crisis within a structured policy framework, enabling organizations to anticipate risks and respond proactively. Yiu et al. (2021) provide empirical evidence that CI strengthens crisis alarm systems by detecting real-time signals and supporting informed responses, thereby shifting organizations away from reactive "remedial management." Samtani et al. (2020) add that CI enhances internal processes, cross-departmental collaboration, and product quality, which indirectly bolster organizational resilience during crisis. Nonetheless, challenges remain: Caserio and Trucco (2018) argue that varying acquisition methods limit the generalizability of CI practices, particularly in crisis contexts where uncertainty requires

combining qualitative and quantitative analyses. Taken together, these studies demonstrate that CI not only improves competitive positioning but also plays a critical role in strengthening crisis management capabilities and long-term organizational performance.

2.3.4 Political Environment Foresight (PEF)

Political environment foresight refers to the systematic anticipation of potential political, social, and environmental developments that may affect governance and policymaking (Burt & van der Heijden, 2022). Manu (2022) highlights that governments face increasing challenges such as climate-induced emergencies, digitalization, and political instability, requiring foresight to navigate uncertainty. Sardain et al. (2019) argue that in highly uncertain contexts, prediction alone is of limited benefit; instead, foresight involves cataloging possible future states, examining their effects, and identifying policy consequences. Strategic foresight, as defined by Greenblott et al. (2019), uncovers assumptions, challenges preconceived notions, and uses methods such as weak signal detection, megatrend analysis, and scenario building to prepare for multiple futures. Havas and Weber (2018) emphasize that governments often struggle to adopt long-term perspectives due to urgent short-term pressures, while Noveck (2015) warns that policies ignoring new information or relying on outdated assumptions risk being counterproductive. Dinges et al. (2018) further describe foresight as essential whenever substantial doubt exists about future contexts, enabling governments to adapt policies at national and sectoral levels.

In the crisis management context, political foresight plays a critical role in strengthening resilience. Van Woensel (2019) identifies three contributions of foresight to policymaking: anticipation (preparing for future opportunities and challenges), policy innovation (incentivizing new approaches), and futureproofing (testing policies to their limits). In addition, Makian and Nematpour (2021)

demonstrate that politically astute leaders using foresight are better able to anticipate and adapt to shocks that could trigger crisis. This builds on Guan's (2012) earlier work on foresight as a sub-construct of crisis management, showing that structured foresight frameworks enable detection of potential crisis and informed responses. Jointly, these studies confirm that political environment foresight enhances governments' ability to move beyond reactive management, anticipate disruptions, and design policies that strengthen crisis preparedness and long-term adaptability.

2.3.5 Consumer Foresight (CF)

Consumer foresight, sometimes referred to as customer foresight, is an emerging approach that integrates traditional customer research with foresight methodologies to anticipate future consumer needs and preferences. It combines the study of current consumer behavior with projections of desired future circumstances, products, and services, thereby filling a gap in the literature on how organizations can strategically prepare for evolving demands. The term "customer foresight" is defined as a planning method that considers consumers' wants and needs alongside the dynamics of change and their anticipations of forthcoming conditions, commodities, and offerings (Schweitzer, Hofmann & Meinheit, 2019). This methodological shift reflects both the importance of foresight in general and the difficulty of placing the customer at the center of strategy, innovation, and long-term planning. Strategic foresight that offers intelligence solutions pertaining to consumers is regarded as one of its most valuable features.

In the context of crisis management, consumer foresight provides organizations with the ability to anticipate shifts in consumer behavior during periods of disruption. By combining insights from customer research with foresight analysis, firms can detect weak signals of changing preferences and prepare adaptive strategies that mitigate the risks of sudden market shocks. Although the literature on

consumer foresight in crisis management is still emerging, its alignment with strategic foresight frameworks suggests that it can strengthen resilience by enabling proactive responses to crisis, ensuring that consumer needs remain central even under volatile conditions. This positions consumer foresight as a critical tool for organizations seeking to balance immediate crisis responses with long-term adaptability and competitiveness.

2.4 Strategic Agility (SA)

Strategic agility (SA) has been defined in multiple ways across literature. Khoshnood and Nematizadeh (2017) describe SA as encompassing responsiveness and knowledge management, emphasizing an organization's ability to adapt to new circumstances by altering resources, processes, and strategies in line with market opportunities and threats. Arokodare and Asikhia (2020) highlight that agile organizations outperform competitors through responsiveness, competence, flexibility, and speed. Elali (2021) views SA as the capacity of businesses to evolve, transform, and survive by implementing regular strategic changes that enhance firm value. Similarly, Arokodare et al. (2019) define SA as the ability to reallocate and redirect resources effectively and in a timely manner toward value-creating and value-protecting activities in response to internal and external changes. Teece, Peteraf, and Leih (2016) reinforce this perspective, describing SA as the efficient reorientation of resources to safeguard and generate value under shifting circumstances. From a resource-based view, organizational agility depends on the ability to discover, mobilize, and reorganize tangible and intangible resources to execute new strategies quickly (Liu, Wei, & Zheng, 2023). Open innovation studies further stress the importance of acquiring unique resources, such as knowledge through outsourcing (Bogers et al., 2020), while expertise itself is considered a critical resource in fast-paced markets (Cillo et al., 2019).

In the crisis management context, strategic agility is increasingly recognized as a vital capability. Kale et al. (2019) note that while SA is consistently identified as a competitive advantage, there remains limited understanding of its origins, influencing factors, and outcomes. Nonetheless, evidence suggests that SA enables firms to adapt to crisis by leveraging foresight, responsiveness, IT expertise, and human resources. Saeidi et al. (2019) argue that strategic foresight, combined with internal and external focus, responsiveness, and technology and human resource capabilities, contributes significantly to organizational success and resilience. Arokodare and Asikhia (2020) conceptualize SA in terms of internal response orientation, strategic insight, external response orientation, IT capability, and HR capability, all of which are critical for navigating crisis and maintaining competitiveness in volatile environments. Collectively, these studies demonstrate that strategic agility equips organizations with the flexibility and speed necessary to weather crisis, sustain performance, and preserve long-term competitive advantage.

2.4.1 Strategic Insight (SI)

As a component of strategic agility, strategic insight (SI) is the first building block (Mavengere, 2013). An organization's predisposition to concentrate on the here and now, learning from and capitalizing on complex strategic situations as they develop is known as "real-time learning" (Al-Romeedy, 2019). SA incorporates both external sensing (also known as "the outside view") and internal awareness (also known as "the inside view") within the context of the organization (Mavengere, 2013). Probing and experimenting to gain insight into the organization's strengths and weaknesses in the context of its external environment can lead to a testing of the company's fundamental business assumptions, which can then be used to further define, refine, and hone those assumptions. On the other hand, when executives engage in external sensing, they step outside their routine logic and begin to model the organization’s interaction with its environment, thereby gaining new insights into both (Kaya, 2023).

2.4.2 Internal Response Orientation (IRO)

Within the broader construct of strategic agility (SA), internal response orientation (IRO) represents an organization's ability to reorganize its resources and processes swiftly and smoothly in response to, or anticipation of, changes in the business environment. Mavengere (2013) and Papadas et al. (2019) define strategic response as the capacity to adapt in tandem with consumers and business partners, ensuring that internal structures remain aligned with external developments. This orientation emphasizes proactive flexibility, enabling firms to adjust operations before disruptions escalate.

In the context of crisis management, IRO plays a critical role in organizational resilience. Jiang, Ritchie and Verreynne (2019) argue that businesses that develop crisis response plans grounded in internal response analysis are better prepared to manage unforeseen events. By embedding responsiveness into organizational routines, firms can mitigate risks, sustain performance, and maintain stakeholder confidence during turbulent periods. Thus, IRO serves as a vital sub-construct of SA, linking internal adaptability with effective crisis preparedness.

2.4.3 External Response Orientation (ERO)

External Response Orientation (ERO) is a sub-construct of strategic agility (SA) that emphasizes an organization's ability to anticipate market events and developments ahead of rivals. Doz and Kosonen (2008) define ERO as the capacity to build and maintain connections with diverse individuals and institutions to absorb new knowledge, insights and innovations. This market-facing orientation enables organizations to recognize the importance of innovation and proactively adapt to external changes.

From a strategic response perspective, Mavengere (2013) describes ERO as the degree to which an organization is prepared to react or proactively prepared to react to its business environment in

response to external events. Arokodare and Asikhia (2020) further conceptualize ERO as a critical dimension of SA, highlighting its role in equipping firms with the foresight and adaptability necessary to remain competitive in dynamic markets.

2.4.4 Summary of the Study Variables

The following Table 2.1 presents a summary of the study variables that have been discussed earlier.

Table 2.1: Summary of the Study Variables

Variable	Authors	Study Context	Key Findings
Crisis Management (CM)	Pearson & Mitroff (1993); Brinks & Ibert (2020); Khamitov et al. (2020); Burgner et al. (2021); Bundy et al. (2017); Smal & Wieprow (2023)	Crisis management; corporate crisis response; energy sector	CM consists of five stages and requires effective detection, preparedness, damage containment, restoration, and learning. Studies show that energy-sector firms need robust strategic capabilities to respond to global energy crisis and financial instability.
CM – Historical Perspectives	Burden (2020); Kimmel (2018)	Historical crisis evolution	Crisis are characterized by urgency, ambiguity, rarity, and high stakes, requiring rapid and informed decision-making.
Strategic Foresight (SF)	Rastegari, Hosseini & Ghayoor (2020); Rastegari et al. (2021); Van der Laan (2021); Conway (2016); Izadi et al. (2022); Berger et al. (2008); Buehring & Bishop (2020); Alizadeh et al. (2016)	Strategic management; foresight; crisis studies; energy sector	SF significantly influences crisis management and human resource agility. SF strengthens decision quality, anticipates multiple futures, and supports long-term planning. Energy-sector foresight studies emphasize the importance of political, economic, and technology factors in crisis handling.
SF in Crisis Context	Greenblott et al. (2019); Canyon (2021); Burrow & Gnad (2018); Al-Omari et al. (2020); Nishant et al. (2020); Gadekar et al. (2022); Flaih	Crisis environments; SMEs; public & private sectors	SF tools help organizations avoid, prepare for, respond to, and recover from crisis. Studies show SF enhances strategic agility and is associated with better organizational readiness

	& Chalab (2022); Halim, Zainal & Ahmad (2021)		during crisis such as pandemics and energy instability.
Technology Intelligence (TI)	Dwivedi et al. (2021); Leone et al. (2021); Sader et al. (2022); Chamoso et al. (2018); Sacks et al. (2020); Khan & Waseem (2022)	Technology forecasting; innovation; crisis preparedness	TI strengthens crisis preparedness by detecting technology risks, improving data accuracy, and enabling timely technology adaptation in uncertain environments.
Competitive Intelligence (CI)	McLean & Woods (2019); Seebacher (2021); Ali & Anwar (2021); Madureira et al. (2021); Guan (2012); Yiu et al. (2021); Samtani et al. (2020)	Competitive intelligence; strategic decision-making	CI serves as an ethical early-warning system, identifies risks, informs competitive strategy, and enhances crisis-response capability.
Political Environmental Foresight (PEF)	Burt & van der Heijden (2022); Manu (2022); Havas & Weber (2018); Noveck (2015); Dinges et al. (2018); Van Woensel (2019); Makian & Nematpour (2021)	Public policy; political foresight	PEF supports policy innovation, anticipates political disruptions, improves futureproofing, and enhances crisis preparedness in unstable environments.
Consumer Foresight (CF)	Schweitzer et al. (2019)	Strategic marketing; consumer behavior	CF helps organizations anticipate future consumer needs and behavioral shifts, supporting proactive adaptation during crisis.
Strategic Agility (SA)	Arokodare & Asikhia (2020); Khoshnood & Nematizadeh (2017); Elali (2021); Teece et al. (2016); Liu et al. (2023); Bogers et al. (2020); Fakunmoju, Arokodare & Makinde (2020)	Dynamic markets; oil & gas sector; competitive environments	SA improves organizational flexibility, responsiveness, and performance. IT capability and foresight significantly contribute to agility, which enhances competitive advantage and organizational adaptability during crisis.
Strategic Insight (SI)	Mavengere (2013); Al-Romeedy (2019); Kaya (2023)	Strategic sensing; decision-making	SI enables real-time learning, internal awareness, and external scanning, strengthening crisis decision-making and environmental interpretation.
Internal Response Orientation (IRO)	Mavengere (2013); Papadas et al. (2019); Jiang et al. (2019)	Organizational adaptability	IRO reflects a firm's ability to reorganize internal structures quickly to maintain performance and stability during crisis.

External Response Orientation (ERO)	Doz & Kosonen (2008); Mavengere (2013); Arokodare & Asikhia (2020)	Market responsiveness; innovation	ERO supports anticipatory response to market shifts and external disruptions, which enhances crisis adaptability.
Human Resource Capability (HRC)	Alhadid & Qaddomi (2016); Mavengere (2013); Gary et al. (2021); Azzam-Elmasri (2017); Al-Hosani & Mohammed-Arbab (2017)	Human resource capability; workforce agility	HRC strengthens crisis response by ensuring a skilled, adaptable workforce capable of supporting organizational flexibility during disruptions.
Information Technology Capability (ITC)	Mavengere (2013); Chu et al. (2019); Fakunmoju, Arokodare & Makinde (2020)	IT capability; digital transformation	ITC improves data-based decision-making, enhances responsiveness, and plays a critical role in supporting strategic agility under crisis conditions.

The body of literature across crisis management, strategic foresight, and strategic agility consistently highlights the central role of anticipatory and adaptive capabilities in strengthening organizational resilience. Crisis management research establishes that effective handling of crisis requires mastery of the five core stages, namely signal detection, preparedness, damage containment, restoration, and learning. Studies from diverse contexts, including corporate settings and the global energy sector, show that organizations with strong analytical systems, structured preparedness, and proactive decision-making are better able to navigate high-uncertainty events. Complementing this, research on strategic foresight demonstrates its value in enabling organizations to anticipate technology, competitive, political, and consumer-related changes.

Empirical findings indicate that strategic foresight contributes significantly to crisis readiness, HR agility, organizational decision quality, and energy-sector stability. These studies collectively show that foresight creates the foundation for recognizing emerging risks and shaping strategic responses before crisis escalate.

Parallel evidence from strategic agility literature reinforces the importance of adaptability, responsiveness, and rapid resource reconfiguration in turbulent conditions. Strategic agility, through its dimensions of strategic insight, internal and external response orientation, human resource capability, and IT capability, supports organizations in interpreting environmental changes, mobilizing resources efficiently, and implementing timely responses during crisis. Prior studies across different sectors, including oil and gas, SMEs, and dynamic markets, confirm that agility enhances performance, competitive advantage, and crisis responsiveness, especially when supported by technology and foresight capabilities.

Integrating these perspectives, the literature strongly supports the conceptual foundation of the present research framework, which positions crisis management as the dependent variable influenced by the independent variables of strategic foresight and strategic agility. Cooperatively, past studies suggest that while foresight generates the anticipatory intelligence needed for crisis recognition and preparation, agility enables the translation of this intelligence into effective action, making both constructions essential for understanding and improving crisis management in organizational settings

2.4.5 Human Resource Capability (HRC)

Human Resource Capability (HRC) is a vital sub-construct of strategic agility that reflects the adaptability and effectiveness of an organization's workforce. Alhadid and Qaddomi (2016) define HRC as the capacity of individuals to assume pivotal roles in dynamic companies facing continuous environmental shifts. The efficiency and effectiveness with which employees perform their assigned tasks serve as indicators of HR capability (Mavengere, 2013). From a structural perspective, Gary, Wood, and Collins (2021) describe HRC as a set of guidelines and regulations that enable management to carry out diverse organizational functions effectively.

Meanwhile, workforce planning further strengthens HRC. Azzam-Elmasri (2017) and Al-Hosani and Mohammed-Arbab (2017) emphasize that managers enhance HR capability by assessing project personnel requirements and filling positions with candidates who meet both quantitative and qualitative standards. This ensures organizations maintain the right mix of skills and resources to respond to evolving challenges. Together, these definitions highlight HRC as a foundation for organizational resilience, enabling firms to adapt strategically through effective workforce deployment and management.

2.4.6 Information Technology Capability (ITC)

According to Mavengere (2013) taxonomy of Strategic Agility (SA), Information Technology Capabilities (ITC) are a sub-construct of the collective capabilities dimensions of SA and can be defined as an organization's skill at making productive use of its data and digital assets. Chu et al. (2019) emphasize that firms with robust information infrastructure and resources for their core functions are better positioned to operate effectively. In competitive markets, the ability to utilize and manage information resources efficiently becomes a critical determinant of organizational performance.

By embedding ITC into the broader framework of SA, organizations enhance their responsiveness, adaptability, and resilience. Effective ITC not only supports day-to-day operations but also strengthens strategic foresight and crisis preparedness by ensuring that data-driven insights can be mobilized quickly to guide decision-making.

2.5 Research Gap

Table 2.2 provides a comprehensive review of past studies and highlights several research gaps identified in the existing literature.

Table 2.2: Gaps in the Previous Studies

No.	Authors / Years	Findings	Gaps
1	Rastegari, Hosseini & Ghayoor (2020)	The findings indicate that strategic foresight talents have a significant 37% effect on crisis management. Additionally, strategic foresight capabilities have a substantial influence on the agility of human resources, accounting for 55% of the overall impact.	The study considered the strategic foresight capabilities only without considering the intelligence aspects and consumer and political issues. Also this study considered human resource agility only and their impact on the crisis management, the researcher study tries to fill these gaps.
2	Arokodare, & Asikhia (2020)	The authors of this study created a conceptual model to illustrate the connection between strategic agility and the performance of businesses. A large body of research has linked strategic flexibility and strategic foresight to increased productivity and profitability at successful businesses.	This study examines the impact of strategic agility and strategic foresight and their impact on the organization performance, while the recent study examines their impact on the crisis management, also the strategic foresight dimensions do not include the political environment and intelligence, the recent study will try to fill this gap.
3	Fakunmoju, Arokodare, & Makinde (2020)	The findings indicate that the correlation between strategic agility and competitive advantage in oil and gas marketing companies is substantially influenced by both information technology capacity and strategic foresight.	This study considered only the term of information technology capability, while the recent study examines another capability as human resource capability as dimension of the strategic agility, also this study examines strategic foresight as moderator on the impact of the strategic agility on the competitive advantage. While the recent study examines the mediating role of strategic agility on the impact of foresight on the crisis management.
4	Flaih & Chalab (2022)	This study aims to determine the influence of strategic foresight on strategic agility by examining its dimensions, including environmental scanning capabilities, strategic selection capabilities, and integration capabilities. Additionally, the study seeks to identify the impact of strategic agility and its dimensions, namely strategic sensitivity, strategic response, and strategic learning.	The recent study examines the impact of the strategic foresight and strategic agility with different dimensions; in different country Jordan and different sector is energy. Also, the recent study and the crisis management as dependent variable and examine the impact of strategic foresight on it with the meditation role of the strategic agility.

5	Halim, Zainal & Ahmad (2021)	The study found that strategic agility was significantly related to technology intelligence and political & environmental foresight, but not to the other two factors. The findings of this study Benefit Small and Medium-Sized Enterprises (SMEs) by illuminating factors that may help them prepare for and adapt to the pandemic	The recent study adds to the model of the impact of the Strategic Foresights and strategic agility among another factor which is the crisis management as dependent variable, and the model will be examined in another context Jordan and another sector; energy sector regarded the strategic agility as mediator in this relationship.
6	Smal & Wieprow (2023)	Considering the ongoing global energy crisis, the article's objective is to evaluate Poland's consumer energy security from the standpoint of energy price stability and the financial standing of Polish energy industry firms.	This study mentions the research gap in the fact that the existing studies do not analyze the issue of energy security in terms of the impact of the global crisis on the financial condition of energy companies. This study fills this gap by consider the strategic foresight and strategic agility as factors to manage any unexpected crisis in the Jordanian energy security sector.
7	Alizadeh et al. (2016)	The study attempted to provide a foresight and strategic management planning method for Iran's energy industry. Core techniques are limited, according to the report. These key uncertainties and expert information led to technology-driven, stagnation, and self-sufficiency scenarios. Several robust methods were found for these cases. National energy efficiency and productivity gains boosted robustness. Overall, economic and political factors will determine Iran's energy future, followed by technology and social factors.	This study fills this gap by consider the strategic foresight and strategic agility as factors to manage any unexpected crisis in the Jordanian energy security sector using empirical study within the managers of the energy companies in Jordan, this study also built on therotical model of the RVB and DCT theories.

Generally, these gaps could be categorized into various issues. First, there is a limited scope of strategic foresight and agility dimensions. Many prior studies (e.g., Rastegari, Hosseini & Ghayoor, 2020; Arokodare & Asikhia, 2020) considered only general foresight capabilities, without integrating broader dimensions like technology intelligence, competitive intelligence, political foresight, and consumer foresight. This leaves a gap in understanding the holistic role of foresight in crisis contexts. Similarly, there is a notable narrow interest of agility dimensions. Prior research often emphasized single capabilities such as IT capability (Fakunmoju et al., 2020) or human resource agility (Rastegari

et al., 2020), while neglecting the multidimensional nature of strategic agility (strategic insight, internal response orientation, external response orientation, HR capability, IT capability). Hence, a comprehensive view is needed to capture agility's full contribution to resilience.

Second, past studies tend to focus on performance rather than crisis management. Several studies (Arokodare & Asikhia, 2020; Fakunmoju, Arokodare & Makinde, 2020) examined foresight and agility mainly in relation to organizational performance or competitive advantage, rather than their impact on crisis anticipation, adaptation, and recovery. In the Jordanian energy sector context that facing volatility and security challenges, crisis-centered perspective is more crucial. moreover, existing studies were conducted in contexts such as SMEs (Halim, Zainal & Ahmad, 2021), oil and gas marketing (Fakunmoju et al., 2020), or national energy planning in Iran (Alizadeh et al., 2016). Few have empirically tested foresight–agility–crisis management relationships in the Jordanian energy sector, which faces unique challenges of energy security, geopolitical pressures, and global crisis spillovers (Smal & Wieprow, 2023).

Third, there is a lack of integration with crisis management frameworks. While some studies explored foresight and agility, they did not explicitly connect these constructs to crisis management dimensions such as alarm signal detection, preparedness, containment, restoration, and learning (Al Thani & Obeidat, 2020). This gap limits practical applicability for organizations navigating crisis. Finally, there is unexplored mediating role of strategic agility. Most prior studies treated foresight and agility as independent or moderating factors (e.g., Fakunmoju et al., 2020), but the mediating role of strategic agility in the relationship between foresight and crisis management has not been systematically examined. This is critical, as agility translates foresight insights into actionable crisis responses, bridging anticipation with adaptation and recovery.

These shortcomings highlight the need for a multidimensional study in the Jordanian energy sector that explicitly investigates how strategic foresight enhances crisis management outcomes through the agility of organizations, thereby advancing both theory and practice in crisis management.

2.6 Underpinning theory

There are a few theories of organizational level that were previously utilized in the research to describe how companies can be able to become adaptable, resilient, and innovative through uncertainty. They include Technology-Organization-Environment (TOE) framework, Contingency Theory, Dynamic Capability Theory (DCT), and the Resource-Based View (RBV). Table 2.3 illustrates overview of theories used in the crisis management studies.

Table 2.3: Overview of Theories Used in Crisis Management Studies

No.	Theory	Core Focus	Typical Application in Literature	Key References	Relevance To This Study
1	Resource-Based View (RBV)	Internal resources as sources of sustainable competitive advantage	Strategic management, agility, innovation	Barney (1991); Wernerfelt (1984)	Explains how internal foresight and agility resources strengthen crisis response.
2	Dynamic Capability Theory (DCT)	Ability to integrate, build, and reconfigure internal/external competencies	Agility, resilience, change management	Teece et al. (1997, 2016); Eisenhardt & Martin (2000)	Explains how foresight enables reconfiguration of resources during crisis.
3	Technology–Organization–Environment (TOE)	Interaction between technology adoption, organizational context, and environment	IT adoption, digital transformation	Tornatzky & Fleischer (1990)	Related but limited to technology adoption, not capability renewal.
4	Contingency Theory	Fit between organizational structure and external environment	Structural design, performance	Donaldson (2001)	Offers partial explanation but lacks dynamic adaptation perspective.

5	Institutional Theory	Conformity to norms, regulations, and legitimacy pressures	Policy and energy sector compliance	DiMaggio & Powell (1983)	Explains regulatory influence but not internal capability building .

While the presented theories vary in focus and application, this study adopts the Dynamic Capabilities Theory (DCT) and the Resource-Based View (RBV) as its theoretical foundation due to their strong relevance to organizational resilience and crisis management. Both theories are organizational in nature and directly explain how firms develop, deploy, and reconfigure internal resources and capabilities; such as strategic foresight and strategic agility to respond effectively to external turbulence, which aligns with the unit of analysis in this study (energy organizations). Specifically, RBV highlights the strategic value of resources that are valuable, rare, inimitable, and non-substitutable, while DCT explains how firms continuously rejuvenate and rearrange these resources to adapt to dynamic environments. Collectively, they provide a comprehensive lens for understanding the foresight–agility–crisis management mechanism. Prior studies (e.g., Teece et al., 2016; Arokodare & Asikhia, 2020; Makian & Nematpour, 2021) have successfully applied DCT and RBV to frameworks of foresight and agility, demonstrating their predictive power and theoretical fit in dynamic industries, including energy. In contrast, other theories such as the TOE framework and Contingency Theory emphasize structure–environment fit but fall short in capturing the dynamism of capability transformation, which is central to crisis management. Thus, the integration of DCT and RBV offers the most robust theoretical background for this study, enabling a deeper explanation of how strategic foresight and agility interact to strengthen crisis management in the Jordanian energy sector.

2.6.1 Dynamic Capability Theory (DCT)

Dynamic Capability Theory (DCT) is the ability of an organization to shift its resource allocation deliberately about the shifting conditions. The concept of the dynamic capabilities' theory developed by Teece et al. (1997) study which defines the ability of the firm to respond to the dynamism of the environment by use, creating and restructuring of internal and external capabilities. Talks about the way the companies react or create changes in their challenging business settings through the way the individual skills and abilities of their company are changed into new ones. (Teece, 2007; Daz-Chao et al., 2021). Dynamic Capabilities Theory (DCT) was a strategy that aided in illustrating relationship between the resources and the success of an organization in the market. The DCT provides this additional argument of why there are so many avenues through which businesses can contrive to sail through the tempests of the prevailing economy.

DCT architecture has three assumptions. To begin with, the proficiency to recognize and to create positively desirable circumstances. The second is to jump on positive situations. Third, so that they can continue by restructuring the resources of the company to survive (Mudalal, 2021). The DCT approach has its reputation and solid theoretical background but does not provide the solution to the complex of issues concerning adapting to the dynamism of the business environment. The problem of understanding dynamic capabilities as it is perceived by Escorcia-Caballero et al. (2022) is managerial perceptions of the necessity of the change as the role of their perception of the external environment and internal environment of their companies. The manager might not understand the necessity of change and provide the most suitable DCT.

In addition, the DCT framework assists managers to improve the performance of business and avoid the crisis that are inherent to the work in globally competitive markets, and academics may learn more

about the latent factors that make the enterprise successful in the long run (Mudalal, 2021). The framework represents the goal of research on strategies and innovations, but it is a synthesis of these two elements that focus on highlights the leadership capabilities that a company ought to be capable of to be able to succeed in the long run (Teece, 2007). To ensure the presence of a company, its competitiveness, and performance, the highest-level capabilities are the dynamic capabilities that allow gathering knowledge, responding quickly, sharing, and continuously updating the working process, communication with the environment, and decision evaluation (Pitelis & Wang, 2019). According to Helfat et al. (2007), the definition of Dynamic Capability Theory (DCT), the essence of the theory lies in an organization's ability to systematically develop, reconfigure, and redeploy its resources in response to external shocks. This view is consistent with Sahebalzamani et al. (2022), who emphasize that firms exhibiting strong dynamic capabilities are better positioned to adapt to their resource base when faced with sudden environmental disruptions.

Strategic foresight, which is conceptualized in this study as (technology intelligence, competitive intelligence, consumer foresight and political environment foresight), and strategic agility, which is also conceptualized in this study as strategic insight, external response orientation, internal response orientation, information technology capability, human resource capability, are both seen as capabilities to support organizations in managing change based on the DCT theory (Rashid & Ratten, 2021).

2.6.2 Resource-Based View Theory (RBV)

This research is grounded in a Resource-Based perspective. Penrose's (1959) seminal work on the theory of firm growth provided the intellectual foundation for the development of the Resource-Based View (RBV), later formalized by Barney (1986). A source of competitive advantage that boosts a company's performance is its valuable, rare, and difficult-to-replicate and-substitute resources, as

stated by the RBV (Barney, 1991). According to the RBV, a company's exit performance and competitiveness can be predicted in large part by its level of strategic agility, which is defined as the availability of strategic insight (in terms of internal response orientation, external response orientation, human resource capability, information technology capability) and strategic foresight (in terms of technology intelligence, competitive intelligence, political environment foresight, and consumer foresight) (Alvarez & Busenitz, 2001; Arokodare & Asikhia, 2020).

Both technology intelligence, competitive intelligence, political environment foresight, and consumer foresight are emphasized as important strategic resources for a firm in this theory (Zhou, Zhang, Chen & Han, 2017). Hence, a company's resilience in the face of uncertainty and crisis increases when it has access to these strategic resources, which improves its ability to perceive and capitalize on opportunities, to take calculated risks, and to take the initiative (Davidson & Honing, 2003).

2.7 Theoretical Framework

Building on the insights from the literature review, this study develops a conceptual framework that integrates strategic foresight, strategic agility, and crisis management within the context of the Jordanian energy sector. The framework is grounded in the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), which together explain how organizations create, deploy, and reconfigure valuable resources and capabilities in response to external turbulence. RBV emphasizes the strategic value of resources that are valuable, rare, inimitable, and non-substitutable, while DCT highlights the dynamic processes through which firms adapt and transform these resources to meet changing environmental demands. By combining these perspectives, the framework provides a comprehensive lens for understanding how foresight-driven agility enables organizations to anticipate, adapt to, and recover from crisis. Specifically, strategic foresight is conceptualized as the independent variable,

strategic agility as the mediating variable, and crisis management as the dependent variable, with each construct treated as multidimensional to capture the complexity of organizational resilience in energy security.

Crisis management is conceptualized as a multidimensional construct comprising five dimensions; namely discovering alarm signals, preparedness and prevention, containment of damages, restoration activity and learning (Al Thani & Obeidat, 2020; Duchek, 2020; Haase, 2023; Shams et al., 2022). This multidimensional approach provides a more comprehensive understanding of how strategic foresight and strategic agility jointly enhance resilience and operational continuity in the energy-security context.

Meanwhile, strategic foresight comprises four dimensions: technology intelligence, competitive intelligence, political environment foresight, and consumer foresight (Rohrbeck et al., 2015). Strategic agility, in turn, consists of five dimensions strategic insight, internal response orientation, external response orientation, human resource capability, and information technology capability as identified by Arokodare and Asikhia (2020).

Theoretically, the framework assumes that stronger strategic foresight enhances an organization's ability to develop high levels of strategic agility, thereby improving the effectiveness of its crisis response. Adopting a multidimensional approach to these constructs enables a more comprehensive examination of organizational foresight, adaptive capacity, and crisis-response behavior within the context of energy security in Jordan. The research framework of this study is presented in Figure 2.1.

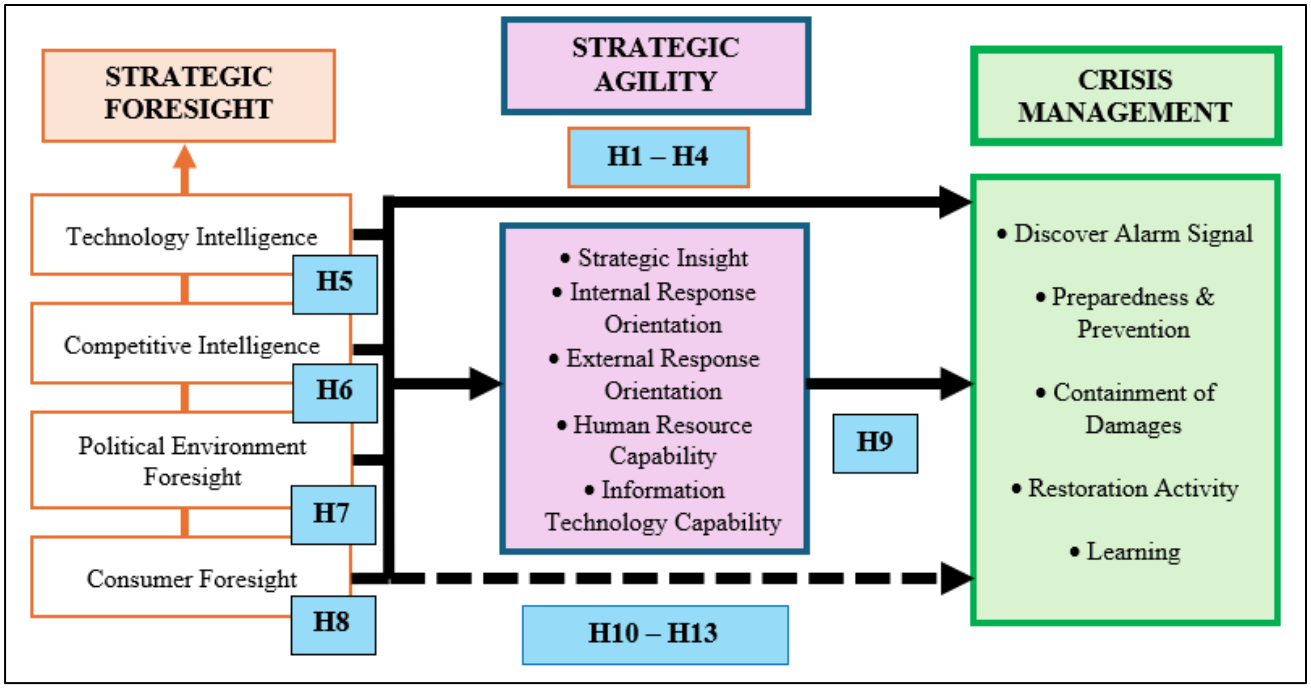

Figure 2.1: The Theoretical Model of the Study

2.8 Hypotheses Development

2.8.1 Strategic Foresight and Crisis Management

Existing studies highlight the importance of strategic foresight in enhancing organizational preparedness, responsiveness, and recovery during crisis. Prior research shows that the increasing complexity and uncertainty in technology environments require strong technology intelligence to support faster and better-informed crisis decisions (Nishant et al., 2020; Gadekar et al., 2022), suggesting that technology-oriented foresight improves crisis-management capacity. Similarly, competitive intelligence has been identified as a crucial early-warning mechanism for detecting emerging risks and enabling timely crisis responses (Caserio & Trucco, 2018; Yiu et al., 2021), indicating that competitive foresight strengthens crisis management. Moreover, political environmental foresight is essential in turbulent and politically sensitive sectors, as it helps

organizations anticipate regulatory and geopolitical shifts that may trigger or exacerbate crisis (Burrow & Gnad, 2018). Consumer foresight also contributes to crisis preparedness by enabling organizations to understand evolving consumer needs and behavioral changes, which supports more adaptive crisis responses (Al-Omari, Alomari & Aljawarneh, 2020). Based on these insights, the following hypotheses are proposed:

(a) H1: Strategic Foresight (Technology Intelligence) positively influences on Crisis Management in the Jordanian Energy Security.
(b) H2: Strategic Foresight (Competitive Intelligence) positively influences on Crisis Management in the Jordanian Energy Security.
(c) H3: Strategic Foresight (Political Environment Foresight) positively influences on Crisis Management in the Jordanian Energy Security.
(d) H4: Strategic Foresight (Consumer Foresight) positively influences on Crisis Management in the Jordanian Energy Security.

2.8.2 Strategic Foresight and Strategic Agility

Prior studies highlight that organizations with strong mechanisms for systematic prediction and foresight are better able to adapt to crisis through enhanced agility (Albadri & Nasereddin, 2019; Conz & Magnani, 2020). Empirical evidence shows that strategic foresight dimensions such as technology intelligence and political/environmental foresight are positively correlated with strategic agility (Halim, Zainal & Ahmad, 2021). Further, research by Flaih and Chalab (2022) demonstrates that foresight capabilities environmental scanning, strategic selection, and integration strengthen agility dimensions including sensitivity, learning, and response. Building on these findings, and addressing

conceptual gaps in prior studies, this research proposes that strategic foresight positively influences strategic agility.

(a) H5: Strategic Foresight (Technology Intelligence) positively influences on Strategic Agility in the Jordanian Energy Security.
(b) H6: Strategic Foresight (Competitive Intelligence) positively influences on Strategic Agility in the Jordanian Energy Security.
(c) H7: Strategic Foresight (Political Environment Foresight) positively influences on Strategic Agility in the Jordanian Energy Security.
(d) H8: Strategic Foresight (Consumer Foresight) positively influences on Strategic Agility in the Jordanian Energy Security.

2.8.3 Strategic Agility and Crisis Management

From a dynamic capability perspective, SA reflects the efficient reorientation and redeployment of organizational resources to safeguard and create value in shifting environments (Teece et al., 2016; Arokodare et al., 2019). Empirical works suggest that SA enables organizations to cope with crisis by combining foresight, responsiveness, IT expertise, and human resource capabilities. Saeidi et al. (2019) further demonstrate that strategic foresight, together with internal and external responsiveness and technology and human capabilities, significantly enhances organizational resilience and crisis performance. Jiang, Ritchie, and Verreynne (2019) show that crisis preparedness rooted in internal response analysis enhances organizational resilience. Workforce planning and skill alignment further strengthen crisis responsiveness (Azzam-Elmasri, 2017; Al-Hosani & Mohammed-Arbab, 2017). While, Chu et al. (2019) demonstrate that firms with strong IT infrastructure are better positioned to

operate effectively in competitive and uncertain environments. Collectively, these studies provide a justification for the following hypothesis.

(a) H9: Strategic Agility positively influences on Crisis Management in the Jordanian Energy Security.

2.8.4 Mediating Role of the Strategic Agility

Strategic foresight is used in crisis management to spot blind spots in decision-making and set lofty, future-oriented objectives (Rastegari et al., 2020) that help businesses function more effectively (Canyon, 2021). Strategic agility improves a company's preparedness to deal with a volatile business climate (Appelbaum et al., 2017). Some shifts may escalate into emergencies when they occur unexpectedly or by accident. To prevent organizational collapse or ineffectiveness arising from such crisis, management must be adequately equipped to respond through the agile deployment and effective utilization of human resources.

The energy security sector faces challenges related to crisis management. There are five stages to crisis management: detection of warning signals; preparation and prevention; damage containment; restoration activity; and reflection and learning. Identifying key personnel, developing all-encompassing crisis planning strategies, and utilizing all relevant resources are all essential for effective crisis management (FACTM, 2018). Experts assert that the act of briefly organizing and ranking the objectives, plans, and tactics in accordance with crisis management is a crucial matter that has been neglected in many of the nation's natural disasters, particularly earthquakes. The goal of the field of crisis management is to educate those in crisis management on how to foresee and avert crisis, as well as how to respond to them effectively once they occur.

However, protecting energy security and, in many cases, accurate and timely use of energy resources, necessitates making use of the strategic predictive capability to shape the perspective of the duties of energy units in the field of energy security. As a result, crisis management relies heavily on the flexible use of human resources. Therefore, the primary concern of this research is how to improve the organization's inputs, including strategic foresight and strategic agility, to effectively and efficiently manage the crisis in the energy service in Jordan. Saeidi et al. (2019) explicitly argue that foresight alone is insufficient unless it is supported by internal and external responsiveness, technology capabilities, and human resources. Similarly, Arokodare and Asikhia (2020) show that SI, IRO, ERO, HRC, and ITC together form the action-oriented mechanisms through which firms convert environmental sensing into competitive and crisis-resilient actions. From a dynamic capability lens (Teece et al., 2016), foresight represents sensing, while strategic agility embodies seizing and reconfiguring. This theoretical fundamental supports the following hypotheses:

(a) H10: Strategic Agility positively mediate the relationship between Strategic Foresight (Technology Intelligence) and Crisis Management in the Jordanian Energy Security.

(b) H11: Strategic Agility positively mediate the relationship between Strategic Foresight (Competitive Intelligence) and Crisis Management in the Jordanian Energy Security.

(c) H12: Strategic Agility positively mediate the relationship between Strategic Foresight (Political Environment Foresight) and Crisis Management in the Jordanian Energy Security.

(d) H13: Strategic Agility positively mediate the relationship between Strategic Foresight (Consumer Foresight) and Crisis Management in the Jordanian Energy Security.

2.9 Summary of Chapter

This chapter has reviewed prior studies on the role of strategic foresight as a key variable and strategic agility as a mediating variable in managing energy security crisis in Jordan. Literature consistently highlights the importance of foresight in anticipating crisis and the necessity of agility in enabling organizations to adapt and recover effectively. In addition, the chapter established the theoretical foundation of the study by adopting the Resource-Based View (RBV) and the Dynamic Capabilities Theory (DCT). RBV explains the strategic value of organizational resources, while DCT captures the dynamic reconfiguration of these resources to meet turbulent environmental demands. Together, they provide a comprehensive lens for understanding how foresight-driven agility strengthens crisis management. These insights form the basis of the research framework presented in the next chapter, which integrates multidimensional constructs of foresight, agility, and crisis management to address the challenges of energy security in Jordan.

CHAPTER 3 – METHODOLOGY

3.1 Introduction

The research methodology's key components are covered extensively in this chapter. These factors include research design, data collection and sampling techniques, measurement variables determination, pre-test, pilot study and data analysis processes.

3.2 Research Design

Quantitative research design was employed in this study using a cross-sectional research strategy based on a survey approach to collect data from the respondents. Since the survey data is only needed once, it saves time and energy (Sekaran & Bougie, 2020). Using questionnaires, researchers can collect data using the survey approach, which can subsequently be examined quantitatively using statistical software (Saunders et al., 2009).

A self-administered questionnaire will be used to gather data for the purpose of this study. When compared to more traditional methods of data collection like interviews and observations, questionnaires often save time and money while collecting more quantitative information. This study's question design used closed questions, which are frequently structured such that respondents can choose their answer from a predetermined set of options. Respondents can make faster selections with the help of closed questions as compared to other options. The researcher additionally benefits from the closed questions while coding the data for the subsequent analysis (Sekaran & Bougie, 2020).

3.3 Unit of Analysis

To address the main research problem, it is essential to clearly specify the unit of analysis applied in the study (Sekaran & Bougie, 2020). The unit of analysis refers to the smallest meaningful entity from which data are collected and analyzed, also described as the analytical granularity of a dataset. The research instrument is employed to measure the variables of interest at the appropriate level of analysis, which may include individuals, groups, departments, or organizations.

This study was conducted to examine managers' perceptions of the relationships among strategic foresight, strategic agility, and crisis management. Prior literature suggests that managers serve as credible informants who can effectively represent organizational practices and capabilities. Specifically, Greenblott et al. (2019) and Bhaduri (2019) argue that managers function as the "voice of experts" and are well positioned to evaluate how effectively their organizations are structured to respond to unforeseen crisis. Based on this rationale, the individual manager holding a managerial position was adopted as the unit of analysis in this study. The research thus focuses on their perceptions of how strategic foresight influences strategic agility and crisis management within their respective organizations.

Accordingly, the focal unit of analysis in this research is the individual manager operating within organizations in the Jordanian energy sector. Although the study investigates phenomena that exist at the organizational level, namely strategic foresight, strategic agility, and crisis management, the data were collected based on managers' personal evaluations of how these practices are implemented in their organizations.

Furthermore, the sample was not proportionately distributed across organizations, and in some cases, multiple respondents may have originated from the same organization. As a result, the data could not be treated at the organizational level. Therefore, all respondents were analyzed as independent analytical cases, and the study was conducted at the individual level of analysis.

This methodological approach is grounded on the premise that the responses are not intended to represent entire organizations, nor is the sample stratified based on organizational size or structure. Under such conditions, the individual is regarded as the most appropriate unit of analysis (Sekaran & Bougie, 2020). Consequently, all statistical analyses and interpretations in this research are performed at the individual level, reflecting managers' personal experiences, evaluations, and perceptions.

3.4 Target Population

If the study is to provide useful findings, the population must be defined with precision (Zikmund & Babin, 2010). Researchers seek to understand or identify the research objectives within the population, which are defined as all relevant individuals, events, or objects (Sekaran & Bougie, 2020). The principal purpose is to examine the study model through the evaluation of the constructs, namely strategic foresight, crisis management, and strategic agility. The study population will consist of the managers working in the energy companies in Jordan, there are eleven energy generator companies granted licenses by the "Energy and Minerals Regulatory Commission" (EMRC) which is the commission charged with overseeing the energy industry in Jordan to generate energy using conventional energy sources.

Also, the population of the study consists of three companies to conduct energy audit activities. Moreover, EMRC has granted the National Electric Power Company (NEPCO) a transport license.

NEPCO is the only licensed company for wholesale and the sole operator of the electrical system in the Kingdom. Finally, the energy and Minerals Regulatory commission, through its role, grants licenses in accordance with instructions and regulations governing the distribution and retail supply of electrical power of connection points (three main companies) with the transport network to the service receiver (i.e., standard distribution & retail license). Based on the EMRC there are eleven generation companies, three energy auditing companies, one main operator company, and three companies for retail distribution and retail supply, this means eighteen companies licensed by EMRC to operate the energy industry in Jordan.

The statistics of the "Jordanian Ministry of Energy and Mineral Resources" (MEMR) there are around 1622 managers in the eighteen companies that will be the population of this study. Sekaran and Bougie (2020) have discussed that the opinions of managers, i.e., are essential in social studies because of their significant roles in their organizations, also they are valuable sources of data thoughts, views, and information. Many researchers find organization managers to be the organization's most influential group to ensure the role of strategic issues (Iqbal, Ahmad, Allen & Raziq, 2018).

3.4.1 Inclusion and Exclusion Criteria

To ensure that the study's sampling frame accurately represents the target population and aligns with the research objectives, the researcher applied clear inclusion and exclusion criteria at both the organizational and individual levels.

Inclusion criteria:

(a) Organizations must operate within Jordan's energy-security sector, including generation, transmission, and distribution companies licensed by the Energy and Minerals Regulatory Commission (EMRC).

(b) Respondents must occupy managerial or supervisory positions (middle or upper management) responsible for decision-making or operational planning related to strategic foresight, strategic agility, or crisis management.

(c) Participants must have a minimum of two years of professional experience in the energy sector to ensure familiarity with strategic and crisis-management processes.

Exclusion criteria:

(a) Non-managerial employees, technicians, or administrative staff without strategic or operational decision-making authority.

(b) Independent consultants, external contractors, or employees of non-energy organizations.

(c) Respondents working in non-regulated sectors or organizations outside Jordan's national electricity network.

These boundaries of inclusions and exclusions make the data gathered more valid and guarantee that the responses are representative of the managerial perception on the constructs of the study-strategic foresight, strategic agility and crisis management-in the context of Jordanian energy-security environment.

3.5 Sample Size

According to Cohen (1988), power analytic method is applied to determine the sample size. Power analytics is a more precise tool in carrying out studies compared to the traditional approach of

determining sample size using the rule of thumb approach and not having sufficiently powered studies due to the lack of enough samples; or even having overpowered studies due to the number of samples (Green, 1991). In the Partial Least Square-Structural Equation Model (PLS-SEM), Kock and Hadaya (2018) proposed the use of the inverse square root method so that a sample of 155 samples is required to obtain statistical significance of 5% and a route coefficient of 0.2. (Hair et al., 2021). The researcher complemented the minimum sample size recommended by Hair et al. (2014) by 20 percent to reach the total of 200 respondents to offset the possible low response rate.

3.6 Sampling Technique

As a probability sampling method, this study utilized simple random sampling. To get these large samples, researcher follow the probability sampling pattern of the population of interest (Hair et al., 2014). Furthermore, in a sample election, every part of the population has an equal shot at being chosen (Sekaran & Bougie, 2020). For studies with a homogeneous population of interest, straightforward random selection is the way to go (Awang, 2012). The study population is all managers in the energy sector companies licensed EMRC in Jordan; at the point of the data collection, there were 1622 managers. The respondents, who were selected from a population list of 1622 managers, received a total of 200 questionnaires, therefore when selecting the requested respondents from a population (N) size of 200, a random selection using SPSS was made by clicking on the "Random Sample of Cases" button.

3.7 Instrumentation

Research instruments are tools that researchers use to collect appropriate data for their studies. The instruments were adjusted and modified to fit the study environment in this investigation. Preparing the appropriate statements and primary elements required describing and representing in a logical method both the dependent and independent constructions, as well as the mediator construct, as the first and most important step in the data collection process.

First, a need to familiarize within the relevant literature regarding the constructs that have been used to test and assess independent constructs, as well as the mediators, moderators, and dependent constructs. There will be four parts to the questionnaire. The demographic information of Jordanian energy company managers and specialists was the subject of inquiries in Section (A). section (B) comprised of questions to measure crisis management with its aspects (i.e., discover alarm signals, preparation & prevention, containment of damages, restoration activity and learning).

Statements pertaining to strategic foresight (i.e., technology intelligence, competitive intelligence, political environment foresight & consumer foresight) are contained in Section (C). In contrast, section (D) had a series of questions regarding managers' views on strategic agility, including questions about strategic insight, internal response orientation, external response orientation, human resource capability and information technology capability. The questionnaire sections, B, C, and D used a 10-point scale. The larger scale, such as a 10-point scale, is more appropriate because it allows for more variation in the variable, improves measurement accuracy, reduces the leniency problem, and ensures independence for data measurement. It is also appropriate for parametric and advanced statistical analysis techniques (Yusnita, Ibrahim & Awang, 2017).

3.8 Measurement

The tools of the recent research were tailored and adapted to the context of the study. The data collection instrument to measure the variables of the study including the dependent, independent, and mediator variables is constructed by undertaking a due review of the related literature to determine the previously used variables and the measurement methodologies used by them in prior studies. The most important variables in the research are strategic foresight, strategic agility as well as crisis management. It was assumed that the Arabic language that the respondents were expected to understand the questions easier is the official language of Jordan and most of the Middle East. The respondents were also able to take the survey provided that the questionnaire was prepared in English. Some examples of the various measures can be found in the next paragraph.

The researcher also renovated questionnaire items based on the previous studies which had validated items to guarantee construct reliability and content validity. Strategic Foresight measurement items were modified according to Rohrbeck, Battistella, and Huizingh (2015); Strategic Agility measurement items were modified according to Arokodare and Asikhia (2020) and Doz and Kosonen (2008); and Crisis Management dimensions' measurement items were modified according to Al Thani and Obeidat (2020). These questionnaires have their original sources now in Appendix A with each construct being given and its reference and wording of the item.

3.8.1 Strategic Foresight

In this research, the use of Bereznoy's (2017) definition of strategic foresight to construct the idea of a business system that provides early warnings of potential problems and discovers new opportunities. Based on the research of Rohrbeck, Battistella and Huizingh (2015), a ten-point (10) Likert scale ranging from (1) strongly disagrees to (10) strongly agrees was used in this study to evaluate the

perception toward Strategic foresight (i.e., technology intelligence, competitive intelligence, political environment foresight & consumer foresight) in Jordanian energy companies. The items adapted from the studies of several researchers such as Rohrbeck et al. (2007); Saayman et al. (2008); Schweitzer, Hofmann and Meinheit, (2019) as shown in Table 3.1.

Table 3.1: Adapted Questionnaires for Strategic Foresight Measurement

Dimension	Original items	Original source	Adapted Items
Technology Intelligence	Technology strategy enables identification and assessment of technological discontinuities.	Rohrbeck et al. (2007)	Our company has a technology strategy to identify, assess and use information in technological discontinuities.
	Technology exploration identifies and assesses emerging technologies.		Our company has technology exploration to identify, assess and use information in emerging technologies.
	Technology experts provide assessment in uncertain situations.		Our company has technology expert to identify, assess and use information in an uncertain situation.
Competitive Intelligence	Competitors, alliances, suppliers, distributors, and stakeholders' plans and intentions are monitored.	Saayman et al. (2008)	Our main competitors, alliances, suppliers, distributors, and other stakeholders' plans and intentions interest us.
	Intelligence reports and assessments on upcoming technology are produced.		We produce intelligence reports and assessments on upcoming technology we consider important.
	Prospective outcomes of competitors' actions are examined.		We examine numerous prospective outcomes of our competitors' actions that could threaten or benefit our company.
	Managers receive information from employees regarding overseas competition.		Managers receive information from employees regarding overseas competition for decision-making.
	Developing technologies are profiled to understand characteristics, uses, and benefits.		Our organization profiles developing technologies to understand their characteristics, uses, and commercial benefits.
	Staff members participate in intelligence seminars and training programs.		Our staff members participate in intelligence seminars and training programs.
Political Environment Foresight	Country legislative information is identified and used to shape strategic plans.	Rohrbeck et al. (2007)	We identify, examine, and use country legislative information to shape our strategic plan.

	Strategic views incorporate political environment factors.		Our organization's strategic view cope with the political environment.
	Response strategies are developed based on political decisions.		Our organization has a response strategy based on the political decisions.
	Country legislative information is identified and used to shape strategic plans.		We identify, examine, and use country legislative information to shape our strategic plan.
	Strategic views incorporate political environment factors.		Our organization's strategic view cope with the political environment.
	Response strategies are developed based on political decisions.		Our organization has a response strategy based on the political decisions.
Consumer Foresight	Client needs for future products and services are researched.	Schweitzer et al. (2019)	Our company research client needs for future products and services.
	Strategies are used to understand current wants to predict future needs.		Our company uses strategies to understand current consumers' wants to predict future needs.
	Consumer needs are integrated with changing dynamics and future expectations.		Our company integrates consumer needs with changing dynamics and future product and service expectations.
	Consumer lifestyle and socio-cultural trends are identified in product/service design.		Our organization identify consumer lifestyle and socio-cultural trends when designing future products and services.

3.8.2 Strategic Agility

Based on the research of Mavengere (2013), this study defines strategic agility as the following five factors: strategic insight, internal response orientation, external response orientation, human resource capability, and IT capability. As part of the collective capabilities dimension of strategic agility, Mavengere (2013) discussed information technology capabilities, which he defined as "the organization's ability to successfully utilize its information infrastructure and resources to derive value in order to improve its performance." In his view, having the proper information infrastructure and resources for essential operations is crucial for a company to promote information management and

make good use of its information resource in a competitive business environment. The second aspect to think about is human resource capacity.

An agile organization's capacity to respond to ever-changing conditions is directly related to its human resource capabilities (Alhadid, 2016). A workforce's capability to carry out its obligations efficiently and effectively is referred to as human resource capability (Mavengere, 2013). They allow management to carry out its responsibilities efficiently. Al-Hosani, Mohammed-Arbab, and Azzam-Elmasri (2017) describe human resource competence as a managerial activity that involves identifying a project's needs in terms of strategic agility. Strategic agility's third component, the IRO, is a subset of strategic response (SR) and internal orientation.

A company's strategic response is its ability to quickly and smoothly reorganize its resources and processes in response to or anticipation of business environment changes, in collaboration with consumers and partners (Mavengere, 2013). The ability to predict market events and developments ahead of competitors is called "internal response orientation" (Doz & Kosonen, 2008). Connecting with many people and groups helps you absorb fresh knowledge, insight, and invention (Doz & Kosonen, 2008). Thus, to value innovation, firms must adopt a market-facing approach. The SR dimension of strategic agility includes external response orientation, which is an organization's ability to react or respond to the business environment, according to Mavengere (2013). The respondents' views of Jordan's energy industry in five strategic agility areas (internal response orientation, strategic insight, human resource capability external response orientation, and information technology capability) were rated on a Likert scale from (1) strongly disagreeing to (10) strongly agreeing. Table 3.2 shows the measurement elements.

Table 3.2: Adapted Questionnaires for Strategic Agility Measurement

Dimension	Original Item	Source	Adapted Item
Information Technology Capability (ITC)	IT systems facilitate information sharing across organizational units	Mavengere (2013)	Our IT systems enable rapid information sharing across departments.
	IT infrastructure enables rapid response to customer requirements		We can quickly meet customer requirements because of our IT infrastructure.
	Well-developed IT infrastructure facilitates cooperation with affiliates and partners		Cooperation with our affiliates and business partners is facilitated by our well-developed IT infrastructure.
	IT infrastructure enables monitoring of developments and adjustment as needed		We can keep an eye on developments and adjust as needed thanks to our IT infrastructure.
	IT infrastructure supports integration of client feedback into product/service development		We can incorporate client feedback into product and service development thanks to our IT infrastructure.
	IT infrastructure ensures quality and reliability of information in market scanning		The information being transmitted in market scanning is of high quality and dependability thanks to our IT infrastructure.
	Dependability of systems is guaranteed by IT infrastructure		The systems' dependability is guaranteed by our IT infrastructure.
Human Resource Capability (HRC)	Employees possess skills to adapt to continuous organizational change	Al-Hosani et al. (2017)	Our employees have the needed skills to face permanent change in the circumstances of the organization.
	Employees demonstrate intelligence and adaptability in dynamic business environments		Our employees have the intelligence to face a change that occurs in the business environment.
	Employees leverage organizational assets effectively		Our employees have the ability of taking full advantage of the organization assets.
	HR policies and practices enable acquisition, development, and maintenance of HR deployment capabilities		Our organization can use HR policies and practices to acquire, develop, and maintain human resource deployment capabilities.
Internal Response	Organizations continuously seek new ways to serve consumers	Mavengere (2013)	We are always on the lookout for new ways to help our consumers.

Orientation (IRO)			
	Clients often have time-sensitive demands requiring immediate fulfillment		The majority of the time, our clients have specific, time-sensitive demands that we must fulfil immediately.
	Proactivity with consumers is critical to business success		We need to be proactive with our consumers because it's important to our business.
	Interdisciplinary teams are employed in product/service creation		In order to create our goods and services, we employ interdisciplinary teams.
	Information sharing across business groups supports new product/service development		When we develop new products or services, we share information across our many business groups.
	Supplier capacity to meet changing demands is regularly assessed		Our suppliers' capacity to meet our ever-changing business demands is something we often assess.
External Response Orientation (ERO)	Strategic agility requires rapid response to stakeholders in dynamic environments	Doz & Kosonen (2008)	We must respond quickly to our stakeholders to survive in this dynamic business environment.
	Functional silos and autonomous decision-making are part of organizational structure		Being structured as functional silos and making choices autonomously is essential in our business environment.
	Quick decision-making is essential in dynamic business environments		We must make quick decisions in our professional environment.
	Continuous innovation and adaptation are required to remain competitive		We must continually innovate and adapt to stay competitive in our corporate environment.
Strategic Insight (SI)	Ability to perceive complex strategic situations	Doz & Kosonen (2008)	Our company can perceive complex strategic situations.
	Ability to interpret and decide in complex situations		Our company can look at complicated strategic situations and figure out what to do.
	Ability to make sense of complex situations		Our company can make sense of complex strategic situations.
	Ability to exploit opportunities in complex situations		Our company can take advantage of the complex strategic situations.

3.8.3 Crisis Management

Study of Al Thani and Obeidat, (2020) and study of Laws and Prideaux (2006), argues that crisis management involves a series of steps starting from preparation to response to the crisis as it evolves, and recovery. Crisis management measured in this study based on the study of Al Thani and Obeidat, (2020) which originates from Pearson and Mitroff (1993), Pearson and Clair (1998) and Mitroff (2005). The dimensions are preparedness and prevention, discover alarm signals, containment of damages, learning and restoration activity. The study has evaluated the replies addressing crisis management using a 10-point Likert scale, where 1 represents a strong disagreement and 10 represents a strong agreement. Crisis management are measured by several factors such as preparedness and prevention, discover alarm signals, containment of damages, learning and restoration activity in the energy companies in Jordan. The items applied to be measured are demonstrated in Table 3.3.

Table 3.3: Adapted Questionnaires for Crisis Management Measurement

Dimension	Original Items	Original Source	Adapted Items
Discover Alarm Signals	Indicators of potential crisis are tracked using historical data.	Pearson & Mitroff (1993)	Indicators of potential energy crisis are tracked using the data from past crisis.
	Workforce experiences provide signals of possible crisis.		Indicators of possible energy crisis can be found from the experiences of our workforce.
	Internal environment is routinely surveyed to detect crisis signals.		To detect signs of an impending energy crisis, the internal work environment is routinely surveyed.
	External environment is regularly studied to detect crisis signals.		An external work environment study is conducted on a regular basis to detect any indications of an energy crisis.
Preparedness and Prevention	Management prepares crisis teams of professionals.	Mitroff (2005)	In the event of an energy crisis, the company's management is prepared with a team of professionals.
	Top management develops scenarios and pre-solutions for anticipated crisis.		In anticipation of the impending energy crisis, the company's upper management is hard at work developing pre-solutions, or scenarios.

	Training programs are instituted to prepare staff for crisis.		In preparation for the energy crisis, the company's management has instituted sufficient training programs for staff.
	Stakeholders receive relevant crisis information from management.		Concerned stakeholders receive all relevant data and information regarding the energy crisis from the Company's management.
Containment of Damages	Distinct responsibilities are assigned to employees during crisis.	Pearson & Clair (1998)	In the event of an energy crisis, the company's management assigns distinct and explicit responsibilities to each employee.
	Management provides necessary resources to address crisis.		The necessary resources to address the crisis are provided by the company's management.
	Strategic reserves are used to contain crisis damages.		The energy crisis can be contained by tapping into the company's strategic store of other minerals and commodities.
Restoration Activity	Adaptive management enables continued operations during crisis.	Mitroff (2005)	Despite the crisis, the company was able to keep operating normally thanks to its adaptable management.
	Employee knowledge and experience help overcome crisis.		They can overcome the crisis thanks to the knowledge and experience of the company's employees.
	Management allocates resources to continue operations during/after crisis.		The management of the Company assigns the necessary resources to continue operations during and after the crisis.
	Critical measures are identified to restart operations.		The company's management identifies the critical measures needed to restart the company's operations.
Learning	Crisis information and procedures are systematically recorded.	Pearson & Mitroff (1993)	Crisis information and handling procedures are systematically recorded and stored to ensure their retrieval when necessary.
	Proactive actions are implemented to avert recurrence of crisis.		The company's management implements proactive actions to avert the occurrence or reappearance of a crisis.
	Lessons learned are generalized after crisis.		The company's management generalizes the lessons learned from the crisis after its completion.
	Results and measures taken are analyzed by post-crisis.		The company's management is working on analyzing the results and the measures taken in dealing with crisis after its completion.

3.9 Study Pre-test

Prior to the actual survey, the technique of validating the questionnaire and verifying the appropriateness of the questions are often used by the experts of the field purposes before proceeding with the survey (Zikmund, Babin, Carr, and Griffin, 2013). To ensure the research was to be performed within the initial objectives of the study, a sample population of the survey members was first provided with a pre-test questionnaire prior to a full survey. One, the questionnaire was tested on three Jordanian managers who are in the energy sector in order to ensure Content Validity; two, the survey questionnaires was tested on a panel of language experts to ensure Face Validity, and three, the supervisors of the researcher scrutinize the survey questionnaires to ensure the Research Criterion Validity. The following Table 3.4 shows the details of the experts (face validity) involved in pretest.

Table 3.4: The Experts' Profile

No.	Expert Name	Academic Rank	Profession / Field	University / Organization	Years of Experience
1	Dr. Shaker Ahmed Al-Qudah	Associate Professor	Full-time Lecturer (Business Administration)	Applied Science Private University	15 years
2	Prof. Abdel-Baset Athamneh	Full Professor of Economics	Labour Economics Professor	Yarmouk University	More than 20 years
3	Dr. Abdallah Mohammad Al-Qudah	Senior Expert / HR Consultant	Former General Manager, Human Resources Consultant	Irbid Electricity Company (previous affiliation)	28 years
4	Dr. Rokaya Al-Bdareen	Associate Professor	Human Resources Management Professor	Jadara University	15 years

The experts selected for the pre-test were chosen because their academic and professional backgrounds closely align with the core constructs of this study. Dr. Shaker Ahmed Al-Qudah and Dr. Rokaya Al-Bdareen, both associate professors with more than 15 years of experience in business administration and human resource management, provide strong academic insight into organizational behavior, strategic practices, and measurement development. Prof. Abdel-Baset Athamneh, a full professor with

over 20 years of experience in labor economics, contributes methodological and analytical expertise that supports the evaluation of item relevance and clarity. Additionally, Dr. Abdallah Mohammad Al-Qudah, a senior HR consultant with 28 years of practical experience in the electricity sector, offers valuable industry-based perspectives to ensure the instrument reflects real organizational and sector-specific realities. Together, their combined academic rigor and professional experience make them well-qualified to evaluate the accuracy, clarity, and appropriateness of the questionnaire items during the pre-test stage.

In addition, the research supervisor conducted a thorough review of the questionnaire to assess its overall methodological coherence and criterion-related validity. This multi-stage validation process strengthened the reliability and credibility of the research instrument prior to large-scale data collection.

3.10 Pilot Study

Following the incorporation of feedback obtained from the pre-test phase, a pilot study was conducted to further assess the clarity, relevance, and internal consistency of the questionnaire prior to the main data collection. The primary purpose of the pilot study was to refine the research instrument, identify potential administrative and logistical issues, and ensure that all measurement items were clearly understood and contextually appropriate for the Jordanian energy sector.

Consistent with the methodological recommendations of Hair et al. (2024) and Creswell and Creswell (2023), the pilot study was implemented at the managerial level using a sample of 100 respondents and collected 100 responses too. This sample was designed to fairly represent the generation, transmission, and distribution segments of the energy industry. The pilot data were utilized to assess

preliminary reliability and validity of the measurement model. Internal consistency reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR), while initial convergent and discriminant validity were examined using the Average Variance Extracted (AVE) and the Heterotrait–Monotrait (HTMT) ratios.

The pilot results enabled the identification of weak, ambiguous, or redundant items, as the sample size (n = 100) was sufficient for basic measurement diagnostics. However, this phase did not involve confirmatory analysis or inferential structural modelling, including path coefficient estimation, mediation analysis, or bootstrapping procedures. Expert input was subsequently employed to rephrase unclear items, while the removal of theoretically important items was avoided to preserve the conceptual integrity of each construct. The refined and finalized questionnaire was then administered to the main study sample (n = 200), where full construct validation and structural model evaluation were conducted, as reported in Chapter 4.

3.11 Data Collection Procedure

The data collection process was conducted in several phases. First, formal permission letters were sent to target organizations requesting approval to distribute the questionnaire to their managerial staff. After approval was granted, the questionnaire link was distributed electronically through email and official WhatsApp communication channels. Respondents were given three weeks to complete the survey, with gentle reminders sent at the end of Week 1 and Week 2 to increase the response rate. Participation was voluntary, and no incentives were provided. To ensure confidentiality and ethical compliance, all participants were informed about the purpose of the study and the anonymity of their responses, as shown in Appendix A.

3.12 Exploratory Factor Analysis

The researcher utilizes the Exploratory Factor Analysis (EFA) process to discover, minimize, and cluster different items of the questionnaires into certain constructs (Yong & Pearce, 2013). Previous researchers found that the sample size of 100 is acceptable to conduct research using EFA (Hair et al., 2014). The current study is adequate to be analyzed as the pilot study consisted of 100 samples. The interval and ratio questions have been EFA according to the recommendation of Suhr (2006), and all the variables have been used in this study have been EFA analyzed. The researcher used Principal Components Analysis (PCA) to test the sampling adequacy, Kaiser-Meyer-Olkin (KMO) as well as the Bartlett Test to ascertain the relevance of the construct. The KMO test is a term used to denote the multicollinearity of the items. When the test value exceeds 0.6, then the items can be subjected to the factor analysis since Kaiser (1974) explains. The level of significance is what defines the validity of the test. The items may be taken as eligible to analysis of components in case the level of significance is near to 0.0 ($p < 0.05$). The items have to have factor loadings of 0.60 or above to be maintained in an EFA. Therefore, the test of Eigenvalues is normally utilized in the process of keeping the factor (Yong and Pearce, 2013; Tabachnick and Fidell, 2013). According to the rule of thumb used by Kaiser, all the factors whose eigenvalue is bigger than one ought to be retained (Kaiser, 1960).

3.11.2 Data Analysis for Pilot Test (EFA)

According to Hair et al. (2014), for this study, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy value should be greater than 0.50, and Bartlett's Test of Sphericity should have a statically significant result at $p < 0.001$. The results of the KMO and Bartlett's Test of Sphericity for all primary and sub-constructs met the minimal threshold given by Hair et al. (2014) and were used for EFA, as shown in Table 3.5.

Table 3.5: Explanatory Factor Analysis Suitability

No	Main Construct	Sub-Construct	KMO	Bartlett's Test of Sphericity P-value
1	Technology Intelligence		0.690	0.000
	Competitive Intelligence		0.896	0.000
	Political Environmental Foresight		0.710	0.000
	Consumer Foresight		0.836	0.000
2	Strategic Agility			
		Strategic Insight	0.812	0.000
		Internal Response Orientation	0.816	0.000
		External Response Orientation	0.777	0.000
		Human Resource Capability	0.789	0.000
		Information Technology Capability	0.896	0.000
3	Crisis Management			
		Discover Alarm Signals	0.826	0.000
		Preparedness and Prevention	0.836	0.000
		Containment of Damages	0.737	0.000
		Restoration Activity	0.823	0.000
		Learning	0.826	0.000

In the next section, the PCA with Varimax Rotation was conducted for all items under each sub-construct that constituted the main construct of the study. The factor loading for all items of the constructs and sub-constructs should exceed 0.60. Furthermore, the following section explained the eigenvalue, variance, and factor loading for each sub-construct under each construct of the study, as will be discussed in the following sections.

3.13 Results of the Strategic Foresight

Strategic foresight in the recent study conceptualized as four first order constructs (i.e., technology intelligence, competitive intelligence, political environmental foresight & consumer foresight), the eigenvalue, variance, and factor loading that will be covered in the sections as followed.

3.13.1 Technology Intelligence

According to Table 3.6, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 73.095%, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.6: Total Variance Explained of Technology Intelligence Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.193	73.095	73.095	2.193	73.095	73.095
2	.496	16.523	89.618			
3	.311	10.382	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.7 shows the technology intelligence component matrix, which consists of three items loaded onto a single component. All these items were kept because, according to Tabachnick and Fidell (2013), a basic rule of thumb is to keep factor loading values over 0.60.

Table 3.7: Technology Intelligence Component Matrix

No	**Items**	**Factor Loading**	**Item Retained**	**Item Dropped**
1	Our company has a technology strategy to identify, assess and use information in technology discontinuities.	0.839	Retained	
2	Our company has technology exploration to identify, assess and use information in emerging technologies.	0.896	Retained	
3	Our company has technology expert to identify, assess and use information in an uncertain situation.	0.828	Retained	

3.13.2 Competitive Intelligence

According to Table 3.8, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 68.523 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.8: Total Variance Explained of Competitive Intelligence Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.095	68.253	68.253	4.095	68.253	68.253
2	.599	9.988	78.242			
3	.459	7.655	85.897			
4	.355	5.920	91.817			
5	.257	4.290	96.107			
6	.234	3.893	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.9 shows the competitive intelligence component matrix, which consists of six items loaded onto a single component. Five of these items were retained and one removed because, according to Tabachnick and Fidell (2013), a basic rule of thumb is to keep factor loading values over 0.60.

Table 3.9: Competitive Intelligence Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	We are concerned with the plans and intentions of our key competitors, alliances, suppliers, distributors, and other stakeholders.	0.488		Dropped
2	Our company produces intelligence reports and assessments on emerging technologies.	0.820	Retained	
3	Our company assesses numerous prospective outcomes of our competitors' actions that could be threats or opportunities.	0.872	Retained	

4	Our employees report information about our competitors in foreign markets to the right manager for better decisions.	0.848	Retained	
5	Our company develops profiles on emerging technologies to better understand their characteristics, potential applications, and market advantages.	0.862	Retained	
6	Our employees attend intelligence seminars/training programs.	0.853	Retained	

3.13.3 Political Environmental Foresight

According to Table 3.10, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 78.583 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.10: Total Variance Explained of Political Environmental Foresight Items

Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.357	78.583	78.583	2.357	78.583	78.583
2	.415	13.831	92.414			
3	.228	7.586	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.11: Political Environmental Foresight Component Matrix

No	**Items**	**Factor Loading**	**Item Retained**	**Item Dropped**
1	In our company, there is identification, assessment, and usage of information on the country's legislation in shaping the strategic plan.	0.846	Retained	
2	Our company's strategic view copes with the political environment.	0.917	Retained	
3	Our company has a response strategy based on the country's political decisions.	0.895	Retained	

Table 3.11 shows the political environmental foresight component matrix, which consists of three items loaded onto a single component. All these items were kept because, according to Tabachnick and Fidell (2013), a basic rule of thumb is to keep factor loading values over 0.60.

3.13.4 Consumer Foresight

According to Table 3.12, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 74.658 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.12: Total Variance Explained of Consumer Foresight Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.986	74.658	74.658	2.986	74.658	74.658
2	.435	10.865	85.524			
3	.314	7.840	93.364			
4	.265	6.636	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.13: Consumer Foresight Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	Our company conducts research aims to understand customers' future needs about future products and services in energy.	0.862	Retained	
2	Our company has methods that aim to understand today's customers' needs to identify their possible future needs.	0.880	Retained	
3	Our company combines the needs of customers with the dynamics of change and expectations of future circumstances, products, and services	0.894	Retained	
4	Our company identifies consumer lifestyle and socio-cultural trends when designing future products and services	0.818	Retained	

Table 3.13 shows the consumer foresight component matrix, which consists of four items loaded onto a single component. All these items were kept because, according to Tabachnick and Fidell (2013), a basic rule of thumb is to keep factor loading values over 0.60.

3.14 Results of Strategic Agility

Strategic agility is a second-order construct consist of five sub-constructs, *i.e.,* strategic insight, internal response orientation, external response orientation, human resource capability, information technology capability and meanwhile the variance, eigenvalue and factor loading will be discussed next.

3.14.1 Strategic Insight

According to Table 3.14, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 78.123 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.14: Total Variance Explained of Strategic Insight Items

Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.125	78.123	78.123	3.125	78.123	78.123
2	.413	10.316	88.440			
3	.281	7.035	95.475			
4	.181	4.525	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.15 shows the strategic insight component matrix, which consists of four items loaded onto a single component. All these items were kept because, according to Tabachnick and Fidell (2013), a basic rule of thumb is to keep factor loading values over 0.60.

Table 3.15 Strategic Insight Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	Our company can perceive complex strategic situations.	0.878	Retained	
2	Our company can look at complicated strategic situations and figure out what to do.	0.879	Retained	
3	Our company can make sense of complex strategic situations.	0.854	Retained	
4	Our company can take advantage of the complex strategic situations.	0.923	Retained	

3.14.2 Internal Response Orientation

According to Table 3.16, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 61.157 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.16: Total Variance Explained of Internal Response Orientation Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.669	61.157	61.157	3.669	61.157	61.157
2	1.084	18.075	79.232			
3	.438	7.303	86.535			
4	.333	5.542	92.077			
5	.269	4.489	96.566			
6	.206	3.434	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.17 presents the internal response orientation component matrix, comprising six items initially loaded onto a single component. Of these, three items were retained, while three were removed based on the guideline proposed by Tabachnick and Fidell (2013), which recommends retaining items with factor loadings exceeding 0.60.

Table 3.17: Internal Response Orientation Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	We are proactively looking for opportunities that add value to our customers .	0.741	Retained	
2	Most of the time, our customers come to us with unique requests that need to be met quickly.	0.787	Retained	
3	Our business requires us to have a proactive relationship with our customers.	0.766	Retained	
4	We utilize cross-functional teams when developing our products/services.	0.441		Dropped
5	We share information among business units in developing our products/services	0.587		Dropped
6	We frequently examine our suppliers' capability to keep up with our dynamic business needs.	0.513		Dropped

3.14.3 External Response Orientation

According to Table 3.18, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 69.649 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.18: Total Variance Explained of External Response Orientation Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.786	69.649	69.649	2.786	69.649	69.649
2	.683	17.087	86.735			
3	.310	7.740	94.475			
4	.221	5.525	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.19 shows the external response orientation component matrix, which consists of four items loaded onto a single component. Three of the items were retained and one item was removed because, according to Tabachnick and Fidell (2013), a basic rule of thumb is to keep factor loading values over 0.60.

Table 3.19: External Response Orientation Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	Our business environment requires us to respond rapidly to our stakeholders	0.874	Retained	
2	Our business environment requires us to be organized as functional silos and take decisions independently	0.890	Retained	
3	Our business environment requires us to make quick decisions.	0.887	Retained	
4	Our business environment requires us to constantly change and reinvent.	0.425		Dropped

3.14.4 Human Resource Capability

According to Table 3.20, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 69.805 %, which is more than the 60% accepted threshold as set by Hair et al. (2012).

Table 3.20: Total Variance Explained of Human Resource Capability Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.792	69.805	69.805	2.792	69.805	69.805
2	.548	13.689	83.494			
3	.410	10.256	93.750			
4	.250	6.250	100.000			
Extraction Method: Principal Component Analysis.						

The component matrix of the human resource capability, as presented in Table 3.21, includes four items that are loaded on a single component. Three items were kept based on their factor loading values exceeding 0.60, while one item was eliminated according to the general rule of thumb suggested by Tabachnick and Fidell (2013).

Table 3.21 shows the human resource capability component matrix, which consists of four items loaded onto a single component. Three of the items were retained and one item was removed because, according to Tabachnick and Fidell (2013), a basic rule of thumb is to keep factor loading values over 0.60.

Table 3.21: Human Resource Capability Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	Our employees have a needed skills to face a permanent change in the circumstances of the organization.	0.460		Dropped
2	Our employees have the intelligence to face a change that occurs in the business environment.	0.875	Retained	
3	Our employees have the ability of taking full advantage of the organization assets.	0.778	Retained	
4	Our company can leverage its HR policies and practices to acquire, cultivate, and retain the capacity to deploy human resources	0.826	Retained	

3.14.5 Information Technology Capability

According to Table 3.22, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 67.914 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.22: Total Variance Explained of Information Technology Capability Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.075	67.914	67.914	4.075	67.914	67.914
2	.570	9.502	77.416			
3	.414	6.907	84.323			
4	.389	6.476	90.799			
5	.320	5.326	96.125			
6	.232	3.875	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.23 shows the information technology capability component matrix, which consists of six items loaded onto a single component. Four of the items were retained and two were removed because according to Tabachnick and Fidell (2013), a basic rule of thumb is to keep factor loading values over 0.60.

Table 3.23: Information Technology Capability Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	Our IT infrastructure enables us to fulfill customer requirements easily	0.747	Retained	
2	Our IT infrastructure enables us to easily collaborate with our partners/subsidiaries	0.809	Retained	
3	Our IT infrastructure enables us to monitor changes and make the necessary changes	0.860	Retained	
4	Our IT infrastructure enables us to incorporate customer requests for developing products/services	0.459		Dropped
5	Our IT infrastructure ensures that the information being exchanged is of high quality and reliability in market scanning.	0.840	Retained	
6	Our IT infrastructure ensures that the systems are highly reliable	0.524		Dropped

3.15 Result of Crisis Management

Crisis' management is a second-order construct consisting of five sub-constructs (i.e., discover alarm signals, preparedness and prevention, containment of damages, restoration activity and learning). The variance, eigenvalue, and factor loading will be discussed next.

3.15.1 Discover Alarm Signals

According to Table 3.24, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 76.502 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.24: Total Variance Explained of Discover Alarm Signals Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.060	76.502	76.502	3.060	76.502	76.502
2	.468	11.697	88.199			
3	.261	6.526	94.726			
4	.211	5.274	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.25 shows the discover alarm signals component matrix, which consists of four items loaded onto a single component. All these items were kept because, according to Tabachnick and Fidell (2013), a basic rule of thumb is to keep factor loading values over 0.60.

Table 3.25 Discover Alarm Signals Component Matrix

No	**Items**	**Factor Loading**	**Item Retained**	**Item Dropped**
1	The indicators of previous crisis are used to monitor indicators of possible energy crisis.	0.803	Retained	

2	Our staff experiences help discover indicators of potential energy crisis.	0.904	Retained	
3	The internal work environment is regularly scanned to identify energy crisis indicators.	0.905	Retained	
4	The external work environment is surveyed regularly to identify signs of an energy crisis.	0.883	Retained	

3.15.2 Preparedness and Prevention

According to Table 3.26, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 74.658 %, which is more than the 60% accepted threshold as set by Hair et al. (2012).

Table 3.26: Total Variance Explained of Preparedness and Prevention Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.986	74.658	74.658	2.986	74.658	74.658
2	.435	10.865	85.524			
3	.314	7.840	93.364			
4	.265	6.636	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.27 presents the preparedness and prevention component matrix, comprising four items loaded onto a single component. All items were retained, as each demonstrated factor loadings exceeding the recommended threshold of 0.60. This indicates a satisfactory level of construct validity and confirms that the items adequately represent the underlying preparedness and prevention construct, in line with the guideline proposed by Tabachnick and Fidell (2013).

Table 3.27: Preparedness and Prevention Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	The Company's management has a team of people with experience to manage energy crisis when it occurs.	0.862	Retained	
2	The Company's management is working on preparing pre-solutions (scenarios) to face the expected energy crisis.	0.880	Retained	
3	The Company's management provides adequate training programs for employees to deal with the energy crisis.	0.894	Retained	
4	The Company's management provides all data and information related to the energy crisis to the concerned parties.	0.818	Retained	

3.15.3 Containment of Damages

According to Table 3.28, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 84.186 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.28: Total Variance Explained of Containment of Damages Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.526	84.186	84.186	2.526	84.186	84.186
2	.297	9.905	94.091			
3	.177	5.909	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.28 shows the containment of damages component matrix, which consists of three items loaded onto a single component. All these items were kept because of the factor loading values over 0.60 (Tabachnick & Fidell, 2013). The component matrix of the containment of damage given in Table

3.29 includes three items loaded on a single component. All items are retained since their factor loading values are above 0.60, which was suggested by Tabachnick and Fidell (2013).

Table 3.29: Containment of Damages Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	The Company's management determines specific and clear duties for each employee when the energy crisis occurs.	0.899	Retained	
2	The Company's management provides the requirements needed to deal with the crisis.	0.939	Retained	
3	The Company has a strategic reserve of other materials and supplies to contain the energy crisis.	0.914	Retained	

3.15.4 Restoration Activity

According to Table 3.30, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 74.063 %, which is more than the 60% accepted threshold as set by Hair et al. (2012).

Table 3.30: Total Variance Explained of Restoration Activity Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.963	74.063	74.063	2.963	74.063	74.063
2	.453	11.331	85.394			
3	.324	8.107	93.501			
4	.260	6.499	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.31 presents the restoration activity component matrix, which initially comprised four items loaded onto a single component. Three items were retained, while one item was removed due to its

factor loading falling below the recommended threshold of 0.60. This decision follows the guideline suggested by Tabachnick and Fidell (2013) and ensures that only items with adequate explanatory power and construct validity were included in the final measurement scale.

Table 3.31: Restoration Activity Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	The Company's management is flexible enough to help it conduct normal business during and after the crisis.	0.824	Retained	
2	The experience and knowledge the company employees possess help them to overcome the crisis.	0.470		Dropped
3	The Company's management allocates the requirements to resume the activity during and after the crisis.	0.890	Retained	
4	The Company's management determines the most important actions required to resume the company's activity.	0.858	Retained	

3.15.5 Learning

According to Table 3.32, the PCA with Varimax Rotation succeeded in extracting only one dimension with an eigenvalue greater than one. The total variance explained was 76.502 %, which is more than the 60% accepted threshold set by Hair et al. (2012).

Table 3.32: Total Variance Explained of Learning Items

Total Variance Explained						
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.060	76.502	76.502	3.060	76.502	76.502
2	.468	11.697	88.199			
3	.261	6.526	94.726			
4	.211	5.274	100.000			
Extraction Method: Principal Component Analysis.						

Table 3.33 shows the learning component matrix, which consists of four items loaded onto a single component. All these items were kept because all the factor loading values over 0.60 as according to Tabachnick and Fidell (2013).

Table 3.33: Learning Component Matrix

No	Items	Factor Loading	Item Retained	Item Dropped
1	Crisis information and handling methods are documented and preserved in ways that allow them to be recovered when needed.	0.803	Retained	
2	The company's management adopts preventive measures to prevent the occurrence or recurrence of the crisis.	0.904	Retained	
3	The company's management generalizes the lessons learned from the crisis after its completion.	0.905	Retained	
4	The company's management is working on analyzing the results and the measures taken in dealing with crisis after its completion.	0.883	Retained	

3.16 Reliability

Researchers do a variety of reliability tests; however, "the internal consistency reliability test" is the most used (Litwin, 1995). The homogeneity of measuring items that tap a specific construct is explained by internal consistency of measures. Correlation is the degree to which elements of a construct assess the construct in question both independently and in combination with one another, while also being correlated such that respondents understand each item for what it really is. Additionally, Cronbach's coefficient alpha is the most often used internal consistency test. According to Sekaran and Bougie (2020), a better instrument is indicated by larger coefficients. The results showed a high reliability coefficient ranging from.848 to.920, as shown in Table 3.34. According to research specialists, Cronbach's coefficient alpha tests with values between 0.60 and 0.70 are considered to have good reliability (Sekaran & Bougie, 2020; Hair et al., 2006; Nunnally, 1967).

Table 3.34: Results of the Reliability of the Study

No	Construct	Sub-Construct	No. of Original Items	No. of Retained Items	Cronbach's Alpha
1	Technology Intelligence		3	3	0.873
	Competitive Intelligence		6	5	0.911
	Political Environmental Foresight		3	3	0.904
	Consumer Foresight		4	4	0.917
2	Strategic Agility				
		Strategic Insight	4	4	0.920
		Internal Response Orientation	6	3	0.848
		External Response Orientation	4	3	0.887
		Human Resource Capability	4	3	0.903
		Information Technology Capability	6	4	0.888
3	Crisis Management				
		Discover Alarm Signals	4	4	0.905
		Preparedness and Prevention	4	4	0.885
		Containment of Damages	3	3	0.903
		Restoration Activity	4	3	0.880
		Learning	4	4	0.897
	Total		**59**	**50**	

From the table, it shows that nine (9) items have been dropped in total. Although these items were removed following the pilot test due to low factor loadings, the reliability analysis confirms that the retained items sufficiently represent each construct. Cronbach's Alpha values remained above 0.848 across all sub-constructs, indicating strong internal consistency. This supports the validity of the measurement model and aligns with best practices in scale refinement (Hair et al., 2019). Moreover, with 100 responses, the sample size is adequate for reliability testing, and the decision to drop items was based on methodological standards rather than sample size limitations.

3.17 Data Analysis

This study employed both descriptive and inferential statistical techniques for data analysis. Descriptive statistics were used to summarize and describe the key characteristics of the data and to provide an initial assessment of relationships among variables. Inferential statistics were subsequently applied to test hypotheses and generalize findings beyond the sample. The analyses were conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) through two established software packages: SmartPLS (Ringle, Wende, & Will, 2005) and PLS-Graph (Chin, Marcolin, & Newsted, 2003).

3.18 Structural Equation Modelling (PLS-SEM)

Researchers employ PLS-SEM, also known as PLS path modeling, as a second-generation structural equation model to address the weaknesses of first-generation approaches. Integrating unobservable variables that are measured indirectly by an indicator variable is made possible using PLS-SEM, a relatively recent technique (Hair et al., 2013). The PLS-SEM method was used to evaluate the data collected for this investigation. PLS-SEM has recently gained a lot of attention from researchers as a promising method. Using a PLS environment, it's easy to specify the relationships between the variables of interest and the measures of individual constructs.

This allows us to analyze how well indicators relate to the construct under measurement and whether theoretically formulated hypotheses hold up empirically. Estimations of the routes among the latent variables can be more robust and accurate when using several measures for each variable in the model. This contrasts with other methods, like multiple regression, which are always biased downward by measurement error (Limayem, Hirt & Chin, 2001). In addition, practical applications are better served by PLS path modelling. Because it can estimate both large and complex models with the help of its

"soft modelling assumptions," it is a valuable tool for dealing with complicated models (Fornell and Bookstein, 1982; Hulland, 1999). Nevertheless, this study utilized PLS SEM techniques to improve prediction by examining relationships among the constructs. These constructs include strategic foresight (i.e., technology intelligence, political environmental foresight, competitive intelligence, and consumer foresight), crisis management (i.e., preparedness and prevention, discover alarm signals, containment of damages, restoration activity & learning), and strategic agility (i.e., internal response orientation, strategic insight, external response orientation, human resource capability & and information technology capability), a mediating variable.

Since PLS path modeling can model latent variables under non-normality conditions, data normality is no longer an issue in a PLS environment, which is an assistance for social science and management researchers who often deal with non-normal data (Chin, 1998). As a result, PLS route modeling is used in this work to sidestep the normality problem that could arise from data analysis. In contrast to other methods of analysis, PLS-SEM provides legitimate and relevant results, according to Rönkkö, McIntosh, and Antonakis (2015). Other approaches may lead to inconclusive results and the need for additional analyses. Because of this, it is considered a top statistical technique for social scientists to use when testing numerous correlations at once.

This study data analysis was conducted in two sequential stages, namely the measurement model assessment and the structural model assessment in accordance with established PLS-SEM guidelines (Hair et al., 2022; Ramayah et al., 2018).

3.18.1 Assessment of the Measurement Model

Measurement model assessment aims to evaluate the reliability and validity of the latent constructs prior to testing the structural relationships which include:

(a) Internal consistency

(b) Indicator reliability or factor loading

(c) Convergent validity

(d) Discriminant validity

3.18.2 Assessment of the Structural Model

After confirming the adequacy of the measurement model, the structural model must be evaluated to examine the hypothesized relationships among latent constructs. The assessment involved these evaluation following the recommendations of Hair et al. (2022) and Sarstedt et al. (2022) such as:

(a) Lateral collinearity

(b) Path coefficients

(c) Coefficient of determination (R^2)

(d) Effect size (f^2)

(e) Predictive relevance (Q^2)

(f) Model fit

3.19 Summary of Chapter

This chapter presents a comprehensive review of the research methodology employed to examine the relationships between strategic foresight, strategic agility as a mediating variable, and the management of the energy security crisis in Jordan. It addresses key methodological components, including the theoretical framework, research hypotheses, research design, operational definitions, demographic and sample characteristics, unit of analysis, data collection procedures, questionnaire design, measurement of variables, pilot testing, and data analysis techniques. Each of these elements is discussed in detail to establish a rigorous and coherent methodological foundation for the study. The structure of this chapter also provides the necessary groundwork for the subsequent chapter, which focuses on the presentation and analysis of the empirical findings.

In the following chapter, the empirical results will be presented and the extent to which the collected data supports the research objectives and hypotheses will be critically evaluated. To investigate the relationships among strategic foresight, strategic agility, and crisis management, appropriate statistical techniques will be employed, with particular emphasis on Partial Least Squares Structural Equation Modelling (PLS-SEM). The discussion of the results will be integrated with the relevant literature and theoretical framework, offering a comprehensive interpretation of the findings and highlighting their implications for the energy security sector.

CHAPTER FOUR - RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings derived from the data analysis conducted using Partial Least Squares (PLS) path modelling. It begins with a report on the response rate of the field study, followed by the procedures for data screening and preliminary analysis. Next, the descriptive statistics of all latent variables are presented using the Statistical Package for the Social Sciences (SPSS) version 28. Subsequently, the chapter reports the results of the measurement model assessment, in which individual item reliability, convergent validity, internal consistency reliability, and discriminant validity were rigorously evaluated. Finally, the structural model assessment is presented to examine the relationships between the endogenous and exogenous latent variables and to test the hypothesised linkages among the study variables.

4.2 Response Rate

According to Sekaran and Bougie (2020), the respondent rate is the percentage of respondents who filled out the study's estimated sample size survey. To have adequate questionnaires for data analysis, the respondent rate is crucial (Hair et al., 2014). Hence, 200 questionnaires have been distributed to Jordanian energy sector managers. Only 191 of the 200 questionnaires were returned, or 95.5% of the respondents' total score. According to Sekaran and Bougie (2020), a response rate of 30% is typically considered acceptable in survey research. Therefore, the sample's response rate is ideal for doing additional analyses.

4.3 Data Editing and Coding

The next step was the entering of the data, data analysis, and cleaning through SPSS software, once all the questionnaires were collected. Next, data coding involves assigning a number to the response of the respondent so that information can be inserted into the database (Sekaran & Bougie, 2020). There are two main methods for applying this technique, the pre-coding system whereby numerical values were pre-coded for all questionnaire items. In fact, after SPSS has accessed the questionnaires submitted by the respondents, data processing protocols have been applied to detect any data entry errors. The double-check procedure was carried out to increase the precision in data eatery processes, as Zikmund, Carr, Babe and Griffin (2013) had recommended. The first test is for all entries to be verified on a case-by-case basis, and the second check is to have descriptive information for continuous data, including frequency distribution, maximum and minimum values and verifications (Sekaran & Bougies, 2016).

4.4 Data Screening

Data screening was conducted prior to running SEM (Cummins, 2014). According to Kline (2011), data were examined for missing data and assessment of normality, as discussed in the following sections.

4.4.1 Missing Data

The descriptive study addressed missing values for all variables by inputting data from 191 questionnaires into SPSS version 28 and analyzing the frequency of missing values. According to Hair et al. (2014), missing values can be replaced with the mean if they account for less than 5% of the dataset. However, in this study, data from only six survey questionnaires were incomplete. Missing value imputation was not applied, as the proportion of missing cases was minimal and did not exceed

the recommended threshold that would necessitate corrective treatment. When missing data are trivial and randomly distributed, case-wise deletion is considered methodologically acceptable and does not significantly bias parameter estimates or reduce statistical power (Hair et al., 2022; Tabachnick & Fidell, 2019; Enders, 2010). Based on this guideline, six incomplete datasets were excluded from the original 191 questionnaires, as summarized in Table 4.1.

Table 4.1: Summary of Data for Analysis

No	Descriptive	Total
1	Population	1622
2	Sample Size	200
3	Unreturned Questionnaire	9
4	Returned Questionnaire (200 - 9)	191
5	Missing Data in Questionnaire	6
6	Usable Sample Size (191 - 6)	185

4.5 Test of Normality

Before constructing the structural model and running the SEM, the study must check for the normality of the distribution of all items measuring the construct. All items assessing the constructs in the study must have their normality distribution evaluated because SEM uses the parametric statistical method to be modeling. The study just needs to demonstrate that the skewness and kurtosis values for all items do not deviate from normality, according to Awang (2015) and Awang et al. (2015). Accordingly, a range of -2 to 2 is considered acceptable for skewness and kurtosis values. Table 4.2 displays the results of the assessment of the normality distribution for all elements (variables).

Table 4.2: The Assessment of Normality for All Components (Sub-Constructs)

Variables (Sub-Constructs)	Skewness	Kurtosis
Technology Intelligence	-0.178	-0.673
Competitive Intelligence	-0.947	1.513
Political Environmental Foresight	-0.733	1.077
Consumer Foresight	-0.983	2.000
- Strategic Insight	-0.939	2.000
- Internal Response Orientation	-0.528	0.263
- External Response Orientation	-0.840	2.002
- Human Resource Capability	-0.430	0.315
- Information Technology Capability	-0.544	0.036
Discover Alarm Signals	-0.733	1.077
Preparedness and Prevention	-0.959	2.000
Containment of Damages	-0.416	-0.025
Restoration Activity	-0.462	0.200
Learning	-0.757	0.933

4.6 Common Method Variance

Common Method Variance (CMV) refers to the portion of variance attributable to the measurement method rather than the constructs of interest. This issue is particularly relevant for studies that rely on self-report surveys, as such designs are prone to inflated correlations among constructs due to common method bias (Spector, 2006; Conway & Lance, 2010). To mitigate the potential impact of CMV, this study adopted procedural remedies recommended by Podsakoff et al. (2003) and MacKenzie and Podsakoff (2012), including the careful design of survey items, ensuring respondent anonymity, and separating measurement contexts. In addition, statistical tests were conducted to detect CMV, including Harman's single-factor test, which confirmed that no single factor accounted for the majority of variance, indicating that common method bias was not a significant threat to the validity of the results.

First, the respondents were made aware that there was no right or incorrect answer to the questions in the questionnaire, and they were reassured of the confidentiality of their answers during the entire research procedure, which helped to lessen evaluation anxiety.

Second, to make the scale items even better, it must be sure that none of the questions were vague and that they were all stated in straightforward, specific, and brief English. Furthermore, the outcome suggests that the exogenous and endogenous factors were not mainly explained by a single component. It follows that typical technique bias is not a big deal and will not likely exaggerate the connections between the variables examined, as demonstrated in this study.

4.7 Profile of Respondents

This section contains information on a demographic profile of the Jordanian energy sector managers who participated in this study. Firstly, the most of respondents were males with 69% while the females' percentage was 31%. Secondly, the majority age of the respondents were 31-40 years old representing 42%; additionally, 25% of respondents were between 41-50 years old. Third, most respondents were highly educated with 49% bachelor's degree respondents and 49% master's and PhD. degree, while those holding diploma were only four respondents with 2%. Fourth, the percentage of 34% of respondents spent in their jobs between 1-5 years, while those who consumed between 5-10 years were 61 with 33%.

Furthermore, 27% of respondents were in their jobs more than ten years. The respondents with the lowest percentage are who's been in the organization for less than one year with 6%.

Table 4.3: Summary of Profile Respondents

No	Respondent Profile	Frequency (N=185)	%
1	Gender of the Manager		
	Male	128	69.
	Female	57	31
	Total	185	100
2	Manager Age		
	20 – 30 years old	43	23
	31 – 40 years old	78	42
	41 – 50 years old	46	25
	Above 50 years old	19	10
	Total	185	100
3	Manager Qualification/ Education Level		
	Diploma	4	2
	Bachelors	91	49
	Masters	78	42
	PhD/DBA	13	7
	Total	185	100
4	Manager Length of Services		
	Below 1 year	11	6
	1 – 5 years	63	34
	5 – 10 years	61	33
	Above 10 years	50	27
	Total	185	100
5	Status Within the Company		
	Top management	65	35
	Middle management	120	65
	Total	185	100

4.8 Descriptive Analysis

The descriptive analysis of this study is investigated utilizing statistical values of means and standard deviations to provide a basic statistical description of the variables being employed. All study variables had these values calculated. The results are shown in table 4.5 below.

Table 4.4: Descriptive Analysis of Study Constructs

No	Construct	Sub-Construct	Min	Max	Mean	Standard Deviation
1	Technology Intelligence		6	10	8.09	1.097
	Competitive Intelligence		2	10	7.76	1.381
	Political Environmental Foresight		1	10	7.63	1.595
	Consumer Foresight		1	10	7.91	1.389
2	Strategic Agility					
		Strategic Insight	1	10	7.89	1.416
		Internal Response Orientation	3	10	7.96	1.306
		External Response Orientation	1	10	7.75	1.482
		Human Resource Capability	4	10	8.03	1.181
		Information Technology Capability	5	10	7.66	1.290
3	Crisis Management					
		Discover Alarm Signals	1	10	7.63	1.595
		Preparedness and Prevention	1	10	7.90	1.386
		Containment of Damages	4	10	7.95	1.236
		Restoration Activity	3	10	7.95	1.271
		Learning	1	10	7.61	1.672

4.9 PLS-SEM Path Model Assessment

The evaluation of PLS-SEM path model findings was recommended by Henseler and Sarstedt (2013) and Hair et al. (2014) in two stages. Moreover, Henseler, Ringle and Sinkovics (2009),

recommended this two-step procedure which consists of (a) measurement model assessment, where item reliability and validity are evaluated, and (b) structural model assessment, where the significance of path coefficients is tested, and the coefficient of determination (R^2 value) is established.

4.10. Measurement Model Evaluation

Measurement model evaluation involves the determination of individual item reliability, internal consistency, discriminant validity and convergent validity (Hair et al., 2014).

4.10.1 Indicator / Item Reliability

Examining the outer loadings of each latent variable allowed us to examine the reliability of individual items (Hair et al., 2022). Outer loadings represent the strength of the relationship between an indicator and the latent variable it is intended to measure. A high outer loading indicates that a substantial proportion of the variance in an indicator is explained by its underlying construct, thereby confirming that the item is a reliable measure of the construct.

According to Hair et al. (2022), an outer loading value of 0.708 or higher is considered ideal, as it implies that the latent construct explains at least 50% of the variance in the indicator. Indicators with outer loading values between 0.40 and 0.70 may be retained provided that their removal does not result in a significant increase in composite reliability (CR) or average variance extracted (AVE). However, indicators with outer loading values below 0.40 should be eliminated due to their weak contribution to construct measurement.

4.10.2 Internal Consistency of Reliability

Internal consistency reliability refers to the extent to which the items of a scale consistently measure the same underlying construct (Sun et al., 2007). In organizational research, Cronbach's alpha and composite reliability (CR) are two commonly used indices for assessing internal consistency, particularly for multi-item scales (McCrae, Kurtz, Yamagata, & Terracciano, 2011; Peterson & Kim, 2013). In this study, CR was preferred over Cronbach's alpha because it accounts for variations in item loadings and provides a more accurate estimate of reliability, whereas Cronbach's alpha assumes that all items contribute equally and may over- or underestimate the true reliability (Gotz, Liehr-Gobbers, & Krafft, 2010). This feature makes CR especially suitable for Partial Least Squares Structural Equation Modeling (PLS-SEM), where the weighted contributions of items are considered. Following the guidelines of Bagozzi and Yi (1988) and Hair et al. (2011), a CR value of 0.70 or higher was considered indicative of satisfactory internal consistency.

Therefore, in this study, the composite reliability (CR) coefficient was preferred over Cronbach's alpha to assess the internal consistency of the modified measures. Scholars have noted that Cronbach's alpha assumes that all indicators contribute equally to their underlying construct, without accounting for the individual loadings of each item (Gotz, Liehr-Gobbers, & Krafft, 2010). In contrast, composite reliability provides a more precise estimate of reliability by considering variations in item loadings within the measurement model. Although conceptually like Cronbach's alpha, CA may sometimes overestimate or underestimate the true reliability of a scale. In the context of Partial Least Squares Structural Equation Modeling (PLS-SEM), CR is particularly appropriate because it accommodates the model's weighted item contributions, ensuring more accurate assessment of construct reliability. Following the guidelines suggested by Bagozzi and Yi (1988) and Hair et al. (2011), a CR value of 0.70 or higher is considered indicative of adequate internal consistency.

Table 4.5 Assessment for Measurement Model

Constructs	Items (Indicators)	Indicators Reliability	Reliability	Validity	Reliability
		Loadings >0.70	Compost Reliability (CR) >0.70	Convergent Validity AVE >0.50	Cronbach Alpha >0.70
Technology Intelligence	TE1	0.828	0.89	0.73	0.815
	TE2	0.882			
	TE3	0.852			
Competitive Intelligence	CI2	0.833	0.934	0.738	0.911
	CI3	0.876			
	CI4	0.867			
	CI5	0.864			
	CI6	0.853			
Political Environmental Foresight	PE1	0.906	0.939	0.837	0.902
	PE2	0.928			
	PE3	0.910			
Consumer Foresight	CF1	0.865	0.936	0.786	0.909
	CF2	0.894			
	CF3	0.894			
	CF4	0.894			
Strategic Insight	SI1	0.878	0.929	0.766	0.898
	SI2	0.919			
	SI3	0.894			
	SI4	0.807			
Internal Response Orientation	IRO1	0.862	0.922	0.746	0.886
	IRO2	0.875			
	IRO3	0.897			
External Response Orientation	ERO1	0.873	0.933	0.778	0.904
	ERO2	0.918			
	ERO3	0.907			
Human Resource Capability	HRC2	0.896	0.93	0.816	0.887
	HRC3	0.918			
	HCR4	0.895			
Information Technology Capability	ITC1	0.866	0.902	0.698	0.855
	ITC2	0.872			

	ITC3	0.776			
	ITC5	0.824			
Discover Alarm Signals	DAS1	0.87	0.934	0.78	0.906
	DAS2	0.872			
	DAS3	0.912			
	DAS4	0.877			
Preparedness and Prevention	PP1	0.820	0.919	0.74	0.883
	PP2	0.868			
	PP3	0.888			
	PP4	0.865			
Containment of Damages	CD1	0.841	0.917	0.786	0.863
	CD2	0.917			
	CD3	0.899			
Restoration Activity	RA1	0.861	0.91	0.772	0.852
	RA3	0.891			
	RA4	0.884			
Learning	L1	0.874	0.933	0.778	0.904
	L2	0.916			
	L3	0.905			
	L4	0.831			

According to Table 4.5, the outer loadings of all retained indicators exceeded the recommended threshold (0.7), indicating that each item demonstrated adequate individual reliability and was a valid reflection of its respective construct. Similarly, study's constructs were found to have satisfactory internal consistency, as indicated by the composite reliability coefficients. All the latent variables in the study surpassed the minimal acceptable level of 0.70. Although some of the items were dropped in the pilot test stage, the coding for each item remains as per original coding. This decision was made to preserve consistency with the initial instrument design, ensure transparency in reporting, and allow comparability between pilot and main study phases. As recommended in scale development literature, item deletion does not necessitate renumbering of the remaining items, since coding functions as a

labeling convention rather than a validity indicator (DeVellis, 2017; Hair et al., 2019). In general, the study confirms that the measurement items used in the questionnaire were appropriate and consistent for measuring the underlying latent variables.

4.10.3 Convergent Validity

According to Hair et al. (2014), convergent validity refers to the correspondence of the indicators of the latent construct to the construct that they are supposed to be measuring and the level of correlation existing between them. To accomplish this the study calculates the Average Variance Extracted (AVE) which is the average variance of the construct and the measures of the construct. Moreover, the variance that one construct shared with the rest of the constructs in each model should be less than its AVE value. Further, Barclay et al. (1995) observe that an AVE value of 0.5 or more is usually satisfactory. This study has displayed convergent validity in all the constructs as indicated by the resultant coefficients of the Average Variance Extracted (AVE) values as indicated by Table 4.5.

4.10.4 Discriminant Validity

Fornell and Larcker (1981) indicate that discriminant validity is the nature of model of measurement where a construct is distinct compared to the other constructs about empirical criteria and cannot be represented by a redundant item. To evaluate the discriminant validity of the measurement model, Smart-PLS has used three, namely: Heterotrait-Monotrait Ratio (HTMT), the Cross-loading criterion, and the Fornell and Larcker criterion. These aspects are further discussed in detail below with regards to the current study.

4.10.5 Cross Loadings

Chin (2010) postulates that, any item to be viable must have a factor loading on the construct to which it is relatable to be more than the cross loading on the other constructs. As a result, cross-loading offers a reason as to why there is discriminative validity. Table 4.6 shows the results of the cross-loading analysis of the variables of the measurement model.

The items had higher values of the factor loading (bold) to the construct associated with the item than the values of the correlations with the other constructs as observed in the cross-correlations in Table 4.6. Therefore, the analysis of discriminating validity demonstrated the validity of the measurements of the study.

Table 4.6 Cross-Loadings for Overall Measurement Model

No of Items	Competitive Intelligence	Customer Foresight	Discover Alarm Signal	External Response Orientation	Human Resource Capability	Informational Technology Capability	Internal Response Orientation	Learning	Political Environmental Foresight	Resorption Activity	Strategic Insight	Technology Intelligence	Containment Of Damage	Preparedness And Prevention
CD1	0.311	0.64	0.646	0.506	0.619	0.501	0.65	0.507	0.672	0.445	0.685	0.314	0.841	0.467
CD2	0.327	0.631	0.636	0.465	0.601	0.518	0.643	0.465	0.906	0.406	0.878	0.335	0.917	0.445
CD3	0.337	0.619	0.633	0.488	0.624	0.514	0.635	0.488	0.928	0.455	0.919	0.321	0.899	0.497
CF1	0.446	0.965	0.748	0.557	0.717	0.548	0.862	0.558	0.673	0.437	0.689	0.349	0.675	0.479
CF2	0.468	0.994	0.778	0.497	0.743	0.524	0.875	0.497	0.559	0.427	0.607	0.396	0.557	0.457
CF3	0.5	0.995	0.87	0.598	0.762	0.607	0.897	0.6	0.628	0.528	0.656	0.461	0.666	0.549
CF4	0.466	0.911	0.912	0.554	0.518	0.539	0.848	0.555	0.59	0.459	0.638	0.366	0.612	0.485
CI1	0.833	0.479	0.5	0.404	0.477	0.379	0.469	0.403	0.35	0.397	0.367	0.516	0.372	0.412
CI2	0.876	0.46	0.467	0.385	0.452	0.391	0.442	0.385	0.338	0.395	0.349	0.523	0.32	0.428
CI3	0.867	0.495	0.478	0.489	0.45	0.484	0.481	0.489	0.333	0.503	0.355	0.584	0.325	0.51
CI4	0.864	0.422	0.41	0.392	0.397	0.419	0.414	0.392	0.309	0.463	0.33	0.572	0.296	0.481
CI5	0.853	0.41	0.402	0.314	0.383	0.335	0.405	0.314	0.265	0.373	0.284	0.491	0.251	0.396
DAS1	0.5	0.814	0.87	0.598	0.762	0.607	0.497	0.6	0.628	0.528	0.656	0.461	0.666	0.549
DAS2	0.371	0.738	0.872	0.547	0.896	0.568	0.421	0.548	0.596	0.488	0.625	0.348	0.599	0.517

DAS3	0.466	0.811	0.912	0.554	0.918	0.539	0.448	0.555	0.59	0.459	0.638	0.366	0.612	0.485
DAS4	0.525	0.77	0.877	0.608	0.895	0.587	0.475	0.608	0.651	0.559	0.671	0.419	0.661	0.584
ERO1	0.378	0.553	0.598	0.873	0.584	0.66	0.562	0.574	0.464	0.606	0.492	0.39	0.49	0.658
ERO2	0.419	0.528	0.546	0.918	0.525	0.706	0.531	0.516	0.431	0.711	0.456	0.419	0.465	0.735
ERO3	0.489	0.537	0.577	0.907	0.569	0.728	0.557	0.505	0.5	0.732	0.524	0.464	0.5	0.752
HRC1	0.371	0.738	0.772	0.547	0.896	0.568	0.421	0.548	0.596	0.488	0.625	0.348	0.599	0.517
HRC2	0.466	0.894	0.412	0.554	0.918	0.539	0.448	0.555	0.59	0.459	0.638	0.366	0.612	0.485
HRC3	0.525	0.77	0.817	0.608	0.895	0.587	0.475	0.608	0.651	0.559	0.671	0.419	0.661	0.584
IRO1	0.446	0.865	0.748	0.557	0.717	0.548	0.862	0.558	0.673	0.437	0.689	0.349	0.675	0.479
IRO2	0.468	0.894	0.778	0.497	0.743	0.524	0.875	0.497	0.559	0.427	0.607	0.396	0.557	0.457
IRO3	0.5	0.894	0.67	0.598	0.762	0.607	0.897	0.6	0.628	0.528	0.656	0.461	0.666	0.549
ITC1	0.355	0.607	0.619	0.8	0.595	0.866	0.63	0.801	0.582	0.704	0.604	0.498	0.579	0.74
ITC2	0.342	0.558	0.569	0.709	0.543	0.872	0.581	0.71	0.481	0.68	0.494	0.457	0.487	0.701
ITC3	0.472	0.504	0.502	0.55	0.462	0.776	0.513	0.55	0.424	0.652	0.455	0.452	0.448	0.642
ITC4	0.421	0.417	0.479	0.594	0.481	0.824	0.442	0.594	0.387	0.661	0.414	0.38	0.4	0.82
L1	0.378	0.553	0.598	0.873	0.584	0.66	0.562	0.874	0.464	0.606	0.492	0.39	0.49	0.658
L2	0.419	0.528	0.546	0.918	0.525	0.706	0.531	0.916	0.431	0.711	0.456	0.419	0.465	0.735
L3	0.489	0.537	0.577	0.907	0.569	0.728	0.557	0.905	0.5	0.732	0.524	0.464	0.5	0.752
LT4	0.356	0.584	0.587	0.828	0.552	0.728	0.302	0.831	0.46	0.63	0.479	0.389	0.474	0.658
PE1	0.327	0.631	0.636	0.465	0.601	0.518	0.343	0.465	0.906	0.406	0.878	0.335	0.817	0.445

PE2	0.337	0.619	0.633	0.488	0.624	0.514	0.335	0.488	0.928	0.455	0.919	0.321	0.819	0.497
PE3	0.362	0.648	0.647	0.492	0.639	0.518	0.374	0.492	0.91	0.421	0.894	0.376	0.785	0.469
PP1	0.421	0.417	0.479	0.594	0.481	0.624	0.442	0.594	0.387	0.861	0.414	0.38	0.4	0.82
PP2	0.404	0.492	0.525	0.697	0.489	0.762	0.512	0.697	0.412	0.891	0.43	0.48	0.433	0.868
PP3	0.492	0.469	0.514	0.711	0.499	0.701	0.483	0.71	0.432	0.884	0.469	0.473	0.458	0.888
PP4	0.476	0.533	0.56	0.73	0.548	0.714	0.556	0.73	0.531	0.741	0.552	0.46	0.524	0.865
RA1	0.421	0.417	0.479	0.594	0.481	0.824	0.442	0.594	0.387	0.861	0.414	0.38	0.4	0.82
RA2	0.404	0.492	0.525	0.697	0.489	0.762	0.512	0.697	0.412	0.891	0.43	0.48	0.433	0.868
RA3	0.492	0.469	0.514	0.711	0.499	0.701	0.483	0.71	0.432	0.884	0.469	0.473	0.458	0.888
SI1	0.327	0.631	0.636	0.465	0.601	0.518	0.443	0.465	0.906	0.406	0.878	0.335	0.817	0.445
SI2	0.337	0.619	0.633	0.488	0.624	0.514	0.335	0.488	0.928	0.455	0.919	0.321	0.899	0.497
SI3	0.362	0.648	0.647	0.492	0.639	0.518	0.374	0.492	0.91	0.421	0.894	0.376	0.785	0.469
SI4	0.359	0.667	0.658	0.496	0.644	0.528	0.364	0.496	0.676	0.466	0.807	0.362	0.673	0.497
TE1	0.62	0.402	0.371	0.386	0.354	0.402	0.397	0.385	0.254	0.416	0.285	0.828	0.24	0.433
TE2	0.547	0.359	0.356	0.354	0.315	0.447	0.35	0.354	0.318	0.429	0.336	0.882	0.318	0.439
TE3	0.456	0.377	0.424	0.459	0.399	0.514	0.406	0.46	0.381	0.452	0.389	0.852	0.367	0.463

4.10.6 Fornell–Larcker Criterion

To examine the discriminant validity of the measurement model, Table 4.8 displays the results of variable correlation using the Fornell-Larcker (F&L) technique.

Table 4.7 Variable Correlation-Root Square of AVE

Constructs	Competitive Intelligence	Customer Foresight	Discover Alarm Signals	External Response Orientation	Human Resource Capability	Informational Technology Capability	Internal Response Orientation	Learning	Political Environmental Foresight	Restoration Activity	Strategic Insight	Technology Intelligence	Containment of Damage	Preparedness and Prevention
Competitive Intelligence	0.859													
Customer Foresight	0.53	0.887												
Discover Alarm Signals	0.529	0.635	0.883											
External Response Orientation	0.468	0.624	0.654	0.882										
Human Resource Capability	0.505	0.886	0.872	0.632	0.903									

Informational Technology Capability	0.472	0.627	0.652	0.8	0.626	0.835								
Internal Response Orientation	0.518	0.682	0.746	0.638	0.901	0.651	0.864							
Learning	0.467	0.625	0.655	0.561	0.633	0.801	0.639	0.882						
Political Environmental Foresight	0.374	0.691	0.698	0.526	0.679	0.565	0.711	0.527	0.915					
Restoration Activity	0.5	0.524	0.576	0.761	0.558	0.766	0.546	0.761	0.467	0.879				
Strategic Insight	0.395	0.731	0.734	0.553	0.715	0.593	0.746	0.554	0.781	0.498	0.875			
Technology Intelligence	0.628	0.444	0.452	0.472	0.419	0.536	0.451	0.472	0.376	0.507	0.398	0.854		
Containment of Damages	0.367	0.709	0.719	0.547	0.692	0.576	0.724	0.548	0.948	0.49	0.438	0.365	0.886	
Preparedness and Prevention	0.522	0.557	0.605	0.796	0.587	0.869	0.581	0.796	0.514	0.478	0.544	0.522	0.529	0.861

According to Fornell and Bookstein (1982), discriminant validity is established in the correlation technique of a variable when the square root of Average Variance Extracted (AVE) exceeds the correlation between factors for each pair, as calculated. In other words, the diagonal elements in the rows and columns should have a higher value compared to the other non-diagonal elements.

This was observed in the correlation matrix of the study. Therefore, the discriminant validity of the measurements was established. The measurement model's discriminating validity is assessed using the Heterotrait-Monotrait Ratio of Correlations, as displayed in Table 4.8, which displays the HTMT results.

Table 4.8 Heterotrait-Monotrait Ratio

Competitive Intelligence	Customer Foresight	Discover Alarm signal	External Response Orientation	Human resource capability	Informational technology Capability	Internal response orientation	Learning	Political environmental Foresight	Resorption Activity	Strategic Insight	Technology Intelligence	containment of damage	preparedness and prevention
0.579													
0.577	0.726												
0.507	0.687	0.723											
0.556	0.686	0.797	0.704										
0.534	0.707	0.738	0.704	0.715									
0.572	0.693	0.756	0.712	0.719	0.744								
0.507	0.687	0.723	1.106	0.704	0.704	0.712							

Competitive Intelligence	Customer Foresight	Discover Alarm signal	External Response Orientation	Human resource capability	Informational technology Capability	Internal response orientation	Learning	Political environmental Foresight	Resorption Activity	Strategic Insight	Technology Intelligence	containment of damage	preparedness and prevention
0.41	0.763	0.772	0.582	0.758	0.639	0.795	0.582						
0.563	0.592	0.655	0.864	0.639	0.718	0.626	0.864	0.532					
0.435	0.711	0.716	0.615	0.802	0.674	0.838	0.615	0.786	0.571				
0.731	0.515	0.521	0.544	0.488	0.636	0.527	0.544	0.434	0.605	0.462			
0.41	0.701	0.714	0.621	0.791	0.668	0.28	0.621	0.768	0.572	0.758	0.43		
0.577	0.618	0.675	0.787	0.66	0.704	0.653	0.87	0.573	0.731	0.61	0.612	0.605	

.

Table 4.8 shows that the Heterotrait-Monotrait Ratio (HTMT), which was established by Henseler, Ringle, and Sarstedt (2015), is used to evaluate discriminating validity. Study of Kline (2011) and Gold and Malhotra (2001) both set threshold values of 0.85 and 0.90, respectively, for HTMT, and the final values should fall below these values. Furthermore, the criterion is not in place to show that discriminant validity is lacking, even when two constructs are strongly but imperfectly associated with values near to 1.0 (Henseler, et al., 2015). That is why any value lower than 1.0 is perfectly fine.

4.11 Assessment of Structural Measurement Model

Evaluating the SEM is the second main process in PLS-SEM analysis, following the assessment of the measurement model's validity and reliability. Following the validation of the measurement model, the next step was to specify the correlation between the constructs to describe the structural model. The structural model shows how the variables are related and how each independent variable is linked to the dependent variable. According to Hair et al. (2011), structural model evaluations pay close attention to the overall model fit before looking at the size and importance of the predicted parameter values.

4.11.1 Multicollinearity Test

Multicollinearity occurs when previously independent variables exhibit a significant degree of correlation with one another. According to Hair et al. (2006), the occurrence of multicollinearity among the independent variables can significantly misrepresent the estimates of regression coefficients and related tests for statistical significance.

Tabachnick and Fidell (2013) state that if the standard error coefficients are raised due to multicollinearity, the coefficients may no longer be considered statistically significant. In order to identify instances of multicollinearity, the tolerance value and Variance Inflated Factor (VIF) were analyzed after the correlation matrix for the independent variables. Emphasizing earlier, Hair et al. (2011) proposed that a VIF value below 5 and a tolerance value above 0.20 constitute multicollinearity. The condition indices, VIF values, and tolerance values for the independent variables are displayed in Table 4.9.

Table 4.9 Tolerance and (VIF) Results

Independent Variables	Tolerance	VIF
Technology Intelligence	0.439	2.276
Competitive Intelligence	0.460	2.173
Political Environmental Foresight	0.364	2.749
Consumer Foresight	0.211	1.830
Strategic Insight	0.219	3.701
Internal Response Orientation	0.287	4.491
External Response Orientation	0.203	3.699
Human Resource Capability	0.701	2.330
Information Technology Capability	0.978	1.023

A study by Hair et al. (2011) asserted that there is no multicollinearity issue exists if the values of the VIF are less than 5, and the values of tolerance exceed 0.20. The data in Table 4.3 shows that there is no multicollinearity issue exists among the exogenous latent variables. Furthermore, the value of Durbin-Watson d = 2.037 suggested that there is no first-order linear autocorrelation in the data. Field (2009) suggests a value less than 1 and greater than 3 is a cause for concern.

This is illustrated in the path diagrams with the one-headed diagram. The last step of this evaluation is to verify the structural model's accuracy using the predicted correlations between the identified and evaluated variables. To investigate the study's hypotheses, the Path - modelling technique and bootstrapping were employed to estimate the structural model with 5000 replications. According to Chin (2010), Hair et al. (2014), Ramayah (2018) and Valerie (2012), five sets of tests were conducted to assess the inner model's R^2, F^2, Q^2, and P-value. Lastly, the direct and indirect effects are shown in figure 4.1 below.

4.11.2 Assessment of Significance of the Structural Model

Once the evaluation of the outer model has been established in this study, the structural model was analyzed to ascertain the links between the latent variables (constructs). To assess the statistical significance of the path coefficients, this study employed a nonparametric assessment criterion based on bootstrapping. The analysis was conducted using 185 cases and 5,000 bootstrap samples, as recommended by Hair et al. (2017). The internal model of this experiment, which includes the mediating effects, is depicted in Figure 4.1.

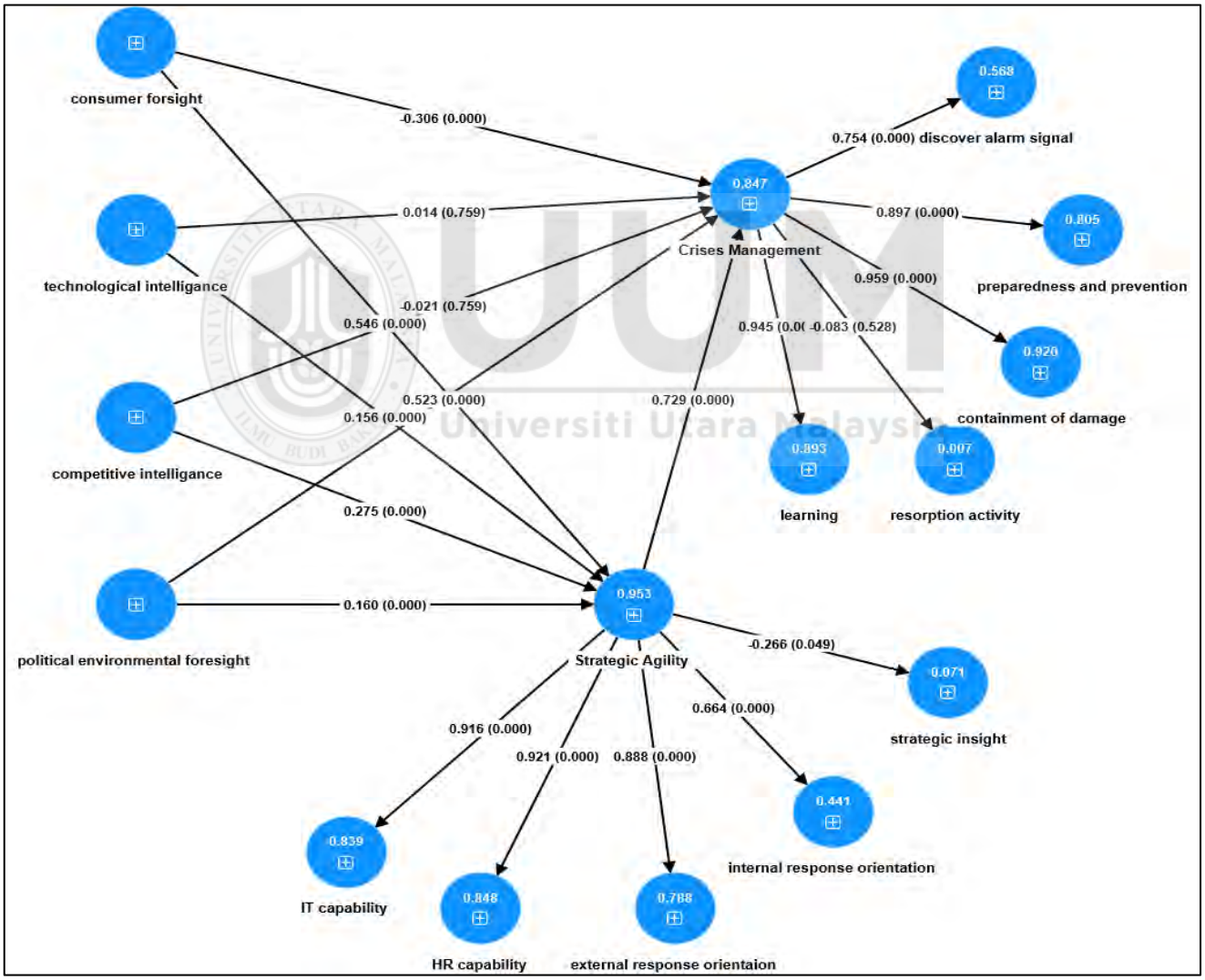

Figure 4.1: Structural Model Path Coefficient and P-Value

This study adopts 5,000 bootstrap resamples as recommended by several scholars. For instance, Hair et al. (2017; 2022) explicitly recommend 5,000 bootstrap samples as the default setting for most PLS-SEM applications, particularly for models of moderate complexity such as the present study. Likewise, Henseler et al. (2016) and Sarstedt et al. (2020) confirm that increasing bootstrap resamples beyond 5,000 produces only marginal improvements in estimation precision, with no substantive impact on statistical inference. Therefore, adopting higher samples (e.g. 10,000 resamples) would not enhance the robustness of results but would instead impose unnecessary computational burden without methodological benefit. Due to this reason, the study sticks to the choice of 5000 bootstrap samples.

4.11.3 Coefficient of Determination (R^2) Value

If there are changes in the correlation between two variables, the effect size (R^2) can be calculated. Table 4.10 and Figure 4.1 both show that the Smart-PLS algorithm function was utilized to determine the values of R^2 in this investigation.

Table 4.10: R-Square of the Endogenous Latent Variables

Latent Construct Relation	Coefficient of Determination (R^2)	R Square Adjusted
Crisis Management	0.847	0.844

Technology intelligence, competitive intelligence, political environmental foresight, consumer foresight, and strategic agility can explain the 84.7% of the variance in crisis management in the Jordanian energy sector, according to the findings of the structural model with R^2 values and path coefficients.

4.11.4 The Effect Size (f^2) Value

According to Hair et al. (2014), once the significance of the links between constructs has been established, the next step is to determine the relevance of those relationships. So, the method proposed by Cohen (1988) is used to measure the effect size analysis. A measure used to evaluate the significant influence of a predictive construct on an endogenous construct is the effect size f^2.

According to f^2, the strength of an exogenous construct's contribution to explaining an endogenous construct is evaluated. Effect sizes f^2 of 0.35, 0.15, and 0.02 are seen as large, medium, and modest effect sizes, respectively, as stated by Cohen (1988). The estimations of the coefficient of effect size f^2 are displayed in Table 4.11.

Table 4.11 Effect Size of the Exogenous Constructs (f^2)

Latent Construct Relation	f^2	Effect Size
Technology Intelligence → Crisis Management	0.001	Small
Competitive Intelligence → Crisis Management	0.001	Small
Political Environmental Foresight → Crisis Management	0.721	High
Consumer Foresight → Crisis Management	0.069	Medium
Technology Intelligence → Strategic Agility	0.369	High
Competitive Intelligence → Strategic Agility	0.527	High
Political Environmental Foresight → Strategic Agility	0.285	High
Consumer Foresight → Strategic Agility	2.520	High

According to this result, all the exogenous constructs are between small and high together with the effect size as indicated in Table 4.11, as suggested by Cohen (1988). The findings have shown that political environmental foresight is of high degree in the management of crisis in Jordan.

4.11.5 Predictive Relevance and Blindfolding (Q^2) Value

The experiment on the predictive relevance of the model is carried out through the process of blindfolding. The reflective measurement model of endogenous construct has a blindfolding operation as a resampling strategy, which predicts and then systematically removes all the data points of the indicators. Hair Jr. et al. (2016) point out that the only type of endogenous constructions that need to undergo the blindfolding procedure is one that has reflected measures. It is assumed that a particular endogenous construct would be predictively valid with the model in case the value of Q^2 is greater than zero (Cohen, 1988; Hair Jr. et al., 2016). Table 4.12 presents the results of the endogenous construct, Q^2.

Table 4.12 Predictive Relevance of the Endogenous Latent Variables

Exogenous Constructs	Q^2 Predict	Results
Crisis Management	0.421	$Q^2 > 0$ The variable explaining gives predictive relevance.

As shown in Table 4.12, the values of crisis management of 0.421 and Strategic agility of 0.523 are greater than 0, indicating that the model's predictive significance is adequate.

The predictive relevance of the model was evaluated using the Stone-Geisser Q^2 criterion obtained through the blindfolding procedure, which yielded a value of 0.421, indicating a large level of predictive relevance. According to Hair et al. (2022), Q^2 values above 0.35 represent substantial in-sample predictive capability, confirming that the model has strong predictive relevance for the endogenous construct. Consequently, the model can already be considered to possess robust predictive power within the sample.

Although recent PLS-SEM literature recommends the use of PLS-Predict to assess out-of-sample predictive performance, its application is primarily intended for studies with a strong prediction-oriented or forecasting objective (Shmueli et al., 2019; Hair et al., 2022). In contrast, the present study is theory-driven and explanatory in nature, aiming to test hypothesized causal relationships among strategic foresight, strategic agility, and crisis management rather than to generate point predictions for new observations. As emphasized by Sarstedt et al. (2022), in explanatory research, the primary focus should remain on path relationships, explanatory power (R^2), effect sizes (f^2), and predictive relevance (Q^2).

Therefore, given the strong Q^2 value of 0.421, which already demonstrates substantial predictive relevance, and considering the explanatory orientation of the study, the application of the PLS-Predict procedure was deemed methodologically unnecessary and unlikely to provide significant additional theoretical value.

4.11.6 Hypotheses Testing (Path Coefficient)

The results of the path coefficient, which were utilized to test research hypotheses, were addressed in this section. The results of direct (H1 to H9), indirect (H10 to H13) hypotheses are shown in Figure 4.1 and Table 4.13. Figure 4.1 shows the structural model of both direct and indirect effects between variables; the model shows the P-value in brackets which represent the significance and the co-efficient value (Beta Value).

Table 4.13 Structural Model Assessment for The Direct Effect Hypotheses

No	Constructs	Original Sample (β)	STDEV	T Statistics	P-Value	BCI LL	BCI UL	Decision
H1	Technology Intelligence → Crisis Management	0.014	0.045	0.307	0.76	-0.071	0.092	Not Supported
H2	Competitive Intelligence → Crisis Management	-0.021	0.067	0.307	0.759	-0.152	0.109	Not Supported
H3	Political Environmental Foresight → Crisis Management	0.523	0.053	9.868	0	0.417	0.611	Supported
H4	Customer Foresight → Crisis Management	-0.306	0.082	3.746	0	-0.458	-0.142	Supported
H5	Technology Intelligence → Strategic Agility	0.156	0.018	8.86	0	0.122	0.189	Supported
H6	Competitive Intelligence → Strategic Agility	0.275	0.023	11.989	0	0.229	0.319	Supported
H7	Political Environmental Foresight → Strategic Agility	0.16	0.021	7.503	0	0.118	0.199	Supported
H8	Customer Foresight → Strategic Agility	0.546	0.026	21.3	0	0.493	0.594	Supported
H9	Strategic Agility → Crisis Management	0.729	0.149	4.899	0	0.405	1.002	Supported

Note: Significant level at $p<0.01$ (1-tailed)

Table 4.13 shows the assessment of the full model. The result of the study shows only seven out of nine hypotheses were supported, namely H3- the impact of the political environmental foresight on the crisis management, H4- the impact of the customer foresight on the crisis management, H5- the impact of the technology intelligence on the strategic agility, H6- the impact of competitive

intelligence on the strategic agility, H7- the impact of political environmental foresight on the strategic agility, H8- the impact of the customer foresight on the strategic agility and finally the H9- the impact of the strategic agility on the crisis management .

Meanwhile, H1 was not supported which is related to the impact of the technology intelligence on the crisis management, also H2 was not supported which is related to the impact competitive intelligence on the crisis management in the Jordanian energy sector.

4.11.7 Indirect Effect (Mediation Effect) of Strategic Agility

This study investigated the effects of technology intelligence, competitive intelligence, consumer foresight, and political-environment foresight on crisis management, while also examining the mediating role of strategic agility. The mediation effects were assessed using the bootstrapping procedure recommended by Preacher and Hayes (2008), which provides a robust, non-parametric method for testing indirect effects without assuming normality of the sampling distribution.

This approach is particularly suitable in the context of PLS-SEM, as it generates bias-corrected confidence intervals for the mediation paths, enhancing the reliability and interpretability of the results. The findings are summarized in Table 4.14. Strategic foresight is conceptualized by four constructs (i.e., technology intelligence, competitive intelligence, political environmental foresight and customer foresight), the four constructs represent strategic insight.

Table 4.14: Mediation Effect of Strategic Agility

No	Hypothesis	Indirect Effect (β)	Std. Error	t-Value	P-Value	LL	UL	Decision
H10	Technology Intelligence → Strategic Agility → Crisis Management	0.114	0.024	4.75	0	0.054	0.215	Supported
H11	Competitive Intelligence → Strategic Agility → Crisis Management	0.2	0.029	6.897	0	0.118	0.292	Supported
H12	Political Environmental Foresight → Strategic Agility → Crisis Management	0.117	0.02	5.85	0	0.066	0.174	Supported
H13	Customer Foresight → Strategic Agility → Crisis Management	0.398	0.039	10.205	0	0.068	0.163	Supported

Note: Significant level at $p<0.01$ (1-tailed)

The result of the study shows all the of four mediation effect were supported, in the Jordanian energy sector. The result of the study support H10 which related to the mediation impact of the strategic agility in the relationship between technology intelligence and crisis management, and support H11 which is related to the mediating effect strategic agility on the relationship of the competitive intelligence and crisis management, also support H12 which is related to the mediation impact of the strategic agility on the relationship between political environmental foresight and crisis management, H13 which is related to the mediation effect of the strategic agility in the relationship between customer foresight and crisis management, was supported in the Jordanian energy sector energy.

4.12 Summary of Chapter

This chapter presents a comprehensive account of the results obtained from the PLS-SEM data analysis conducted in this study. It begins by detailing the key indicators and variables used to address the research objectives and hypotheses, providing the foundation for understanding the subsequent analyses. The chapter then presents a thorough examination of the original dataset, including preliminary checks for data quality, missing values, and distributional assumptions, ensuring the suitability of the data for advanced statistical modelling.

Following this, descriptive statistics for all latent variables are reported using SPSS, offering a detailed overview of the central tendencies, dispersion, and patterns within the dataset. The chapter proceeds with an in-depth evaluation of the measurement model, assessing the reliability and validity of the constructs employed in the study. This includes the examination of individual item reliability, internal consistency reliability through composite reliability and Cronbach's alpha, as well as assessments of convergent and discriminant validity. These steps are critical in confirming that the measurement instruments accurately and consistently capture the underlying theoretical constructs.

Once the measurement model is validated, the structural model is analyzed to quantify and establish the relationships between the exogenous and endogenous latent variables. This analysis not only identifies the direct effects among constructs but also evaluates the overall explanatory power and predictive capabilities of the model, thereby providing empirical evidence for the causal relationships proposed in the research framework. The chapter further investigates the mediating role of strategic agility, employing robust bootstrapping techniques to test indirect effects and determine the significance and strength of the mediation paths. This analysis provides deeper insights into how

strategic agility influences crisis management outcomes and enhances the theoretical understanding of organizational responsiveness in dynamic environments.

By integrating both measurement and structural analyses, this chapter offers a detailed and methodologically rigorous account of the empirical results, highlighting the robustness and validity of the study's findings. The results presented herein not only support the theoretical framework but also provide actionable insights for practice, illustrating how organizations can leverage foresight capabilities and strategic agility to respond effectively to crisis.

CHAPTER 5: DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter presents a detailed discussion of the empirical findings derived from the structural-model analysis conducted in Chapter 4, interpreted within the context of this study. The primary aim of this discussion is to link the results with the theoretical foundations established in Chapter 2, specifically the Resource-Based View (RBV) and Dynamic Capabilities Theory (DCT), while also situating the findings within the practical realities of the Jordanian energy sector, as reflected in the respondent profile. To ensure the discussion remains current and relevant, recent scholarly literature (2020–2025) has been integrated, allowing the conclusions to be positioned within the broader contemporary academic discourse.

The chapter provides a comprehensive examination of the impact of strategic foresight on crisis management within the Jordanian energy-security industry. In particular, it explores the four dimensions of strategic foresight technology intelligence, competitive intelligence, political-environment foresight, and consumer foresight and evaluates both their direct effects on crisis management and their indirect effects through strategic agility. By analyzing these relationships, the discussion highlights how organizations can leverage foresight capabilities and adaptive strategies to respond effectively to crisis in highly dynamic and uncertain environments.

Furthermore, this chapter delves into the theoretical and managerial implications of the study. From a theoretical perspective, the findings extend the application of RBV and DCT by demonstrating the mechanisms through which strategic foresight and strategic agility contribute to organizational resilience. From a managerial perspective, the results provide actionable insights for leaders in the

energy sector, emphasizing the importance of developing foresight capabilities, agile human-resource strategies, and dynamic response mechanisms to enhance crisis preparedness and recovery.

Finally, the chapter addresses the study's limitations and identifies avenues for future research, thereby offering a roadmap for advancing scholarly inquiry into strategic foresight, agility, and crisis management in both the Jordanian context and similar emerging economies. Through this comprehensive discussion, the chapter bridges empirical evidence, theory, and practice, reinforcing the study's contribution to the field of strategic management and energy-security research.

5.2 Summary of the Findings

This study was aimed at analyzing the association between strategic foresight and crisis management mediated by strategic agility in the Jordanian energy sector. The empirical validation of the model was done through the data of 185 respondents at the managerial level in Jordan energy sector.

Thirteen (13) hypotheses were tested based on the conceptual framework. The results revealed that:

(a) H1–H2 (technology & competitive intelligence → crisis management) were not supported.

(b) H3–H4 (political-environment & consumer foresight → crisis management) were supported.

(c) H5–H8 (all foresight dimensions → strategic agility) were supported.

(d) H9 (strategic agility → crisis management) was supported.

(e) H10–H13 (strategic agility mediating the foresight–crisis-management links) were supported.

These findings confirm that foresight exerts a strong indirect influence on crisis management via agility. Political and consumer foresight emerged as the most salient direct contributors to crisis

performance, whereas technology and competitive intelligence affect crisis outcomes only when channeled through agile capabilities.

The results collectively affirm the RBV/DCT perspective that valuable knowledge resources (foresight) must be converted into adaptive capabilities (agility) to enhance organizational resilience and crisis-response effectiveness.

5.3 Discussion of Findings

5.3.1 Objective 1: Effect of Strategic Foresight on Crisis Management

The first research objective of this study was to examine the effect of strategic foresight, operationalized through technology intelligence, competitive intelligence, political-environment foresight, and consumer foresight, on crisis management in the Jordanian energy sector. To address this objective, Hypotheses H1–H4 were tested, and the findings were compared with existing literature.

The results revealed that H1 was not supported, indicating that technology intelligence does not have a significant direct effect on crisis management. This finding can be attributed to the early stage of digital transformation in Jordan's energy sector. Although advanced technologies such as Artificial Intelligence (AI) and the Internet of Things (IoT) have begun to be adopted particularly within Ministry-affiliated organizations for purposes such as data collection and network monitoring their integration into formal crisis management systems remains limited. As a result, the potential of technology intelligence to enhance crisis preparedness, response, and recovery has not yet been fully realized.

This result contrasts with Wang and Wu (2021), who found that technology intelligence strengthens crisis management by enabling rapid response, risk anticipation, and effective resource allocation.

Similarly, Alkhaffaf and Almomani (2021) and Aladawi and Ahmad (2023) highlighted the growing importance of AI in crisis contexts, while Sandri et al. (2020) emphasized the continued lack of advanced technology applications within Jordan's energy security sector.

The findings also showed that H2 was not supported, indicating that competitive intelligence does not exert a significant direct effect on crisis management. This outcome is largely explained by the limited competitiveness of the Jordanian energy sector, which is dominated by government ownership and constrained by financial and budgetary limitations. Such conditions reduce competitive pressure and, consequently, weaken incentives for innovation and rapid strategic response, thereby limiting organizations' crisis management capacity. This interpretation is consistent with Aly et al. (2021), who argued that restricted competition within state-owned institutions diminishes organizational agility and sensitivity to crisis signals. However, this result differs from prior studies such as Wu et al. (2023) and Iwu-James et al. (2020), which reported significant positive effects of competitive intelligence on crisis management in more competitive market environments. These contrasting findings highlight the importance of contextual factors in shaping the effectiveness of competitive intelligence.

In contrast, the results supported H3, confirming that political-environment foresight has a significant positive effect on crisis management. The ability to anticipate policy changes, tariff reforms, and regulatory shifts enables managers to develop proactive contingency strategies and allocate organizational resources more effectively, thereby minimizing disruption during crisis. This finding is consistent with Rastegari et al. (2020) and Makian and Nematpour (2021), who emphasized the central role of political foresight in strengthening organizational resilience and improving stakeholder coordination in uncertain and highly regulated environments.

Similarly, the results supported H4, indicating that consumer foresight has a significant positive impact on crisis management. Anticipating changes in customer expectations and energy consumption patterns allows organizations to maintain service continuity and protect consumer trust during crisis. In the Jordanian context, electricity distribution companies increasingly utilize consumption analytics and social media monitoring to anticipate abnormal demand patterns, which enhances their ability to respond proactively. This result aligns with the findings of Makian and Nematpour (2021) and Suhail et al. (2019), who demonstrated that consumer foresight strengthens organizational resilience by improving service design, responsiveness, and demand-side adaptability.

The profile of the respondents further strengthens this interpretation. Most respondents are middle-level managers (65%), and a substantial proportion have more than five years of work experience (60%), indicating that they are closely involved in operational decision-making and customer-facing activities. Their educational background, with nearly half holding bachelor's degrees and 42% holding master's degrees, equips them with the analytical and managerial skills required to interpret policy signals, analyze consumer data, and integrate foresight into crisis preparedness strategies. This combination of professional experience and educational competence enhances the sector's ability to utilize consumer foresight as a practical and effective capability.

Consistent with the Resource-Based View (RBV), consumer foresight represents a valuable and rare managerial resource that, when embedded within routine decision-making processes, is transformed into a dynamic organizational capability. This transformation directly strengthens crisis management performance by enhancing organizational legitimacy, service continuity, and overall resilience.

Taken together, these findings reveal the differentiated roles of strategic foresight dimensions in crisis management within the Jordanian energy sector. While technology intelligence and competitive

intelligence remain largely latent resources due to structural, financial, and maturity-related constraints, political-environment foresight and consumer foresight emerge as active dynamic capabilities that directly enhance organizational resilience. From a theoretical perspective, these results support the Dynamic Capabilities Theory (DCT), which emphasizes the importance of sensing and reconfiguring external signals in turbulent conditions, as well as the Resource-Based View (RBV), which highlights the need to strategically deploy valuable organizational resources to generate superior crisis management capabilities.

5.3.2 Objective 2: Effect of Strategic Foresight on Strategic Agility

The second research objective of this study is to ascertain the effect of strategic foresight (competitive intelligence, technology intelligence, political environment foresight political environment consumer foresight) on the strategic agility in the Jordanian energy sector. The result of this study supports hypothesis H5, which result was a significant direct effect of technology intelligence on strategic agility, also the result of this study supports H6 which is related to the impact of competitive intelligence on strategic agility. This contradicts with findings from Atkinson et al. (2022) that show a positive significant impact of competitive intelligence on strategic agility.

When competitiveness is limited, organizations may lack the drive or ability to innovate, react to threats, or take advantage of new possibilities, which are crucial elements of strategic agility Shams et al.,2021). The Resource-Based View (RBV) theoretical perspective argues that enterprises lacking sufficient competitive resources face challenges in developing the dynamic capabilities necessary for agility, resulting in delayed strategic transitions and potential disadvantages in the market (Manzoor et al.,2022). The context of the Jordanian security sector can be justified by the limited level of competitiveness between the energy sector companies as these companies are owned by the

government, and there are limited number of these companies as discussed in the study of (Shehadeh et al., 2022). Moreover, the study result supports H7 which is related to the impact of political environment foresight on the strategic agility in the Jordanian energy sector. Political environment foresight enables managers to interpret upcoming policy shifts, energy reforms, regional geopolitical dynamics, and government priorities, which are factors that are particularly influential in a heavily regulated sector such as energy. When organizations can foresee these developments, they can proactively adjust their resource allocation, operational plans, and strategic priorities, thereby enhancing their agility.

In the context of Jordan's energy sector, where government policies, subsidy reforms, and political stability directly influence operational and financial decisions, the ability to anticipate such changes becomes a critical driver of agility. The supported hypothesis suggests that strategic agility does not occur in isolation but is strengthened by a forward-looking understanding of the political landscape. This aligns with prior literature emphasizing that political foresight equips organizations with the situational awareness needed to respond swiftly to regulatory shifts, minimize disruptions, and sustain competitive resilience. Thus, the positive relationship confirmed in this study underscores the importance of integrating political environment scanning into strategic planning processes to build and maintain agility within the Jordanian energy sector.

Finally, the study supports H8 which is related to the impact of consumer foresight on strategic agility. This finding indicates that organizations that actively anticipate changes in consumer needs, preferences, and behavioral patterns are more capable of adapting their strategies quickly and effectively. Consumer foresight enables firms to detect emerging consumption trends, shifts in public expectations, and evolving energy-use behaviors, insights that are particularly valuable in sectors

undergoing technology transitions, such as the energy industry. By understanding how consumer demands are likely to evolve, organizations can proactively redesign their services, invest in relevant technologies, and adjust operational plans before changes in the market intensify. In the context of the Jordanian energy sector, where consumers increasingly expect reliability, affordability, transparency, and sustainable energy solutions, the ability to foresee these expectations enhances an organization's agility. The supported hypothesis suggests that strategic agility is strengthened when organizations incorporate consumer-oriented intelligence into their strategic planning, enabling faster and more accurate decision-making. This aligns with previous studies highlighting that consumer foresight does not merely improve customer satisfaction but also improves an organization's capacity to pivot and innovate in response to shifting market conditions. Therefore, the confirmation of H8 demonstrates that consumer foresight acts as a key enabler of strategic agility, reinforcing the importance of maintaining continuous engagement with consumer trends to support adaptive and resilient strategic responses.

A study by Arokodare and Asikhia (2020) supports the relationship between technology intelligence and strategic agility which consists of this study result. Other studies such as Arokodare and Asikhia (2020) and the study of Rastegari et al. (2020) support the significant relationship between the political environment foresight on strategic agility. In the same vein, the relationship between consumer foresight and strategic agility is supported by many studies such as Arokodare and Asikhia (2020) and the study of Fakunmoju et al. (2020). Based on this discussion it is seen that many studies support the recent study results related to the relationship between strategic foresight (i.e., technology intelligence, competitive intelligence, political environment foresight and consumer foresight) and strategic agility in the Jordanian energy sector.

5.3.3 Objective 3: Effect of Strategic Agility on Crisis Management

The third research objective of this study was to ascertain the effect of strategic agility on crisis management in the Jordanian energy sector. To address this objective, hypothesis H9 was examined, and the results confirmed a significant positive impact of strategic agility on crisis management. This finding underscores the critical role of agility in enabling organizations to anticipate, adapt, and respond effectively to crisis in volatile and uncertain environments.

The result of this study is consistent with Elali (2021), who demonstrated that strategic agility interacts positively with firm performance and emphasized the necessity of cultivating agile organizations capable of thriving under conditions of volatility and uncertainty. Similarly, the findings align with Khraim and Afaishat (2021), who, in the Jordanian context, highlighted the importance of advanced information technology systems and strategic communication frameworks in enhancing organizational responsiveness. Their study confirmed that organizations with high levels of decision-making agility are better equipped to manage change cycles and exhibit greater flexibility in responding to market challenges.

From a theoretical perspective, this finding reinforces the Dynamic Capabilities Theory (DCT), which posits that agility represents a higher-order capability enabling firms to sense environmental shifts, seize opportunities, and reconfigure resources in response to crisis. Strategic agility thus functions as a bridging mechanism between foresight and crisis management, transforming latent resources into actionable capabilities. The Resource-Based View (RBV) further supports this interpretation, suggesting that agility constitutes a valuable and rare organizational resource that enhances resilience and crisis preparedness when strategically deployed.

The Jordanian energy sector provides a particularly relevant context for this relationship. Given its exposure to political volatility, regulatory reforms, and evolving consumer demands, agility enables managers to adapt operational processes, coordinate stakeholders, and sustain service continuity during disruptions. The respondent profile, dominated by middle management with substantial experience and advanced educational qualifications suggests that managers possess the capacity to exercise agility in decision-making and operational reconfiguration, thereby strengthening crisis management outcomes.

5.3.4 Objective 4: Mediating Role of Strategic Agility

The fourth research objective of this study was to investigate the mediating effect of strategic agility on the relationship between strategic foresight (namely technology intelligence, competitive intelligence, political-environment foresight, and consumer foresight) and crisis management in the Jordanian energy sector. To achieve this objective, hypotheses H10–H13 were examined, and the results confirmed the mediating role of strategic agility across all four dimensions of foresight.

The findings support H10, indicating that strategic agility mediates the relationship between technology intelligence and crisis management. This suggests that technology knowledge alone does not directly enhance crisis preparedness unless organizations develop agile capabilities to anticipate, adapt, and reconfigure resources. The result is consistent with Pereira et al. (2021) and Elali (2021), who emphasized that agility enables firms to translate technology foresight into actionable crisis-management strategies. In the Jordanian context, where digital transformation is still emerging, agility provides the necessary mechanism to operationalize technology intelligence.

The study also supports H11, confirming the mediating role of strategic agility between competitive intelligence and crisis management. This finding differs from Wamba (2022) and Wu et al. (2023),

who reported no significant mediating effect in other contexts. The discrepancy can be explained by the structural characteristics of Jordan's energy sector, which is dominated by government ownership and limited competition. As Maaitah and Almahasneh (2023) noted, strategic agility requires a competitive environment to fully support crisis management. In Jordan, the restricted rivalry reduces the incentive for organizations to innovate or respond proactively, thereby limiting the strength of this mediating relationship. Nonetheless, the significant result observed in this study suggests that even within low-competition environments, agility can still play a role in leveraging competitive intelligence for incremental improvements in crisis preparedness.

The results further support H12, establishing that strategic agility mediates the relationship between political-environment foresight and crisis management. This finding highlights the importance of agility in enabling organizations to anticipate regulatory changes, tariff reforms, and policy volatility, and to reconfigure strategies accordingly. The result is consistent with Rastegari et al. (2020) and Fathi et al. (2021), who emphasized that agility strengthens the link between political foresight and resilience by facilitating adaptive planning and stakeholder coordination.

Finally, the study supports H13, confirming the mediating role of strategic agility between consumer foresight and crisis management. Anticipating shifts in customer expectations and consumption patterns enhances resilience only when organizations possess the agility to adjust operations and service delivery proactively. This finding is supported by Asmai et al. (2022) and Rastegari et al. (2020), who demonstrated that agility enables organizations to transform consumer foresight into adaptive service continuity and trust-building during crisis.

Taken together, these findings underscore that strategic foresight alone is insufficient to guarantee effective crisis management. Organizations must cultivate strategic agility as an internal capability to

anticipate crisis, reconfigure resources, and adapt to external shocks. From a theoretical perspective, this reinforces the Dynamic Capabilities Theory (DCT), which posits that agility functions as a higher-order capability that transforms foresight into actionable resilience. The Resource-Based View (RBV) further supports this interpretation, suggesting that foresight represents a valuable resource, but its strategic utility depends on the presence of agility as a complementary capability.

5.4 Research Contributions

5.4.1 Theoretical Contributions

This study makes an important theoretical contribution by advancing the understanding of how strategic foresight interacts with both crisis management and strategic agility. By testing hypotheses H1–H13, the study demonstrates that foresight dimensions, namely technology intelligence, competitive intelligence, political-environment foresight, and consumer foresight do not give uniform impact to crisis management. In particular, political and consumer foresight were found to have direct and significant impacts on crisis management, while technology and competitive intelligence required mediation through strategic agility to become effective.

This distinction enriches the Dynamic Capabilities Theory (DCT) by clarifying that strategic foresight functions primarily as a sensing capability, that is an organizational ability to detect signals of change in the external environment, such as technology disruptions, competitive shifts, regulatory reforms, or evolving consumer demands. However, sensing alone does not automatically translate into resilience or effective crisis management. Within the DCT framework, sensing must be complemented by seizing (the ability to mobilize resources and design responses) and reconfiguring (the capacity to realign structures, processes, and strategies). The findings of this study demonstrate that foresight, while

valuable, remains a latent resource unless it is reconfigured through strategic agility, which acts as the enabling mechanism that transforms foresight into actionable resilience.

In other words, foresight provides the early awareness of threats and opportunities, but agility determines whether organizations can convert that awareness into adaptive action. For example, technology intelligence may allow managers to anticipate digital innovations, yet without agile routines to integrate these technologies into operations, the foresight remains underutilized. Similarly, competitive intelligence may highlight potential market shifts, but in a regulated environment like Jordan's energy sector, only agile decision-making structures can translate such insights into meaningful crisis responses. Thus, agility serves as the bridge between foresight and resilience, ensuring that sensing capabilities are not static but dynamically reconfigured to meet the demands of turbulent environments.

By positioning foresight as a sensing capability that requires agility for operationalization, this study extends DCT in two important ways. First, it emphasizes the conditional nature of foresight's effectiveness, showing that foresight alone does not guarantee resilience. Second, it highlights agility as a conversion capability, a higher-order dynamic capability that transforms foresight from potential into performance. This theoretical refinement underscores that resilience in crisis contexts is not simply about possessing foresight but about embedding it within agile organizational processes that enable rapid adaptation, resource reallocation, and stakeholder coordination.

By empirically validating the mediating role of strategic agility, this study makes a substantial theoretical advancement by positioning agility as a higher-order dynamic capability that bridges the gap between foresight and organizational outcomes. Prior research has often treated foresight as a stand-alone capability, if the ability to anticipate technology, competitive, political, or consumer shifts

would directly translate into resilience and improved performance. However, the findings of this study demonstrate that foresight alone is insufficient; it must be channeled through agility to become actionable. In this sense, agility operates as the conversion mechanism that transforms foresight from a latent sensing resource into a dynamic capability that enables organizations to adapt, reconfigure, and thrive in turbulent environments.

Moreover, the findings contribute to the Resource-Based View (RBV) by illustrating that foresight resources, while valuable, remain underutilized unless complemented by agility. Agility elevates these resources into dynamic capabilities, ensuring that organizations can leverage them to achieve sustained resilience and competitive advantage. In the Jordanian energy sector, where technology maturity and competitive intensity are limited, agility becomes the critical factor that allows managers to operationalize foresight in ways that strengthen crisis management and organizational performance. In summary, the empirical validation of agility's mediating role positions it as a higher-order capability that transforms foresight into resilience and performance. This insight not only extends prior research but also provides a more nuanced theoretical framework for understanding how organizations in regulated and volatile environments can convert foresight into tangible strategic outcomes.

5.4.2 Managerial Contributions

From a managerial perspective, the findings provide several practical implications for strengthening crisis preparedness and response within energy organizations. First, foresight routines should be institutionalized by embedding continuous scanning of technology developments, regulatory changes, competitive dynamics, and evolving consumer behavior into formal planning cycles. The establishment of dedicated foresight units or cross-functional foresight committees can ensure that

strategic intelligence is systematically translated into crisis-response planning rather than remaining fragmented across departments.

Second, the results highlight the need to actively cultivate strategic agility through greater resource flexibility, adaptive human-capital practices, and stronger integration of digital systems. Investments in predictive analytics, digital dashboards, and real-time monitoring platforms can significantly enhance early-warning detection and speed of managerial response during crisis.

Third, the study emphasizes the importance of linking foresight directly to decision rights. In a highly regulated market such as Jordan's electricity sector, crisis responsiveness depends on the timely delegation of authority to operational managers once foresight-based warning signals emerge. Clear protocols for escalation and rapid decision-making, combined with proactive coordination with regulators or government, are essential to shorten response times.

Fourth, organizational learning and recovery mechanisms must be strengthened. Post-crisis reviews and structured investigation should be institutionalized to systematically capture lessons learned from foresight practices and crisis responses. This will reinforce the learning dimension of crisis management and support continuous improvement.

Finally, the findings underscore the importance of leadership capacity development, particularly at the middle-management level. As most respondents occupy mid-level positions, targeted training in foresight interpretation, agile coordination, and crisis leadership will significantly enhance the organization's ability to sense risks, seize opportunities, and reconfigure operations under pressure.

5.4.3 Policy Implications

From a policy perspective, the findings strongly support the national goals set out in Jordan Vision 2030 and the National Energy Strategy, particularly aspects that related to energy security, digital transformation, resilience, and institutional governance.

First, national energy authorities should institutionalize foresight at the sectoral policy level by requiring all energy organizations to integrate structured foresight activities, such as technology innovation, regulatory reform, market dynamics, and consumer behavior into national crisis-preparedness and energy-security frameworks. This aligns directly with Jordan Vision 2030's emphasis on strategic planning, anticipatory governance, and risk-informed policy making.

Second, policymakers should actively promote organizational agility through digital transformation, in line with Jordan's national digital economy strategy. Regulatory incentives, innovation grants, and public–private partnerships should be used to accelerate the adoption of smart grids, predictive analytics, artificial intelligence, and real-time monitoring systems, which are essential for early-warning detection and adaptive crisis response within the energy sector.

Third, given the highly regulated structure of Jordan's electricity market, policy frameworks should be revised to allow greater operational flexibility during crisis situations. Emergency governance protocols should support faster delegation of authority, shortened approval cycles, and real-time coordination between regulators and utilities, thereby strengthening crisis responsiveness without compromising regulatory oversight. This directly reinforces Jordan Vision 2030's objective of building responsive, efficient, and transparent public institutions.

Fourth, the study highlights the need for mandatory post-crisis learning mechanisms at the national level. Policymakers should require standardized after-action reviews, sector-wide reporting systems, and shared national databases of crisis lessons learned. This supports the Vision 2030 objective of building a learning state that continuously improves institutional performance and service delivery.

Finally, the findings emphasize the importance of national leadership and human-capital development policies. In alignment with Jordan Vision 2030's focus on talent development and institutional capacity building, specialized national training programs in foresight, strategic agility, and crisis leadership should be developed for middle- and senior-level managers in the energy sector. Structured certification programs and executive development initiatives will strengthen sensing, seizing, and reconfiguring capabilities across the sector.

5.5 Limitations and Recommendations for Future Research

This study offers valuable insights into the role of strategic foresight and strategic agility in crisis management within the Jordanian energy sector; however, several limitations also open meaningful avenues for future research. First, this study employed a cross-sectional quantitative survey design in which data were collected at a single point in time. While this approach is suitable for examining relationships among constructs, it does not allow for causal inferences or the observation of dynamic changes over time. Future studies are therefore encouraged to adopt longitudinal or mixed-method research designs to capture how strategic foresight and agility evolve and interact across different phases of crisis. Such approaches would respond directly to the calls by Nguyen et al. (2024) and Khaw and Teoh (2023) to examine organizational learning, adaptation, and transformation processes over time in developing economies.

Second, this study relied on self-reported data from managerial respondents, which may introduce subjectivity and potential common method bias. Although procedural remedies, such as respondent anonymity and clear survey instructions, were implemented to mitigate this issue, future research could strengthen methodological rigor by triangulating perceptual data with objective indicators. These may include organizational performance metrics, digital transformation indices, system logs, or documented crisis-response records. Such data integration would provide a richer and more robust assessment of crisis management capabilities.

Third, the empirical investigation was confined to the Jordanian energy sector, covering both the pilot and main data collection phases. While this sector-specific focus provides strong contextual depth, it limits the generalizability of the findings across other industries and national settings. Future research should therefore extend this framework to comparative cross-sectoral studies such as across energy, water, transportation, and healthcare sectors, or conduct cross-country comparisons within the MENA region. This would enable scholars to distinguish between context-specific and universal drivers of crisis management and organizational resilience.

Finally, this study contributes to the growing body of literature advocating for further exploration of strategic agility in business contexts across Jordan. As noted by Elali (2021) and Khraim and Afaishat (2021), agility is not only a determinant of crisis resilience but also a driver of long-term organizational performance. Future research should therefore investigate the mechanisms through which agility interacts with foresight dimensions, digital transformation, and stakeholder engagement to enhance crisis management capabilities in regulated industries.

Taking together, these future research directions present opportunities to enhance the theoretical generalizability, methodological robustness, and practical relevance of strategic foresight and agility research in crisis management, particularly within emerging and highly regulated economies.

5.6 Conclusion

This study investigated the interplay between strategic foresight and strategic agility in enhancing crisis management within the Jordanian energy sector, using PLS-SEM to empirically test the proposed framework. The findings reveal that political-environment foresight and consumer foresight have significant positive effects on crisis management, whereas technology intelligence and competitive intelligence do not exert a direct influence. This pattern reflects the highly regulated and low-competition characteristics of the sector, where anticipating policy changes and understanding consumer dynamics are more immediately actionable than technology or competitive insights.

Importantly, strategic agility emerges as a critical enabler of crisis management, mediating the relationship between foresight and effective response. Organizations that combine foresight with agility are able to rapidly sense, interpret, and respond to environmental disruptions, transforming early awareness into timely, strategic action. This highlights a fundamental insight: foresight alone is insufficient unless accompanied by the organizational capability to act decisively, underscoring the interdependent nature of sensing and responding capabilities.

Theoretically, this study extends the Dynamic Capabilities Theory by empirically demonstrating the complementary roles of foresight as a sensing capability and agility as a reconfiguration capability in a real-world, non-Western context. It also reinforces the Resource-Based View by showing that organizational capabilities generate value only when effectively mobilized and integrated into

actionable processes. By situating these findings within the Jordanian energy sector—a highly regulated, emerging-market setting this research advances the cross-context applicability of capability-based frameworks, offering evidence that theory developed in Western contexts can be meaningfully adapted to emerging economies with distinct structural and regulatory characteristics.

From a practical standpoint, the study provides actionable insights for energy organizations and policymakers. Institutionalizing foresight mechanisms, strengthening organizational agility, and empowering managerial decision-making are essential for enhancing resilience and adaptive performance. By aligning strategic foresight with agile response systems, organizations can not only anticipate crisis but also execute timely interventions, ensuring continuity and sustainability in an increasingly uncertain energy landscape.

Overall, this study contributes both theoretically and practically to the understanding of crisis management in the energy sector. It offers a robust empirical demonstration that integrating foresight with agility is essential for organizational resilience, highlighting the critical mechanisms through which organizations transform strategic awareness into actionable outcomes. These findings provide a roadmap for energy-sector leaders globally, emphasizing the importance of developing integrated capability systems to navigate volatility, uncertainty, complexity, and ambiguity in contemporary organizational environments.

REFERENCES

Abd Ali, N. D. (2022). The role of competitive intelligence in enhancing the effectiveness of strategic decisions. *The Iraqi Magazine for Managerial Sciences, 18*(71).

Abo-Murad, M., Abdullah, A. K., & Jamil, R. (2019). Effect of the organizational culture on crisis management in hotel industry: A qualitative exploration. *International Journal of Entrepreneurship, 23*(2), 1–18.

Abu-Rumman, G., Khdair, A. I., & Khdair, S. I. (2020). Current status and future investment potential in renewable energy in Jordan: An overview. *Heliyon, 6*(2), e03346.

Ahammad, M. F., Glaister, K. W., & Gomes, E. (2020). Strategic agility and human resource management. *Human Resource Management Review, 30*(1), 100700.

Al Eid, N. A., & Arnout, B. A. (2020). Crisis and disaster management in the light of the Islamic approach: COVID-19 pandemic crisis as a model (a qualitative study using the grounded theory). *Journal of Public Affairs, 20*(4), e2217.

Al Hosani, A. R., Arbab, A. M., & Elmasri, A. A. (2017). Does information technology affect improvement of Human Resources Directorate's performance in a selected organization in the Kingdom of Bahrain? In *International Business and Management*. https://doi.org/10.3968/9750

Al Naimat, A., & Liang, D. (2023). Substantial gains of renewable energy adoption and implementation in Maan, Jordan: A critical review. *Results in Engineering, 101367*. https://doi.org/10.1016/j.rineng.2023.101367

Al Thani, F. B. H., & Obeidat, A. M. (2020). The impact of strategic leadership on crisis management. *International Journal of Asian Social Science, 10*(6), 307–326.

Ala'a, M., Qadourah, J. A., Alrwashdeh, S. S., Qatlama, Z., Alddibs, E., & Noor, M. (2022). Energy performance and economics assessments of a photovoltaic–heat pump system. *Results in Engineering, 13*, 100324.

Aladawi, A. S. A. R., & Ahmad, A. N. A. (2023). A study of factors influencing the adoption of artificial intelligence in crisis management. *International Journal of Sustainable Construction Engineering and Technology, 14*(5), 416–425.

Alhadid, A. Y., & Qaddomi, B. A. (2016). The effect of marketing strategy on maximizing organizational performance: Sustainable competitive advantage as a mediating variable. *International Journal of Academic Research in Business and Social Sciences, 6*(4), 318–324.

Al-Hamamre, Z., Al-Mater, A., Sweis, F., & Rawajfeh, K. (2014). Assessment of the status and outlook of biomass energy in Jordan. *Energy Conversion and Management, 77*, 183–192.

Alharthi, M. N. A. N., & Khalifa, G. S. (2019). Business continuity management and crisis leadership: An approach to re-engineer crisis performance within Abu Dhabi governmental entities. *International Journal on Emerging Technologies, 10*(2), 32–40.

Al-Harthi, S. (2012). *Building a computer simulation model as an introduction to school crisis management* [Master's thesis, Umm Al-Qura University]. Makkah Al-Mukarramah, Saudi Arabia.

Ali, B. J., & Anwar, G. (2021). Measuring competitive intelligence network and its role on business performance. *International Journal of English Literature and Social Sciences, 6*(2), 45–55.

Alizadeh, R., Lund, P. D., Beynaghi, A., Abolghasemi, M., & Maknoon, R. (2016). An integrated scenario-based robust planning approach for foresight and strategic management with application to the energy industry. *Technological Forecasting and Social Change, 104*, 162–171.

Alkhaffaf, M., & Almomani, H. (2021). Role of intelligent technology in crisis management: Systematic literature review – the case of coronavirus. In *The Effect of Coronavirus Disease (COVID-19) on Business Intelligence* (pp. 3–14).

Allahveisi, F., Ahmadi, K., & Mohammadi, M. (2019). The role of strategic thinking in the quality of crisis management operations. *International Journal of Business Management, 4*(2), 113–121.

Al-Mutairi, F. (2011). *The effect of using strategic planning methods on crisis management in the Kuwaiti Islamic banking sector* [Unpublished master's thesis]. Middle East University, Amman, Jordan.

Al-Omari, Z., Alomari, K., & Aljawarneh, N. (2020). The role of empowerment in improving internal processes, customer satisfaction, learning and growth. *Management Science Letters, 10*(4), 841–848.

Al-Omary, M., Kaltschmitt, M., & Becker, C. (2018). Energy system in Jordan: Status and prospects. *Renewable and Sustainable Energy Reviews, 81*, 2398–2409.

Alpaslan, C. M., & Mitroff, I. I. (2021). Exploring the moral foundations of crisis management. *Technological Forecasting and Social Change, 167*, 120713.

Al-Romeedy, B. S. (2019). Strategic agility as a competitive advantage in airlines: Case study – EgyptAir. *Journal of the Faculty of Tourism and Hotels, University of Sadat City, 3*(1), 1–15.*

Alrwashdeh, S. S. (2021). Investigation of the energy output from PV panels based on using different orientation systems in Amman–Jordan. *Case Studies in Thermal Engineering, 28*, 101580.

Alrwashdeh, S. S. (2022). Energy sources assessment in Jordan. *Results in Engineering, 13*, 100329. https://doi.org/10.1016/j.rineng.2022.100329

Alsheyyab, A. M. T., Zahari, F. B. M., & Elias, E. B. M. (2024). The impact of strategic foresight on crisis management in Jordan's energy security sector. *Educational Administration: Theory and Practice, 30*(5), 11295–11307.

Al-Shibli, B. (2018). *The impact of information technology capabilities on crisis management: A field study on the Jordanian commercial banking sector* [Unpublished master's thesis]. Middle East University, Amman, Jordan.

Alshwawra, A. (2020). *Impact of regional conflicts on energy security in Jordan* [Unpublished master's thesis]. Yarmouk University, Jordan.

Aly, A., Khalid, H., & Abdelrahman, S. (2021). Competitive intelligence and strategic agility in regulated environments: Evidence from public-sector enterprises. *Journal of Business Strategy*, *42*(7), 112–128. https://doi.org/10.1108/JBS-10-2020-0246

Arokodare, M. A., & Asikhia, O. U. (2020). Strategic agility: Achieving superior organizational performance through strategic foresight. *Business Management Review, 23*(2), 45–63.

Arokodare, M. A., Asikhia, O. U., & Makinde, G. O. (2019). Strategic agility and firm performance: The moderating role of organizational culture. *Business Management Dynamics, 9*(3), 1–12.*

Arokodare, M. A., Asikhia, O. U., & Makinde, G. O. (2020). Information technology capability and performance of selected oil and gas marketing companies in Lagos State, Nigeria: The moderating role of organizational culture. *International Journal of Business and Management, 15*(3), 37–49.*

Arvesen, A., & Hertwich, E. G. (2015). More caution is needed when using life cycle assessment to determine energy return on investment (EROI). *Energy Policy, 76*, 1–6.

Atkinson, H., Tarba, S., & Weber, Y. (2022). Dynamic capabilities for technological agility: Integrating foresight and resilience. *Journal of Organizational Change Management, 35*(4), 678–698. https://doi.org/10.1108/JOCM-03-2021-0098

Bahramara, S., Mazza, A., Chicco, G., Shafie-khah, M., & Catalão, J. P. (2020). Comprehensive review on decision-making frameworks for distribution network operation in the presence of distributed energy resources and microgrids. *International Journal of Electrical Power & Energy Systems, 115*, 105466.

Baldwin, P. (1997). The past rise of social security: Historical trends and patterns. In *Reforming the welfare state* (pp. 3–24). Springer Berlin Heidelberg.

Baloch, M., Xu, Q., & Rahman, S. (2023). Customer foresight and service resilience in utility sectors. *Technological Forecasting and Social Change, 194*, 122658. https://doi.org/10.1016/j.techfore.2023.122658

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.

Behar, M. A., & Hlatshwayo, S. (2021). *Strategic foresight at the International Monetary Fund.* International Monetary Fund.

Bhaduri, R. M. (2019). Leveraging culture and leadership in crisis management. *European Journal of Training and Development, 43*(7–8), 635–649.*

Bhardwaj, R., & Singh, H. (2018). Modeling the effects of intellectual capital on decision-making: A study of interaction moderation with knowledge management process. *International Journal of Computer Applications, 180*(35), 37–50.*

Bresciani, S., Shams, R., & Vrontis, D. (2024). Dynamic capabilities and strategic foresight for sustainable energy transition. *Sustainability, 16*(2), 941. https://doi.org/10.3390/su16020941

Brinks, V., & Ibert, O. (2020). From coronavirus to corona crisis: The value of an analytical and geographical understanding of crisis. *Tijdschrift voor Economische en Sociale Geografie, 111*(3), 275–287.*

Brown, A. D., & Barnard, B. (2018). Entrepreneurship, innovation and strategic foresight: How entrepreneurs engage the future as opportunity. *SSRN Electronic Journal.* https://doi.org/10.2139/ssrn.3295996

Brueller, N. N., Carmeli, A., & Drori, I. (2014). How do different types of mergers and acquisitions facilitate strategic agility? *California Management Review, 56*(3), 39–57.*

Buehring, J., & Bishop, P. C. (2020). Foresight and design: New support for strategic decision-making. *She Ji: The Journal of Design, Economics, and Innovation, 6*(3), 408–432. https://doi.org/10.1016/j.sheji.2020.06.001

Bundy, J., Pfarrer, M. D., Short, C. E., & Coombs, W. T. (2017). Crisis and crisis management: Integration, interpretation, and research development. *Journal of Management, 43*(6), 1661–1692.*

Burden, A. (2020). The history of crisis and crisis management in anesthesia: Prevention, detection, and recovery. *International Anesthesiology Clinics, 58*(1), 2–6.*

Burgner, A., Ikizler, T. A., & Dwyer, J. P. (2020). COVID-19 and the inpatient dialysis unit: Managing resources during contingency planning pre-crisis. *Clinical Journal of the American Society of Nephrology, 15*(5), 720–722.*

Canyon, D. (2021). Simplifying complexity with strategic foresight and scenario planning. *Security Nexus, 22*, 1–10.

Caserio, C., & Trucco, S. (2018). Enterprise resource planning and business intelligence systems for information quality. *Springer International Publishing.*

Castellanos, O. F., & Torres, L. M. (2010, July). Technology intelligence: Methods and capabilities for generation of knowledge and decision making. In *PICMET 2010 Technology Management for Global Economic Growth* (pp. 1–9). IEEE.

Chakraborty, S., & Ghosh, S. (2023). Consumer foresight and value innovation in dynamic markets: An integrative framework. *Journal of Business Research, 158*, 113679. https://doi.org/10.1016/j.jbusres.2023.113679

Chamoso, P., González-Briones, A., Rodríguez, S., & Corchado, J. M. (2018). Tendencies of technologies and platforms in smart cities: A state-of-the-art review. *Wireless Communications and Mobile Computing, 2018*, 1–17.

Christofi, K., Evripidou, L. C., Hadjiphanis, L., & Chourides, P. (2021). Towards Strategic Agility: Intellectual Roots, Key Emergent Concepts and Future. *Academy of Strategic Management Journal*, *20*(3), 1–19.

Chu, Y., Chi, M., Wang, W., & Luo, B. (2019). The impact of information technology capabilities of manufacturing enterprises on innovation performance: Evidence from SEM and fsQCA. *Sustainability, 11*(21), 5946.

Cillo, V., Petruzzelli, A. M., Ardito, L., & Del Giudice, M. (2019). Understanding sustainable innovation: A systematic literature review. *Corporate Social Responsibility and Environmental Management, 26*(5), 1012–1025.

Clausen, L. T., & Rudolph, D. (2020). Renewable energy for sustainable rural development: Synergies and mismatches. *Energy Policy, 138*, 111289.

Coccia, M. (2021). Preparedness of countries to face COVID-19 pandemic crisis: Strategic positioning and structural factors supporting prevention. *Environmental Research, 111678.*

Collins, C. J. (2021). Expanding the resource-based view model of strategic human resource management. *The International Journal of Human Resource Management, 32*(2), 331–358.

Conway, M. (2016). *Foresight infused strategy development: A how-to guide for using foresight in practice.* Thinking Futures.

Coombs, W. T. (2015). The value of communication during a crisis: Insights from strategic communication research. *Business Horizons, 58*(2), 141–148.

Coombs, W. T., & Holladay, S. J. (2002). Helping crisis managers protect reputational assets: Initial tests of the situational crisis communication theory. *Management Communication Quarterly, 16*(2), 165–186.

Coombs, W. T., & Laufer, D. (2018). Global crisis management – Current research and future directions. *Journal of International Management, 24*(3), 199–203.

Coombs, W. T., Holladay, S. J., & White, K. L. (2020). Situational crisis communication theory (SCCT) and its application in dealing with complex, challenging, and recurring crisis. In *Advancing Crisis Communication Effectiveness* (pp. 165–180). Routledge.

Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.

Dahlgren, C., & Bergman, K. (2020). A conceptual framework for long-term strategic foresight. *Foresight Journal, 22*(6), 455–470.

Dai, S., Duan, X., & Zhang, W. (2020). Knowledge map of environmental crisis management based on keyword network and co-word analysis, 2005–2018. *Journal of Cleaner Production, 262*, 121168.

De las Heras-Rosas, C., & Herrera, J. (2021). Innovation and competitive intelligence in business: A bibliometric analysis. *International Journal of Financial Studies*, *9*(2), 31.

De Rooij, D., Belfroid, E., Eilers, R., Roßkamp, D., Swaan, C., & Timen, A. (2020). Qualitative research: Institutional preparedness during threats of infectious disease outbreaks. *BioMed Research International, 2020*, 1–9.

Díaz-Chao, Á., Ficapal-Cusí, P., & Torrent-Sellens, J. (2021). Environmental assets, Industry 4.0 technologies, and firm performance in Spain: A dynamic capabilities path to reward sustainability. *Journal of Cleaner Production, 281*, 125264.

Dinges, M., Biegelbauer, P., & Wilhelmer, D. (2018). The tower of Babylon in the governance of research, technology, and innovation: Participatory foresight as a method of policy coordination. *Futures, 100*, 34–44.

Doz, Y. (2023). Strategic agility for a changing world: Updating the sensing–seizing–transforming framework. *Long Range Planning, 56*(1), 102242. https://doi.org/10.1016/j.lrp.2023.102242

Doz, Y. L., & Kosonen, M. (2010). Embedding strategic agility: A leadership agenda for accelerating business model renewal. *Long Range Planning, 43*(2–3), 370–382.

Doz, Y. L., & Kosonen, M. (2021). *Fast strategy: How strategic agility will help you stay ahead of the game* (Updated ed.). Pearson Education.

Duchek, S. (2020). Organizational resilience: A capability-based conceptualization. *Business Research, 13*(1), 215–246. https://doi.org/10.1007/s40685-019-0085-7

Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., ... & Williams, M. D. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice, and policy. *International Journal of Information Management*, *57*, 101994.

Dyer, H., & Trombetta, M. J. (2013). *International handbook of energy security*. Edward Elgar Publishing.

EDAMA. (2019). *Recommendations for the energy sector strategy*. EDAMA, Amman, Jordan.

Elali, W. (2021). The effect of strategic agility on firm performance in dynamic environments. *International Journal of Business Research, 24*(3), 88–106.

El-Karmi, F. Z., & Abu-Shikhah, N. M. (2013). The role of financial incentives in promoting renewable energy in Jordan. *Renewable Energy, 57*, 620–625.

Elliott, D., Harris, K., & Baron, S. (2005). Crisis management and services marketing. *Journal of Services Marketing, 19*(5), 336–345.

Escorcia-Caballero, J. P., Chams-Anturi, O., & Moreno-Luzon, M. D. (2022). The effect of ambidexterity on market performance: A new perspective and measurement from the dynamic capability framework. *Technology Analysis & Strategic Management, 34*(5), 512–528.*

Fakunmoju, S., Adeoye, A., & Arokodare, M. (2020). Consumer foresight and adaptive strategy in emerging markets. *International Review of Management and Marketing, 10*(3), 75–86.*

Fathi, M., Dehghani, S., & Rastegari, A. (2021). Strategic agility and crisis management in public utilities. *Management Science Letters, 11*(6), 1899–1910. https://doi.org/10.5267/j.msl.2021.2.016.

Field, A. (2009). Discovering statistics using SPSS (3rd ed.). SAGE Publications.

Fink, S. L., Beak, J., & Taddeo, K. (1971). Organizational crisis and change. *The Journal of Applied Behavioral Science, 7*(1), 15–37.*

Frandsen, F., & Johansen, W. (2020). Reframing the field: Public crisis management, political crisis management, and corporate crisis management. *Crisis Communication, 23*, 59–72.

Gadekar, R., Sarkar, B., & Gadekar, A. (2022). Key performance indicator–based dynamic decision-making framework for sustainable Industry 4.0 implementation risks evaluation: Reference to Indian manufacturing industries. *Annals of Operations Research, 1–61*. https://doi.org/10.1007/s10479-022-04832-8

García-Granero, E. M., & Rojas, R. (2022). Technology intelligence for innovation management: A systematic literature review. *Journal of Engineering and Technology Management, 65*, 101714. https://doi.org/10.1016/j.jengtecman.2022.101714

Gavetti, G., & Porac, J. (2022). Pankaj Ghemawat's commitment and the job of the strategist. *Strategy Science, 7*(2), 138–142. https://doi.org/10.1287/stsc.2022.0154

Goldthau, A. (2011). Governing global energy: Existing approaches and discourses. *Current Opinion in Environmental Sustainability, 3*(4), 213–217. https://doi.org/10.1016/j.cosust.2011.06.003

Greenblott, J. M., O'Farrell, T., Olson, R., & Burchard, B. (2019). Strategic foresight in the federal government: A survey of methods, resources, and institutional arrangements. *World Futures Review, 11*(3), 245–266.

Haase, T. W. (2023). Uncertainty in crisis management. In A. Farazmand (Ed.), *Global encyclopedia of public administration, public policy, and governance* (pp. 12957–12961). Springer. https://doi.org/10.1007/978-3-319-31816-5_3861.

Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E. (2019) Multivariate Data Analysis. 8th Ed. Pearson, Upper Saddle River.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19*(2)*, 139–152.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), 3rd ed. Thousand Oaks, CA: Sage.

Hajizadeh, A., & Valliere, D. (2022). Entrepreneurial foresight: Discovery of future opportunities. *Futures, 135*, 102876. https://doi.org/10.1016/j.futures.2022.102876

Hamed, M., & Bressler, L. (2019). Energy sector reforms and crisis management challenges in the MENA region: Lessons for sustainable transition. *Energy Policy, 133*, 110906. https://doi.org/10.1016/j.enpol.2019.110906

Hamed, T. A., & Bressler, L. (2019). Energy security in Israel and Jordan: The role of renewable energy sources. *Renewable Energy, 135*, 378–389.

Hashemite Kingdom of Jordan. (2007). *Updated master strategy of energy sector in Jordan 2007–2020.* Jordan Atomic Energy Commission.

Havas, A., & Weber, M. (2018). Foresight as a governance tool to help shape the next production revolution. *SSRN Electronic Journal.* https://doi.org/10.2139/ssrn.3295746

Hazaa, Y. M. H., Almaqtari, F. A., & Al-Swidi, A. (2021). Factors influencing crisis management: A systematic review and synthesis for future research. *Cogent Business & Management, 8*(1), 1878979. https://doi.org/10.1080/23311975.2021.1878979

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M. A., Singh, H., Teece, D. J., & Winter, S. G. (2007). *Dynamic capabilities: Understanding strategic change in organizations*. Blackwell Publishing / Wiley-Blackwell.

Huang, B., Zhang, L., Ma, L., Bai, W., & Ren, J. (2021). Multi-criteria decision analysis of China's energy security from 2008 to 2017 based on Fuzzy BWM–DEA–AR model and Malmquist productivity index. *Energy, 228*, 120481.

Hughes, M., Peyrot, B., & Zhang, C. (2021). Competitive intelligence and firm performance: The mediating role of strategic flexibility. *Industrial Marketing Management, 97*, 112–124. https://doi.org/10.1016/j.indmarman.2021.06.012

Hunaiti, Z., & Huneiti, A. (2024). Policy foresight and energy resilience in the Middle East: Lessons from Jordan. *Energy Policy, 183*, 113545. https://doi.org/10.1016/j.enpol.2023.113545

Hunaiti, Z., & Huneiti, Z. A. (2024). Prospects and obstacles associated with community solar and wind farms in Jordan's suburban areas. *Solar*, *4*(2), 307–328. https://doi.org/10.3390/solar4020017

Hunt, V., Layton, D., & Prince, S. (2015). *Diversity matters.* McKinsey & Company.

Hussein, L., Uren, C., Rekik, F., & Hammami, Z. (2021). A review on waste management and compost production in the Middle East–North Africa region. *Waste Management & Research, 39*(11), 1347–1361.

Hutchins, H. M., & Wang, J. (2008). Organizational crisis management and human resource development: A review of the literature and implications for HRD research and practice. *Advances in Developing Human Resources, 10*(3), 310–330.

Jaber, J. O., & Probert, S. D. (1997). Exploitation of Jordanian oil-shales. *Applied Energy, 58*(2–3), 161–175.

Jaber, J. O., Elkarmi, F., Alasis, E., & Kostas, A. (2015). Employment of renewable energy in Jordan: Current status, SWOT, and problem analysis. *Renewable and Sustainable Energy Reviews, 49*, 490–499.

Kao, G. H. Y., Wang, S. W., & Farquhar, J. D. (2020). Modeling airline crisis management capability: Brand attitude, brand credibility, and intention. *Journal of Air Transport Management, 89*, 101894.

Karandikar, M. A., & Tamboli, M. Z. (2020). Crisis management. *Journal of Xi'an University of Architecture & Technology*, *12*(2), 86–94.

Karsantık, İ. (2025). Development of organizational healing scale: Validity and reliability. *Frontiers in Psychology, 16*, Article 149118. https://doi.org/10.3389/fpsyg.2024.149118

Kaya, Y. (2023). Agile leadership from the perspective of dynamic capabilities and creating value. *Sustainability, 15*(21), 15253. https://doi.org/10.3390/su152115253

Khamitov, M., Grégoire, Y., & Suri, A. (2020). A systematic review of brand transgression, service failure recovery, and product-harm crisis: Integration and guiding insights. *Journal of the Academy of Marketing Science, 48*(3), 519–542.

Khan, T., Yu, M., & Waseem, M. (2022). Review on recent optimization strategies for hybrid renewable energy systems with hydrogen technologies: State of the art, trends, and future directions. *International Journal of Hydrogen Energy, 47*(20), 10923–10943.

Khraim, H., & Afaishat, T. (2021). Strategic agility and performance in Jordanian service organizations. *Journal of Management Development, 40*(5), 427–445. https://doi.org/10.1108/JMD-03-2021-0056

Khoshnood, N. T., & Nematizadeh, S. (2017). Strategic agility and its impact on the competitive capabilities in Iranian private banks. *International Journal of Business and Management, 12*(2), 220–229.

Kimmel, M. S. (2018). The contemporary "crisis" of masculinity in historical perspective. In *The Making of Masculinities* (pp. 121–153). Routledge.

Komendantova, N. (2021). Energy security governance in the Middle East and North Africa. *Energy Reports, 7*, 891–904.

Komendantova, N. (2021). Governance challenges for the energy transition in the Middle East and North Africa. *Energy Research & Social Science, 80,* 102240. https://doi.org/10.1016/j.erss.2021.102240

Komendantova, N., Linnerooth-Bayer, J., & Mechler, R. (2021). Transferring awareness into action: A meta-analysis of the behavioral drivers of energy transitions in Germany, Austria, Finland, Morocco, Jordan, and Iran. *Energy Research & Social Science, 71,* 101826. https://doi.org/10.1016/j.erss.2020.101826

Köseoglu, M. A., Morvillo, A., Altin, M., De Martino, M., & Okumus, F. (2019). Competitive intelligence in hospitality and tourism: A perspective article. *Tourism Review, 75*(1), 239–242.

Kriyantono, R., & McKenna, B. (2017). Developing a culturally relevant public relations theory for Indonesia. *Malaysian Journal of Communication, 33*(1), 1–16.

Kumar, A., Joshi, S., Sharma, M., & Vishvakarma, N. (2022). Digital humanitarianism and crisis management: An empirical study of antecedents and consequences. *Journal of Humanitarian Logistics and Supply Chain Management, 12*(4), 570–593. https://doi.org/10.1108/JHLSCM-02-2021-0021

Laws, E., & Prideaux, B. (2006). Crisis management: A suggested typology. *Journal of Travel & Tourism Marketing, 19*(2–3), 1–18.

LeMay, S. A., McMahon, D., Batchelor, J., & Keller, B. (2020). Factor market rivalry, factor market myopia, and strategic blind spots: The case of the truck driver labor market. *Journal of Transportation Management, 31*(1), 4–17.

Leone, D., Schiavone, F., Appio, F. P., & Chiao, B. (2021). How does artificial intelligence enable and enhance value co-creation in industrial markets? *Journal of Business Research, 129,* 849–859.

Liang, L., Kuusisto, A., & Kuusisto, J. (2018). Building strategic agility through user-driven innovation: The case of the Finnish public service sector. *Theoretical Issues in Ergonomics Science, 19*(1), 74–100.

Liedtka, J. (2018, July). Innovation, strategy, and design: Design thinking as a dynamic capability. In *Academy of Management Proceedings* (Vol. 2018, No. 1, p. 13004). Briarcliff Manor, NY: Academy of Management.

Liu, Y., Wei, Z., & Zheng, X. (2023). Resource orchestration for strategic agility: The dynamic reconfiguration of tangible and intangible assets. *Technological Forecasting and Social Change, 193*, 122700. https://doi.org/10.1016/j.techfore.2023.122700

Lungu, M. F. (2018, May). Achieving strategic agility through business model innovation: The case of the telecom industry. In *Proceedings of the International Conference on Business Excellence* (Vol. 12, No. 1, pp. 557–567).

Lutes, A. J. F. (2021). *Crisis eruptions: A comparative analysis of right-wing populism in El Salvador and Guatemala* [Doctoral dissertation, Carleton University].

Makian, A., & Nematpour, M. (2021). Strategic foresight and crisis management in sustainable organizations. *Foresight, 23*(4), 351–371. https://doi.org/10.1108/FS-09-2020-0118

Malik, M. S., & Sinha, R. (2020). Corporate foresight and dynamic capabilities: A critical review and future research agenda. *Technological Forecasting and Social Change, 161*, 120274.

Manzoor, F., Jiang, S., & Maaitah, R. (2022). Strategic agility and organizational performance: Evidence from the energy sector. *Energy Economics Letters, 9*(2), 112–124.

Maritz, R., Pretorius, M., & Plant, K. (2011). Exploring the interface between strategy making and foresight. *Foresight, 13*(3), 32–47. https://doi.org/10.1108/14636681111138748

Martin, R., & Sunley, P. (2015). On the notion of regional economic resilience: Conceptualization and explanation. *Journal of Economic Geography, 15*(1), 1–42.

McCann, J. (2004). Organizational effectiveness: Changing concepts for changing environments. *Human Resource Planning, 27*(1), 42–50.

Mcknight, B., & Linnenluecke, M. K. (2016). How firm responses to natural disasters strengthen community resilience: A stakeholder-based perspective. *Organization & Environment, 29*(3), 290–307. https://doi.org/10.1177/1086026616629794

Mendonça, S., & Sapio, B. (2009). Managing foresight in changing organizational contexts. *Foresight, 11*(4), 5–17.

Mintzberg, H., Ahlstrand, B., & Lampel, J. (2005). *Strategy safari: A guided tour through the wilds of strategic management* (2nd ed.). Free Press.

Moh'd, T., & Al-Adwan, M. (2019). Energy consumption and economic growth in Jordan: Empirical evidence. *Energy Policy, 128*, 702–711.

Mohd Noor, A. (2018). Strategic foresight in public management: Toward a framework for public sector transformation. *Foresight, 20*(5), 490–504.

Mokhber, M., Khairuzzaman, W., Vakilbashi, A., Ismail, W., & Vakilbashi, A. (2018). The impact of transformational leadership and its components on organizational innovation. *International Journal of Organizational Leadership, 7*(4), 434–445.

Mousa, A. (2022). Renewable energy investments and policy foresight in Jordan: Challenges and opportunities. *Energy Strategy Reviews, 43*, 100928.

Munir, H., & Arokodare, M. A. (2022). Strategic agility and digital transformation: A pathway to organizational resilience. *Business Management Review, 24*(3), 56–74.

Nagel, M. H. (2020). Technology foresight for sustainable development. *Technological Forecasting and Social Change, 153*, 119879.

Nguyen, T., Vo, B., & Le, H. (2024). Digital transformation, strategic agility, and organizational resilience. *Technological Forecasting and Social Change, 198*, 122845. https://doi.org/10.1016/j.techfore.2024.122845

Nunes, M., & Cook, N. (2021). Future-oriented government: Integrating foresight and strategy for national resilience. *Public Administration Review, 81*(5), 791–803.

OECD. (2019). *Strategic foresight for better policies: Building effective governance in the face of uncertainty*. OECD Publishing. https://doi.org/10.1787/9789264310991-en

Ojo, A., & Fauzi, A. (2022). Foresight and innovation in public sector governance. *Foresight and STI Governance, 16*(2), 65–76.

Omri, A. (2020). Technological innovation and sustainable development: Does the stage of development matter? *Environmental Impact Assessment Review, 83*, 106398.

Onat, N., & Kucukvar, M. (2021). Carbon footprint and sustainability assessment of Jordan's energy sector: Scenarios and policy implications. *Sustainable Production and Consumption, 27*, 1085–1098.

O'Regan, N., & Ghobadian, A. (2004). The importance of capabilities for strategic direction and performance. *Management Decision, 42*(2), 292–313.

Pereira, V., Temouri, Y., & Mellahi, K. (2021). How strategic agility mediates the link between foresight and resilience: Evidence from the energy industry. *Journal of Business Research, 134*, 565–578. https://doi.org/10.1016/j.jbusres.2021.04.005

Pettigrew, A. M. (1992). The character and significance of strategy process research. *Strategic Management Journal, 13*(S2), 5–16.

Porter, M. E. (1985). *Competitive advantage: Creating and sustaining superior performance.* Free Press.

Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review, 86*(1), 78–93.

Powell, T. C. (2001). Competitive advantage: Logical and philosophical considerations. *Strategic Management Journal, 22*(9), 875–888.

Prahalad, C. K., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review, 68*(3), 79–91.

Rahman, S., & Bresciani, S. (2023). Policy foresight, innovation, and crisis preparedness in developing economies. *Technological Forecasting and Social Change, 193*, 122501.

Rahi, S., & Khan, M. (2023). Strategic agility and competitive advantage: Empirical evidence from the energy and telecom sectors. *Energy Reports, 9*, 2001–2015.

Raimo, N., De Marco, M., Giakoumelou, A., & Vitolla, F. (2023). How does integrated reporting affect the financial performance of energy companies? *Sustainability, 15*(7), 6003. https://doi.org/10.3390/su15076003

Rasool, F., & Zhang, H. (2022). Crisis leadership and digital agility: Insights from the energy industry. *Leadership & Organization Development Journal, 43*(8), 1253–1270.

Rohrbeck, R., & Schwarz, J. O. (2024). Corporate foresight in the digital age: Rethinking strategy for volatility and uncertainty. *Futures, 157*, 103356.

Rowe, G., & Wright, G. (2020). The Delphi technique in forecasting: A review of the research agenda. *International Journal of Forecasting, 36*(1), 42–49.

Rumelt, R. P. (2011). The perils of bad strategy. *McKinsey Quarterly, 3*, 30–39.

Sahebi, I. (2022). Testing RBV and DCT integration in strategic management research. *International Journal of Strategic Management, 25*(1), 1–16.

Saka, A., & Arokodare, M. A. (2021). Strategic foresight and strategic agility: A framework for managing uncertainty in public organizations. *Journal of Management and Strategy, 12*(4), 55–68.

Salama, A. (2020). Managing energy crisis: Lessons from the Middle East. *Energy Policy, 139*, 111341. https://doi.org/10.1016/j.enpol.2020.111341

Sandri, S., Khalil, A., & Omari, M. (2020). Barriers to technological foresight in Arab economies. *Foresight and STI Governance, 14*(3), 20–32.

Sardar, Z. (2010). The namesake: Futures; futures studies; futurology; futuristic; foresight – What's in a name? *Futures, 42*(3), 177–184.

Sasaki, K., Yoshida, H., & Suzuki, M. (2021). AI foresight in smart grids: Policy and technological perspectives. *Energy Reports, 7*, 10122–10136.

Sawalha, I. H. S. (2017). Managing adversity: Understanding some dimensions of organizational crisis management and crisis preparedness in Jordanian public sector. *Business and Management Research, 6*(2), 59–72.

Sawalha, I. H. S. (2020). A contemporary perspective of crisis management and organizational resilience: An integrated view. *Business Management and Strategy, 11*(1), 229–253.

Shams, R., & Bresciani, S. (2024). Strategic foresight, agility, and resilience under environmental turbulence. *Management Decision, 62*(1), 45–68.

Shmueli, G., Sarstedt, M., Hair, J. F., Cheah, J., Ting, H., Vaithilingam, S., & Ringle, C. M. (2019). Predictive model assessment in PLS-SEM: guidelines for using PLSpredict. European Journal of Marketing, 53(11), 2322–2347. https://doi.org/10.1108/ejm-02-2019-0189

Shu, C., Zhou, K. Z., Xiao, Y., & Gao, S. (2019). How green management influences product innovation in China: The role of institutional benefits. *Business Strategy and the Environment, 28*(5), 659–674.

Simpson, R., & Clegg, S. (2019). Post-crisis management and the reconstitution of legitimacy. *Organization Studies, 40*(10), 1491–1514.

Sköld, B., & Karlsson, M. (2013). Foresight capabilities for innovation: Evidence from the energy sector. *Technology Analysis & Strategic Management, 25*(10), 1163–1180.

Slaughter, R. (1995). *The foresight principle: Cultural recovery in the 21st century.* Adamantine Press.

Smith, K., & Riley, M. (2012). *School leadership and educational change: International perspectives.* Routledge.

Solberg Søilen, K. (2020). A framework for competitive intelligence, analysis, and strategy. *Journal of Intelligence Studies in Business, 10*(3), 7–20.

Sousa, M. J., & Rocha, Á. (2019). Strategic foresight for digital transformation. *Journal of Business Research, 101*, 709–715.

Stewart, J., & Fenn, P. (2006). Strategy: The motivation for innovation. *Construction Innovation, 6*(3), 173–185.

Suleman, M. T., & Alshammari, M. A. (2021). Resilience, agility, and adaptability in crisis leadership: Lessons from COVID-19. *International Journal of Leadership Studies, 15*(2), 105–122.

Taleb, N. N. (2012). *Antifragile: Things that gain from disorder.* Random House.

Tarba, S., Weber, Y., & Dagnino, G. (2023). From foresight to resilience: How dynamic capabilities drive sustainable performance. *Long Range Planning, 56*(3), 102276.

Tripathi, V., & Roy, S. (2023). Dynamic capabilities, agility, and digital readiness in public enterprises. *Journal of Business Research, 159,* 113702.

Tushman, M. L., & O'Reilly, C. A. (1996). Ambidextrous organizations: Managing evolutionary and revolutionary change. *California Management Review, 38*(4), 8–30.

Van der Heijden, K. (2005). *Scenarios: The art of strategic conversation* (2nd ed.). Wiley.

Wamba, S. F. (2022). The moderating role of digital transformation on strategic agility and performance. *Technological Forecasting and Social Change, 180*, 121715.

Wang, J., & Wu, S. (2021). Technological intelligence and crisis mitigation: A resource-based view. *Management Research Review, 44*(8), 1021–1041.

Weick, K. E., & Sutcliffe, K. M. (2015). *Managing the unexpected: Sustained performance in a complex world* (3rd ed.). Wiley.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal, 5*(2), 171–180.

Wooten, L. P., & James, E. H. (2008). Linking crisis management and leadership competencies: The role of human resource development. *Advances in Developing Human Resources, 10*(3), 352–379.

Wu, P., Zhang, Y., & Shams, R. (2023). Competitive intelligence and crisis responsiveness: The role of dynamic capabilities. *European Journal of Management Studies, 28*(2), 201–219.

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.

Zahra, S. A., & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension. *Academy of Management Review, 27*(2), 185–203.

Zainol, Z., Mohd Noor, A., & Ahmad, N. H. (2018). Foresight practices in the Malaysian public sector: Implementation and challenges. *Foresight, 20*(1), 36–48.

Zehir, C., Can, E., & Karaboga, T. (2015). Linking entrepreneurial orientation to firm performance: The role of differentiation strategy and innovation performance. *Procedia – Social and Behavioral Sciences, 210*, 358–367.

Zhou, K. Z., & Li, C. B. (2012). How knowledge affects radical innovation: Knowledge base, market knowledge acquisition, and internal knowledge sharing. *Strategic Management Journal, 33*(9), 1090–1102.

APPENDIX A

STRATEGIC FORESIGHT, STRATEGIC AGILITY AND THE ENERGY CRISIS MANAGEMENT IN JORDAN

Dear Participant,

My name is Ata Mousa Tayel Alsheyyab, a PhD candidate/student at the School of Technology Management and Logistics, Universiti Utara Malaysia (UUM), Malaysia. I am currently studying Strategic Foresight, Strategic Agility, and the Crisis Management of Energy Security in Jordan. This study is under the supervision of Dr. Fadhilah Mohd Zahari and Dr. Ezanee Mohamed Elias. All answers provided will be treated with strict confidentiality and used for research purposes only. Your kind cooperation in filling in the survey questionnaire is highly appreciated.

Thank You

Yours Faithfully,

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PART A - DEMOGRAPHIC CHARACTERISTICS

Directions: Please tick (/) on the appropriate answer below.

1. Gender:

☐ Male
☐ Female

2. Age:

☐ 20 – 30 years old
☐ 31 – 40 years old
☐ 41 – 50 years old
☐ Above 50 years old

3. Qualification/ Education Level:

☐ Diploma
☐ Bachelors
☐ Masters
☐ PhD

4. Length of Services:

☐ Below 1 year
☐ 1 – 5 years
☐ 5 – 10 years
☐ Above 10 years

5. Your Status Within the Company.

☐ Top management (e.g., CEO, MD, or another board member)
☐ Middle management (e.g., functional manager, or another senior on-board member)

PART B – CRISIS MANAGEMENT

Definition: Management strategies that commence with pre-crisis planning, are activated to respond to the crisis as it unfolds and are implemented to recover from it. Crisis Management is conceptualized in this study in terms of (e.g., discover alarm signals, preparedness and prevention, containment of damages, restoration activity and learning).

Directions: Please indicate the level of agreement or disagreement by circling your answer using the scale below:

1 = Strongly Disagree (SD) <----------->10 = Strongly Agree (SA)

NO	STATEMENTS	SD<---------- ----------> SA
DISCOVER ALARM SIGNALS		
1	The indicators of previous crisis are used to monitor indicators of possible energy crisis.	1 2 3 4 5 6 7 8 9 10
2	Our staff experiences help discover indicators of potential energy crisis.	1 2 3 4 5 6 7 8 9 10
3	The internal work environment is regularly scanned to identify energy crisis indicators.	1 2 3 4 5 6 7 8 9 10
4	The external work environment is surveyed regularly to identify signs of an energy crisis.	1 2 3 4 5 6 7 8 9 10
PREPAREDNESS AND PREVENTION		
5	The Company's management has a team of people with experience to manage energy crisis when it occurs.	1 2 3 4 5 6 7 8 9 10
6	The Company's management is working on preparing pre-solutions (scenarios) to face the expected energy crisis.	1 2 3 4 5 6 7 8 9 10
7	The Company's management provides adequate training programs for employees to deal with the energy crisis.	1 2 3 4 5 6 7 8 9 10
8	The Company's management provides all data and information related to the energy crisis to the concerned parties.	1 2 3 4 5 6 7 8 9 10
CONTAINMENT OF DAMAGES		
9	The Company's management determines specific and clear duties for each employee when the energy crisis occurs.	1 2 3 4 5 6 7 8 9 10
10	The Company's management provides the requirements needed to deal with the crisis.	1 2 3 4 5 6 7 8 9 10
11	The Company has a strategic reserve of other materials and supplies to contain the energy crisis.	1 2 3 4 5 6 7 8 9 10
RESTORATION ACTIVITY		

12	The Company's management is flexible enough to help it conduct normal business during and after the crisis.	1 6	2 7	3 8	4 9	5 10
13	The Company's management allocates the requirements to resume the activity during and after the crisis.	1 6	2 7	3 8	4 9	5 10
14	The Company's management determines the most important actions required to resume the company's activity.	1 6	2 7	3 8	4 9	5 10
LEARNING						
15	Crisis information and handling methods are documented and preserved in ways that allow them to be recovered when needed.	1 6	2 7	3 8	4 9	5 10
16	The company's management adopts preventive measures to prevent the occurrence or recurrence of the crisis.	1 6	2 7	3 8	4 9	5 10
17	The company's management generalizes the lessons learned from the crisis after its completion.	1 6	2 7	3 8	4 9	5 10
18	The company's management is working on analyzing the results and the measures taken in dealing with crisis after its completion.	1 6	2 7	3 8	4 9	5 10

PART C – STRATEGIC FORESIGHT

Definition: Strategic Foresight is defined as the understanding, and anticipation of the future. This concept is built on the idea of establishing a corporate system that warns about unpleasant surprises and identifies emerging opportunities. In this study, strategic foresight is conceptualized as, technology intelligence, competitive intelligence, political environment foresight, and consumer foresight.

Directions: Please indicate the level of agreement or disagreement by circling your answer using the scale below:

1 = Strongly Disagree (SD) <----------->10 = Strongly Agree (SA)

NO	STATEMENTS	SD<----------> SA				
TECHNOLOGY INTELLIGENCE						
1	Our company has a technology strategy to identify, assess and use information in technology discontinuities.	1 6	2 7	3 8	4 9	5 10
2	Our company has technology exploration to identify, assess and use information in emerging technologies,	1 6	2 7	3 8	4 9	5 10
3	Our company has technology expert to identify, assess and use information in an uncertain situation.	1 6	2 7	3 8	4 9	5 10
COMPETITIVE INTELLIGENCE						

4	Our company produces intelligence reports and assessments on emerging technologies.	1 6	2 7	3 8	4 9	5 10
5	Our company assesses numerous prospective outcomes of our competitors' actions that could be threats or opportunities.	1 6	2 7	3 8	4 9	5 10
6	Our employees report information about our competitors in foreign markets to the right manager for better decisions.	1 6	2 7	3 8	4 9	5 10
7	Our company develops profiles on emerging technologies to better understand their characteristics, potential applications, and market advantages.	1 6	2 7	3 8	4 9	5 10
8	Our employees attend intelligence seminars/training programs.	1 6	2 7	3 8	4 9	5 10
POLITICAL ENVIRONMENT FORESIGHT						
9	In our company, there is identification, assessment, and usage of information on the country's legislation in shaping the strategic plan.	1 6	2 7	3 8	4 9	5 10
10	Our company's strategic view copes with the political environment.	1 6	2 7	3 8	4 9	5 10
11	Our company has a response strategy based on the country's political decisions.	1 6	2 7	3 8	4 9	5 10
CONSUMER FORESIGHT						
12	Our company conducts research aims to understand customers' future needs about future products and services in energy.	1 6	2 7	3 8	4 9	5 10
13	Our company has methods that aim to understand today's customers' needs to identify their possible future needs.	1 6	2 7	3 8	4 9	5 10
14	Our company combines the needs of customers with the dynamics of change and expectations of future circumstances, products, and services	1 6	2 7	3 8	4 9	5 10
15	Our company identifies consumer lifestyle and socio-cultural trends when designing future products and services	1 6	2 7	3 8	4 9	5 10

PART D – STRATEGIC AGILITY

Strategic Agility is defined in this study as the ability of an organization to detect changes through the opportunities and threats existing in the business environment, and to give rapid response through the recombination of resources, processes, and strategies. In this study strategic agility is conceptualized as; strategic insight, internal response orientation, external response orientation, human resource capability and information technology capability.

Directions: Please indicate the level of agreement or disagreement by circling your answer using the scale below:

1 = Strongly Disagree (SD) <----------->10 = Strongly Agree (SA)

NO	STATEMENTS	SD<----------> SA
STRATEGIC INSIGHT		
1	Our company can perceive complex strategic situations	1 2 3 4 5 6 7 8 9 10
2	Our company can look at complicated strategic situations and figure out what to do.	1 2 3 4 5 6 7 8 9 10
3	Our company can make sense of complex strategic situations	1 2 3 4 5 6 7 8 9 10
4	Our company can take advantage of the complex strategic situations	1 2 3 4 5 6 7 8 9 10
INTERNAL RESPONSE ORIENTATION		
5	We are proactively looking for opportunities that add value to our customers .	1 2 3 4 5 6 7 8 9 10
6	Most of the time, our customers come to us with unique requests that need to be met quickly.	1 2 3 4 5 6 7 8 9 10
7	Our business requires us to have a proactive relationship with our customers.	1 2 3 4 5 6 7 8 9 10
EXTERNAL RESPONSE ORIENTATION		

8	Our business environment requires us to respond rapidly to our stakeholders	1	2	3	4	5
		6	7	8	9	10
9	Our business environment requires us to be organized as functional silos and take decisions independently	1	2	3	4	5
		6	7	8	9	10
10	Our business environment requires us to make quick decisions	1	2	3	4	5
		6	7	8	9	10
HUMAN RESOURCE CAPABILITY						
11	Our employees have the intelligence to face a change that occurs in the work environment	1	2	3	4	5
		6	7	8	9	10
12	Our employees can take full advantage of the organization's assets	1	2	3	4	5
		6	7	8	9	10
13	Our company can leverage its HR policies and practices to acquire, cultivate, and retain the capacity to deploy human resources	1	2	3	4	5
		6	7	8	9	10
INFORMATION TECHNOLOGY CAPABILITY						
14	Our IT infrastructure enables us to fulfill customer requirements easily	1	2	3	4	5
		6	7	8	9	10
15	Our IT infrastructure enables us to easily collaborate with our partners/subsidiaries	1	2	3	4	5
		6	7	8	9	10
16	Our IT infrastructure enables us to monitor changes and make the necessary changes	1	2	3	4	5
		6	7	8	9	10
17	Our IT infrastructure ensures that the information being exchanged is of high quality and reliability in market scanning	1	2	3	4	5
		6	7	8	9	10

Thank you very much for your kindness in completing this questionnaire.

APPENDIX B

ARTICLES PUBLISHED

1) The Impact of Strategic Foresight on Crisis Management in Jordan's Energy Security Sector

The Impact of Strategic Foresight on Crisis Management in Jordan's Energy Security Sector | Educational Administration: Theory and Practice (kuey.net)

Educational Administration: Theory and Practice 2024, 30(5), 11295-11307 ISSN: 2148-2403
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2) The Impact of Strategic Agility on the Crisis Management of Energy Security Sector in Jordan

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African Journal of Biological Sciences (afjbs.com)

https://doi.org/10.48047/AFJBS.6.12.2024.4771-4793