جـــامـعـــة الـــشـرق الأوسـط
MIDDLE EAST UNIVERSITY
Amman - Jordan

The Impact of Business Analytics on Strategic Change:

The Moderating Role of Decision Support Systems

A Field Study on Food Import Companies in Amman-Jordan

أثر تحليلات الأعمال على التغيير الاستراتيجي:

الدور المعدل لأنظمة دعم القرار

دراسة ميدانية على شركات استيراد المواد الغذائية في عمان-الأردن

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Thesis Submitted in Partial Fulfillment of the Requirements

for Master Degree in Business Administration

Business Department

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Authorization

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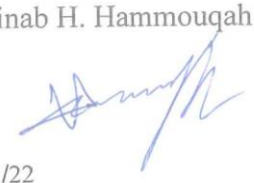
Signature: 

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Thesis Committee Decision

This thesis titled: "The Impact of Business Analytics on Strategic Change: The Moderating Role of Decision Support Systems - A Field Study on Food Import Companies in Amman, Jordan" was discussed, accepted and approved on Monday, January 22, 2024.

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The Researcher

Dedication

I dedicate this thesis to the soul of my hero and my backbone - my father, who eagerly anticipated the completion of this work and my dedication to him. Dad, thank you for your unwavering support, belief in me, and for raising me with tenderness to become the person I am today.

To my angel, my caring and supportive mother, who always surrounded me with love.

To my beloved sister Fatima, who has been the strongest support in my life, especially during the course of this work.

To my two brothers, my two daughters, and my entire family, who have consistently stood by me throughout this journey.

Finally, to my love.

The Researcher

Table of Contents

List of Tables

List of Figures

List of Appendices

The Impact of Business Analytics on Strategic Change:

The Moderating Role of Decision Support Systems

A Field Study on Food Import Companies in Amman-Jordan

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Abstract

The study aims to assess the impact of Business Analytics on strategic change, considering Decision Support Systems as a moderator variable. The study addresses the Food Import Companies in Amman, Jordan, employing a total of 500 or more individuals and have capital exceeding 10 million Jordanian Dinars, according to the classification made by the Amman Chamber of Industry. The study was conducted with six large companies that agreed to adhere to the study's terms related to capital and employees number. The study population consists of 490 individuals employed across three administrative levels: Top Management, Middle Management, and First-Line Management. The field study applies the method of proportional stratified random sampling. The sample consisted of 217 managers, while 187 valid questionnaires were retrieved for analysis. Descriptive statistics and structured equation models were used to analyze the data and test hypotheses using SMART PLS-4 software.

This study concluded with the following results:

The levels of practice of the three study variables; Business analytics, strategic change, and decision support systems were (moderate). Moreover, it appeared that there is a direct

impact of business analytics on strategic change, and that when the moderating variable entered the relationship between the independent variable and the dependent variable it increased the positive effect of Business Analytics on the Strategic Change.

The field study presented a set of recommendations; of which the most important ones as follow:

Ensuring a forceful effective utilization of Business Analytics is necessary for the Food Import Companies and optimize the utilization of DSS across all departments for every decision and process will contribute to nurturing a culture of innovation and reaching a higher overall quality of decision-making processes.

Key words: Business Analytics, Strategic Change, Decision Support Systems, Food Import Companies

أثر تحليلات الأعمال على التغيير الاستراتيجي: الدور المعدل لأنظمة دعم القرار

دراسة ميدانية على شركات استيراد المواد الغذائية في عمان–الأردن

اعداد: زينب هاني حموقه

اشراف: الأستاذ الدكتور أحمد علي صالح

الملخص

هدفت الدراسة إلى التعرف على أثر تحليلات الأعمال على التغيير الاستراتيجي بوجود أنظمة دعم القرار متغير معدل وكان مجال هذه الدراسة شركات استيراد المواد الغذائية في عمان، الأردن التي توظف ما مجموعه 500 فرد فأكثر والتي يزيد رأس مالها عن 10 ملايين دينار أردني، حسب تصنيف غرفة صناعة عمان. علاوة على ذلك، فقد طبقت الدراسة على ست شركات كبيرة انطبقت عليها الخصائص المطلوبة من عدد الموظفين ورأس المال، وتكون مجتمع الدراسة من 490 فردًا يعملون في ثلاثة مستويات إدارية: الإدارة العليا، والإدارة الوسطى، وإلادارة الاشرافية.

واعتمد أسلوب العينة العشوائية الطبقية التناسبية والتي بلغ حجمها 217 مديراً، فيما تم استرجاع 187 استبانة صالحة لتحليلها، واستخدمت وسائل الإحصاء الوصفي ونموذج المعادلة المهيكلة في تحليل البيانات واختبار الفرضيات باستخدام برمجية SLP TRAMS–4

وخلصت هذه الدراسة إلى مجموعة من النتائج كان أهمها:

مستويات الممارسة لمتغيرات الدراسة الثلاثة؛ تحليلات الأعمال والتغيير الاستراتيجي وأنظمة دعم القرار (متوسطة). علاوة على ذلك، تبين أن هناك تأثرا مباشراً لتحليلات الأعمال على التغيير الاستراتيجي، وتبين أنه عندما دخل المتغير المعدل في العلاقة بين المتغير المستقل والمتغير التابع زاد من الاثر الإيجابي لتحليلات الأعمال على التغيير الاستراتيجي.

وقدمت الدراسة الميدانية مجموعة من التوصيات؛ والتي من أهمها:

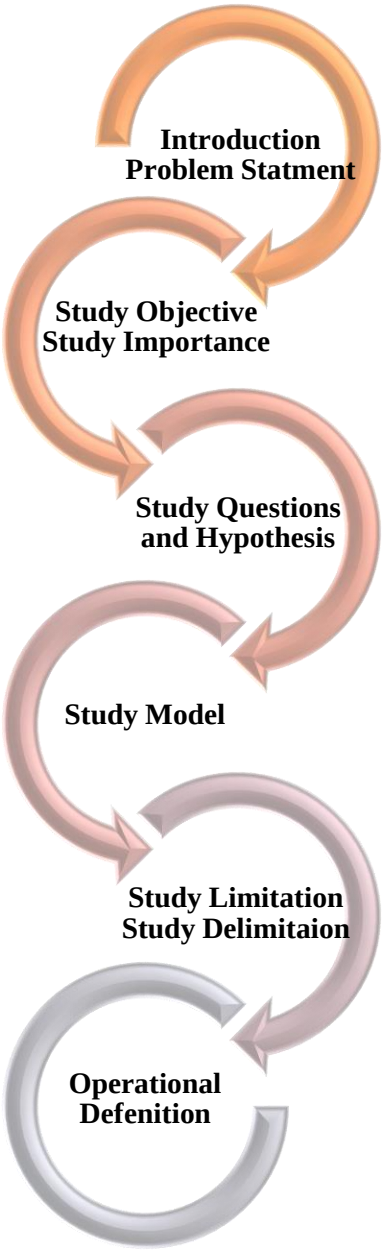
التأكيد على الاستخدام الفعال لتحليلات الأعمال أمر ضروري لشركات استيراد المواد الغذائية في عمان، وتطوير الاستفادة من استخدام أنظمة دعم القرار في جميع الإدارات في كل قرار وعملية سيساهم في تعزيز ثقافة الابتكار والوصول إلى جودة أعلى بشكل عام في عمليات صنع القرار.

الكلمات المفتاحية: تحليلات الأعمال، التغيير الاستراتيجي، نظم دعم القرارات، شركات استيراد الأغذية

Chapter One

Background of the Study

Figure 1.1: Work plan for the First Chapter



1.1 Introduction:

In the contemporary business landscape, complexity, uncertainty, and dynamic changes have become intrinsic features of operations. The powerful influence of globalization resonates globally, particularly in moments of crisis, impacting nations worldwide, compounded by the rapid march of digitalization and technological innovation, competition and challenges. Organizations require a rapid adaptation to both external shifts and internal intricacies. This adaptability is crucial for ensuring their continuity, survival, and the achievement of their objectives. Aday (2020) In Jordan, a diverse range of industries bore the brunt of these transformations, a fact emerges by the COVID-19 pandemic and the Russian-Ukrainian conflict which affected the national economy. Notably, the sectors deeply intertwined with the import of food and medical supplies emerged as some of the most profoundly impacted (Baryshnikova et al., 2021; Laine & Galkina, 2017).

Strategic change is a fundamental and initial factor that underpins the success and survival of organisations. Strategic change is the implementation of new strategies, the movement of a company away from its present state towards a desired future state to increase its competitive advantage. Whether the change to be incremental (evolution) or radical (Revolution) it depends on many internal and external factors and strategic choices. (Keister, 2002; Dupouët & Barlatier, 2019; Kirtley & O'Mahony 2023).

Despite the significance of this subject, numerous studies have consistently highlighted the existence of gaps and assorted challenges within this domain. These persistent issues demand renewed attention and effective solutions (MacKay & Chia, 2013; Al Eid & Yavuz, 2022). Thus, the need to explore and embrace alternative solutions, also identifying appropriate approaches, techniques and methodologies to

effectively address these challenges and attain optimal outcomes remains a complex endeavor. Business Analytics, as underscored by numerous studies, emerges as a pivotal variable with the potential to significantly impact strategic change (Duan & Li, 2015; Kunc & O'brien, 2019; Iberaheem, 2023)

Business Analytics entails the systematic application of statistical and quantitative data analysis techniques to gain insights into business performance. Through its diverse modes—descriptive, predictive, and prescriptive—it facilitates a profound comprehension of organizational dynamics. This understanding, in turn, furnishes invaluable inputs for Strategic Change (Roden et al., 2017; Mikalef & Krogstie 2020; Duan & Edwards 2020).

To enhance the tangible influence of Business Analytics on Strategic Change, the identification of a moderator for this relationship has become crucial. Drawing from insights offered by earlier research, it has become apparent that Decision Support Systems (DSS) can hold a substantial influence in reinforcing and facilitating the prominent role of BA within the realm of decision-making. (Talari & O'Brien, 2022; Al Eid & Yavuz, 2022; Alasiri & Salameh, 2020)

Miah (2022) emphasizes that Decision Support Systems (DSS) are computer applications designed to enhance users' decision-making abilities in the realm of business. These systems offer a direct bridge between digital technology and decision-makers in order to select the convenient strategic change decision, eliminating the requirement for specialized information experts in the field. This aligns with the views expressed by (Zörrer et al., 2019; Alasiri & Salameh, 2020; Miah, 2022) further solidifying the central role of DSS in informed Strategic decision-making and achieve the appropriate Strategic Change.

Food industry especially the food import sector considered as one of the main and important commercial sectors in Jordan. It has a big role in affecting the Jordanian economy and food security. Petra (12 /8/2023). The minister of Industry and Trade praises the role of food sector, viewed in 15/8/2023 (https://www.petra.gov.jo/Include/InnerPage.jsp?ID=253682&lang=ar&name=news). Hundaileh & Fayad (2019) also highlighted the need to provide strong solutions and strategic decisions to protect the local economy and increase its performance. They confirm backed by reliable statistics that the food sector especially the food processing sector is one of the most important economic sectors in Jordan that directly affecting the economy and social development. Their statistics shows that the contribution percentage is 25.9% of the net added value within Jordan's industrial economy.

Based on the above-mentioned insights, this study aims to investigate the influence of Business Analytics on Strategic Change within the context of the Jordanian environment and with the presence of Decision Support Systems as a moderating factor, particularly within the realm of the Food import sector.

1.2 Problem Statement:

In today's dynamic business landscape, characterized by technological advancements, evolving customer expectations, and global disruptions, such as the ongoing Covid-19 pandemic and geopolitical tensions like those in Ukraine, the significance of evaluating the necessity for strategic change in the food and health sectors' supply chain operations cannot be overstated. (Amuna et al., 2017; Agri et al., 2017).

Jagtap et al., (2022) mentioned that a comprehensive study aimed at understanding the vital importance for strategic realignment within the food sector's supply chain

processes will not only address potential inefficiencies but also identify opportunities to enhance agility, resilience, and cost-effectiveness. Recognizing the significance of such crises as catalysts for change, previous researchers suggested conducting subsequent studies to reveal the benefits achieved by the change processes come up with better ideas and plans for the global food supply chains. This will help us be ready for similar problems and crises in the future.

In the dynamic realm of business environments, the need to craft strategies for addressing emerging risks, adapting to evolving conditions, and fostering transformative functional approaches is evident. Baryshnikova et al. (2021) emphasize the importance of achieving a balance among internal capabilities, dynamic adaptability, and the ever-changing external landscape also endorse a systematic approach, highlighting the significance of identifying drivers of change and challenges. This is followed by thorough analyses to tailor strategic shifts that improve outcomes.

In this context, MacKay & Chia (2013) advocate for a reorientation of studies on strategic change to determine the most effective change levels and processes. This perspective aligns with Dupouët & Barlatier's (2019) inquiry into the most effective strategies for navigating dynamic environmental changes.

Supporting to this, Iberaheem (2023) recommendation to the need to understand the company’s current position, envision potential future scenarios, and determine the best path forward in order to achieve the business objectives.

The ongoing contrast of opting for radical versus incremental strategic change, as underscored by Keister (2002), remains a determinant of organizational success and resilience. This inquiry penetrates the heart of the strategic landscape, encapsulating the delicate interaction of internal dynamics, external influences, stakeholder engagement,

and adaptable change methodologies. The composition of these perspectives lays the foundation for a comprehensive exploration into the differences of strategic change.

Most theories of strategic change mentioned the importance of firms to invest in their existing capabilities in order to recognize the need for strategic change and how early-stage entrepreneurs lacking such investments to make the decision when and how to change their strategies (Kirtley & O'Mahony 2023).

However, there are a limited number of adequate studies to research this topic thorough examining the effects and implications.

Christoforidou (2023) further stresses the criticality of directing attention towards the food industry and economy, particularly within Jordan. This emphasis aims to steer the adoption of optimal strategic decisions and global trade strategies, thus facilitating a more effective response to the diverse range of challenges currently being encountered. Emphasizing the Minister of Industry Trade and Supply's statements “The food trade sector carries a major commercial significance in the Jordanian economy and in sporting the strategic inventory”. Petra (12 /8/2023). The minister of Industry and Trade praises the role of food sector, viewed in 15/8/2023 (https://www.petra.gov.jo/Include/InnerPage.jsp?ID=253682&lang=ar&name=news).

As a conclusion it is clear that the knowledge gap of the current study is summarized in the limited studies related to strategic issues, including the issue of strategic change in the food sector, especially in Jordan, and this was supported by previous studies (Aday & Aday, 2020; Garcia et al., 2020; Salih & Abdul-Majeed, 2017; Rafeeq, 2022; Kloub, 2023). That’s why there is a need to expand the study of this subject and understand its relationships with other variables also that have not been sufficiently studied, including

business analytics and decision support systems. Accordingly, the current study came to try to close this knowledge gap in the food import sector in Jordan.

1.3 Study Objectives:

The main purpose of this study is to examine the impact of Business analytics on Strategic Change with the presence of Decision Support Systems as a moderator in Food Import companies in Amman –Jordan through accomplishing the following objectives:

1- Determining the level of practicing of the three variables (Business Analytics, Strategic Change and Decision Support Systems) in Food Import companies in Amman- Jordan

2- Investigating the impact of Business analytics on Strategic Change in Food Import companies in Amman- Jordan

3- Diagnosing the moderate role of Decision Support Systems for the impact of Business analytics on Strategic Change in Food Import companies in Amman- Jordan

1.4 Study Questions and Hypothesis:

Study Questions:

1- What is the level of practicing the business analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) in Food Import Companies in Amman- Jordan?

2- What is the level of practicing strategic change (evolution and revolution change) in in Food Import Companies in Amman- Jordan?

3- What is the level of practicing Decision support systems in Food Import Companies in Amman- Jordan?

4- Does business analytics impact on the strategic change in Food Import Companies in Amman- Jordan?

5- Does Decision Support Systems Moderate the impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Strategic Change in Food Import Companies in Amman- Jordan?

Study Hypothesis:

According to the study problem and its questions, the following hypothesis were formulated to be tested:

First main Hypothesis

H01: There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Strategic Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan

The main hypothesis is subdivided into two sub- hypotheses as follows:

H01.$_1$: There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Evolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan

H01.$_2$: There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Revolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan.

Second main Hypothesis

H02: Decision Support Systems does not moderate the impact of Business Analytics on Strategic Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan.

The main hypothesis is subdivided into two sub- hypotheses as follows:

H02.$_1$: Decision Support Systems does not moderate the impact of Business Analytics on Evolution Change at a level of significance ($a \geq 0.05$) in Food Import Companies in Amman- Jordan.

H02.$_2$: Decision Support Systems does not moderate the impact of Business Analytics on Revolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan.

1.5 Study Importance:

The significance of this study is considering both the Theoretical and practical point of view:

Theoretical Importance:

The study will provide a conceptual framework on the topics related to Decision Support Systems, and to be considered as a new topic and study in this subject as it is very limited especially in Arab region.

It will also help in bridging the gap between Business Analytics and Strategic Change with the use of Decision Support Systems and enriching the libraries especially in the Arab region with new study.

Depending on some previous researchers this study can be a good additional reference where other industries in Jordan can benefit from.

Practical Importance:

This study may help in providing decision makers with the needed information necessary in taking appropriate decisions and governance while implementing new procedures that applies the new learnings from this study about Business Analytics and Strategic Change with the role of Decision Support Systems as a moderator in Food Import companies in Jordan.

It may also help decision makers to understand the importance role of Business Analytics in Food Import or other industries to the best strategic choice to face the uncertain and dynamic changes.

According to the researcher's knowledge and depending on the survey on the global search, this study may be considered as the first of its kind in linking the Decision Support Systems as a Moderator and examine its impact with Business Analytics (Descriptive, Predictive and Prescriptive Analytics) on Strategic Change in Food Import Companies in Amman- Jordan?

This study can benefit the Food Import companies facing Numerous challenges in deciding the best Strategic choice whether the change to be Evolution or Revolution one depending on Business Analytics and Decision Support Systems.

1.6 Study Model:

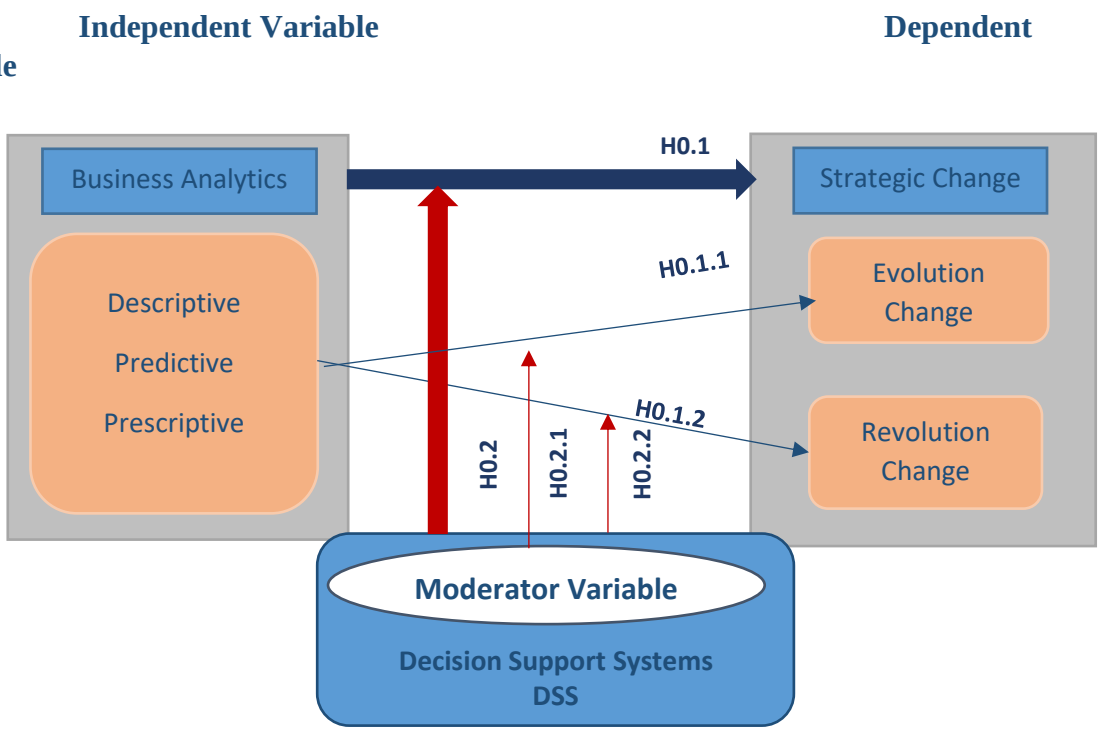


Figure 1.2: The Study Model

The model is prepared by the researcher depending on literature and previous studies as follows:

- Business Analytics (independent Variable): (Duan & Li 2015 ; Lepenioti et al., 2020; Iberaheem, M. 2023; Duan & Edwards 2020)
- Strategic Change (Dependent Variable): (Kirtley & O'Mahony 2023; Müller & Kunisch 2018; Chen et al., 2022).
- Decision Support Systems (Moderating Variable): (O'Brien et al., 2022; Aldhmour & Eleyan 2012; Al siri & Salameh 2020; Al Eid & Yavuz 2022)

1.7 Study Limitation:

- This study will be applied at the Food import companies in the city of Amman, and it may be difficult to generalize it in other industries.
- This study will be applied at the Food import companies in the city of Amman, and it may be difficult to generalize it in other companies in other industries.
- This study will be applied in Jordan but can't be applied in companies in the same industry outside Jordan.

1.8 Study Delimitation:

- Spatial: In Food Import Companies In the city of Amman
- Humanity: Field of mangers in Food Import Companies in Amman
- Temporal: The Academic year of 2023/2024
- Scientific: The effect of Business Analytics with the presence of Decision support systems on Strategic Change.

1.9 Operational Definition:

Business Analytics: Is the techniques and processes used to transform data into insight including the descriptive, predictive, and perspective types of analytics in order to improve the business and strategic change decision in the Import Food companies in Amman. It is measured by the degree of individual's response to the questionnaire through questions (1-18)

Descriptive Analytic: Is using historical and current data of Import Food companies in Amman and analyze it to identify patterns and relationship. Its help in understanding what happened and what is happening in these companies to provide a good base of data. It is measured by the degree of individual's response to the questionnaire through questions (1-6).

Predictive Analytic: Is the use of data in order to forecast future outcomes of Import Food companies in Amman. It uses different tools to find patterns for better predicting future behavior and to provide a view about what could happen and why. It is measured by the degree of individual's response to the questionnaire through questions (7-12).

Prescriptive Analytic: Is the use of past trends and performance of Import Food companies in Amman to determine what need to be done and why to be able to achieve its future goals. It is measured by the degree of individual's response to the questionnaire through questions (13-18).

Decision Support Systems DSS: Is a computerized system use not just to collect data but also to analyze it in Import Food companies in Amman in order to provide a comprehensive information to help decision makers in their process to adopt the appropriate decision. It is measured by the degree of individual's response to the questionnaire through questions (37-48).

Strategic Change: Is a strategic decision process in food import Companies in Amman to make a change and restructure itself internally or externally within its industry for getting the best opportunities in market in order to archive its objectives. It is measured by the degree of individual's response to the questionnaire through questions (19-36).

Evolution Change: Is an incremental, gradual, and progressive change over time. It happened step by step not overnight to ensure the survival of organization. It is measured by the degree of individual's response to the questionnaire through questions (19-27).

Revolution Change: Is a radical complete, sudden and overhaul renovation. It's fundamental and irreversible. This change reshapes and realigns strategic goals. It is measured by the degree of individual's response to the questionnaire through questions (28-36).

Food import companies: Companies responsible for sourcing and procuring food products from overseas locales. They aim to bring these products into local markets, facilitating distribution and eventual sale. These companies might operate as both importers and manufacturer (import certain food to supplement their product lines.

Chapter Two

Theoretical Framework and Previous Studies

Figure 2.1: Work plan for the Second Chapter

This chapter is divided into two parts:

- The first section of this chapter will discuss the theoretical framework that contains of evolution and concept of each variable (Business Analytics, Decision Support Systems, and Strategic Change) and will end up by explaining the benefits of each variable.
- The latter section of chapter two will discuss previous studies about the current study variables, also what differentiates this study from earlier research.

2.1 Theoretical Framework:

2.1.1 Business Analytics

Business Analytics entails the systematic application of statistical and quantitative data analysis techniques to gain insights into business performance. Through its diverse modes—descriptive, predictive, and prescriptive—it facilitates a profound comprehension of organizational dynamics. This understanding, in turn, furnishes invaluable inputs for Strategic Change.

The Evolution of Business Analytics:

Even though Business Analytics has become popular nowadays, it's not a new concept in terms of its meaning or purpose. Furthermore, in the 1940s, during World War II, the need for more effective methods to make the most of scarce resources led to the use of Business Analytics in its most basic form. The evolution of Business Analytics started in the 1970s by creating a routine reports to help and inform decision makers about what had happened in the previous period to enhance the decision-making process and implementing changes. Yet, the necessity to grasp and tackle evolving business requirements and challenges that surpass historical data and existing information pushed

the advancement toward Big Data. So the reality is that even though analytics is not new, the explosion in its popularity is very new. With the recent explosion of big data, the means to collect and store this data, and capable and intuitive software tools, data and data-driven insight is more accessible to business professionals than ever before (Delen & Ram 2018).

Business Analytics Concept:

Despite the numerous definitions describing Business Analytics, most researchers agree on a closely related meaning to the concept, depending on the aspect they are focusing on, with slight differences in details and explanations.

Parks & Thambusamy (2017) describe Business Analytics as the utilization of knowledge and intelligence to apply data-based decision-making in support of an organization's performance. It also promises to enhance organizational Information Systems and profitability, improve decision-making processes, and reduce risks.

It also can be described as the identification of meaningful patterns within data. Given that living in an environment full of big data, analytics definitions often focus on the (Data) created in large volumes (Delen & Ram, 2018). Omar et al. (2019) state that Business Analytics is concerning with evidence-based problem recognition and solving which occur within the business situations context, as a result of active collaboration between the human labor and the modern cyber-physical production systems that works towards a shared goal.

It is a spectrum of techniques and methodologies employed to extract valuable insights from data, facilitating more informed strategic decision-making through the utilization of various functions and tools tailored to its specific context (Mikalef, & Krogstie, 2020)

Business Analytics involves extensive use of data, whether through statistical and quantitative analysis or explanatory and predictive models. It's a fact-based approach to management aimed at driving decision-making and actions. It can be categorized into descriptive, predictive, and prescriptive analytics, all contributing to better resource and strategy alignment, faster decision-making, and enhanced competitive advantage (Duan & Edwards, 2020).

Adding to this, it's crucial to note a common error made in research writing regarding the distinction between "Analytics" and "Analysis." Analysis refers to group of activities and process of breaking down a complex issue into parts for thorough examination, particularly in cases where investigating the entire system is impractical. This necessity for facilitation and simplification leads to dividing it into more understandable components. Conversely, Analytics is an integrated methodology encompasses a range of methods, technologies, and tools aimed at generating new knowledge and insights to solve intricate problems (Delen & Ram, 2018). The role of a business analytics involves performing thorough analysis of an organization and market, to provide valuable insights to inform strategic decisions and to drive effective changes (Iberaheem, 2023). In conclusion, adopting appropriate Business Analytics techniques and incorporating them into organizational strategies is vital and essential.

Business Analytics Objectives & Benefits:

Analytics is a widely used term in business today. You'll come across numerous articles discussing analytics and how it's reshaping the way managerial decisions are made. The popularity of analytics can be categorized into three main reasons: necessity, availability/affordability, and a shift in culture. Business Analytics aims to leverage big data, statistical analytics, and data visualization to drive changes and their implementation

in business (Delen & Ram, 2018). Many businesses view analytics as a capability within their organizations, built upon a set of processes and technologies that utilize data to comprehend and analyze business performance. It's seen as an interdisciplinary collection of tools, directly and indirectly linked to strategic processes (Kunc & O'Brien, 2019).

In a simple consensus, Business Analytics is understood to transform data into actionable insights for more informed and prompt decision-making. It can assist in effective marketing, revenue forecasting, and the development of automation systems, ultimately enhancing overall business performance (Delen & Ram, 2018).

The Levels of Business Analytics

Business analytics can offer valuable insights for strategic decision-making, utilizing various functions and tools based on its intended purpose. The consensus among writers and researchers is that Business Analytics can be categorized into three levels: Descriptive, Predictive, and Prescriptive (Duan & Edwards, 2020; Delen & Ram, 2018; Kunc & O'Brien, 2019).

• **Descriptive Analytic:** Descriptive analytics is the most frequently employed set of analytics tools that employs various techniques to categorize, characterize, and classify data into valuable insights, aiding in comprehending past and present business performance. The typical outcomes include charts, reports dashboards, scorecards, and data warehouses to identify patterns and trends within the data through calculations like means, frequencies, variations, rankings, and deviations (Kunc & O'Brien, 2019). According to Duan & Edwards (2020), descriptive analytics can be defined as answering the question,

"What has happened and what is happening?" For instance, it utilizes business intelligence and data mining to offer trending information about past or current events.

• **Predictive Analytic:** Predictive analytics concentrates on examining historical data to predict future performance and detect relationships within the data, followed by extrapolation. The outcomes involve uncovering hidden patterns in vast amounts of data to forecast behavior and identify trends (Kunc & O'Brien, 2019). According to Duan & Edwards (2020), predictive analytics can be defined as addressing the question, "What could happen?" For example, it employs statistical models and forecasts to provide precise projections of future occurrences along with the underlying reasons for those predictions.

• **Prescriptive Analytic:** Prescriptive analytics employs various tools, such as optimization, scenarios and simulation, to identify the optimal alternatives for achieving business objectives. Many of the mathematical and statistical techniques used in predictive analytics can also be applied to consider uncertainty in the data (Kunc & O'Brien, 2019). According to Duan & Edwards (2020), prescriptive analytics addresses the question, "What should we do?" For instance, it employs optimization and simulation to recommend one or more courses of action, providing the best possible outcome for each decision.

Figure (2.2) illustrates the levels of Business Analytics and the inherent tasks of each level (Delen & Ram, 2018).

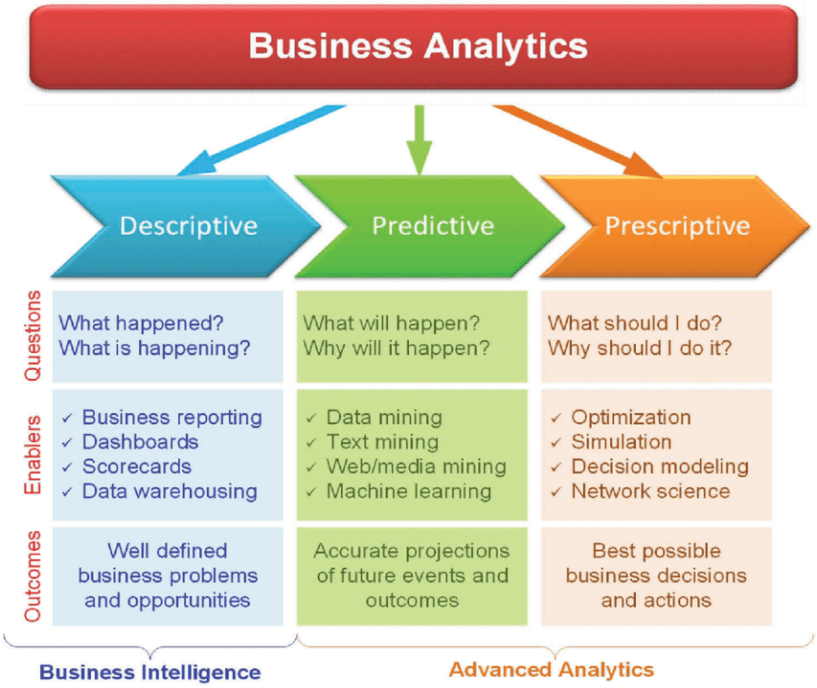


Figure 2.3: Business Analytics levels (Delen & Ram, 2018)

2.1.2 Strategic Change

The Evolution of Strategic Change

Lewin, (1947) reported that "change occurs within organizations at the event of an alteration of the existing balance between driving and restraining forces." Subsequently, it started to rely on goals, structure, management style, and the adopted strategies to achieve desired outcomes.

Given the dynamic and contingent pressures on managers, old theories about change did not offer a specific path to follow. Instead, they enabled managers to define their own change strategies, particularly if they were strategically focused on managing their organization and devising the requisite plans for its improvement.

Then, many scholars emphasized that organizations rarely resort to change, and that the processes organizations adopt to conform to institutional norms and values are insufficient (Baum & Oliver, 1996). Organizational change has evolved to encompass

four distinct processes aimed at ensuring improved personnel and organizational performance to achieve success in the mission and vision. These processes include planning, budgeting, and monitoring employees' productivity, as well as job analysis, classification, and the establishment of a rewarding system concerning pay and benefits (Magued, 2023).

Strategic Change concept

Considering the vital role of strategic change in business, it's natural to expect various definitions to emerge. These differences stem from diverse aspects and scopes, including purpose, boundaries, and actors.

To begin, strategy can be defined as the organization's process intent to achieve long-term goals and objectives, involving the adoption of courses of action that shape the organization's approach. Both managers and employees collaborate to realize these objectives, establishing the path and roadmap that the organization follows to reach its goals

Change, on the other hand, is the series of actions through which an organization modifies a significant component. It encompasses solutions aimed at improving how work is conducted within organizations, addressing problems, and seizing opportunities. It’s to transform the organizations current state to future desired state.

Strategic change is a dynamic process characterized by complexity, ambiguity, and discrepancies to implement new strategies. It encompasses six pathways: temporality, actors, emotionality, tools and practices, complexity, and tensions (Kunisch et al., 2017).

It's a significant organizational transformation that manifests in the firm's mission, scope, priorities, and goals, resulting from a combination of environmental determinism and managerial choices to achieve long term goals (Müller & Kunisch, 2018).

Strategic change faces three limitations: Firstly, firms are driven to change when new information reveals a gap between a firm's outcomes and its anticipated performance. Secondly, strategic change often regards change as a positive aid in rectifying decisions, rather than evaluating which decisions makers should accept or reject. Thirdly, the strategic change and renewal literature predominantly concentrates on how mature and established firms react to substantial shifts (Kirtley & O'Mahony, 2023).

In simple terms, strategic change involves implementing new strategies that introduce fundamental changes beyond the organization's usual routines. It signifies transitioning the current organizational state towards a desired future state to enhance competitive advantage. It encompasses two types: revolutionary change (radical and transformational) and evolutionary change (incremental). The choice between these depends on various factors determining the appropriate change for the organization to adopt.

Strategic Change objectives and benefits

Strategic planning holds significance in reshaping decision-making dynamics through the definition of the organization's position, mission, and goals. This aids in formulating effective managerial tasks and enhancing performance. Its objective lies in maintaining business efficiency and productivity within a constantly changing and challenging environment, relative to threats and opportunities (Magued, 2023).

Strategic change involves determining what elements of one's strategic orientation need to change, as well as how and when to implement these changes. This transformation could be prompted by significant environmental shifts, declining organizational

performance, or even a combination of both. The strategic change process encompasses four key steps: strategic analysis, strategy development, strategic plan design, and strategic plan implementation (Roberts, 2008).

Strategic change holds importance in establishing future organizational objectives and priorities, particularly when an organization requires specialized adaptations to remain competitive in its operational activities (Pettit et al., 2023).

Strategic Change Types

Given the significance of Strategic Change in management, particularly within this dynamic environment, it's imperative for managers to have a comprehensive grasp of its processes and dimensions. This concept holds a central position in the realms of management and strategy. Writers and researchers diverge in identifying the patterns of change, elucidating several types based on various internal and external factors that impact the organization, along with the scope and speed of required change. They define four principal types for adoption: Revolution, Evolution, Adaptation, and Reconstruction (Lewis, 2002; Agarwal & Ansell, 2016; Kirtley & O'Mahony, 2023; MacKay & Chia, 2013; Xu & Yan, 2014).

In this study, the researcher employed a binary division of patterns and selected Evolution (Incremental) and Revolution (Radical) Change as the chosen categories.

• Evolution Change:

Evolutionary strategies is a systematic approach aimed at enhancing innovation are less deliberate compared to either institutional or evolutionary approaches. Strategies that foster the evolution of innovation are crafted to enable the organization to surpass its

current capabilities by rendering boundaries ambiguous. They encapsulate the crucial notion that innovation is a tumultuous, probabilistic process (Mezias & Glynn, 1993).

It signifies a gradual, slow change, characterized by incremental progress occurring step by step and being reversible (Müller & Kunisch, 2018).

Incremental change doesn't fundamentally alter underlying organizational cultural beliefs or values. Instead, it involves making slight adjustments to how things are done, and the cause of these changes is easily recognizable by everyone, including reviewing and evaluating managers' roles, improvements in performance methods, completion of tasks, and changes in the organizational and functional structure through the adoption of technologies of technical-social systems, comprehensive quality management, and flexible work teams

This type of change impacts the roles of managers and entails minor shifts in tasks for other employees with relatively less resistance. Business management ideas (Archie P). **Strategic Change**. Viewed on 5/8/2023. (https://www.businessmanagementideas.com/strategic-management/strategic-change)

• Revolution Change:

The revolutionary approach to innovation encompasses deliberate endeavors to depart from the existing organizational paradigm and transcend the status quo to surmount innovation challenges. Firstly, revolution strategies explicitly acknowledge that certain crucial changes may remain elusive if one operates solely within the status quo. This may necessitate a shift in paradigms or organizational theories. Secondly, revolution strategies presuppose that resistance to change could hinder the successful implementation of innovations stemming from an institutionalized process (Mezias & Glynn, 1993).

This approach signifies a radical, transformational change. It entails a complete, fundamental, and irreversible transformation (Müller & Kunisch, 2018).

Transformational change does involve altering organizational cultural assumptions because it revolves around executing things differently or profoundly changing how things are done. The causes of such changes may not be clear to everyone, leading to heightened resistance levels.

It’s adopted by the company's management to drastically transform its goals, working methods, organizational structure, and strategy. This transformation is aimed at achieving the most effective response to environmental changes and addressing competitive pressures. It involves the adoption of methods such as re-engineering, restructuring, fostering creativity, embracing high-risk activities, fostering effective readiness for managing the great resistance to change.

Business management ideas (Archie P). Strategic Change. Viewed on 5/8/2023. (https://www.businessmanagementideas.com/strategic-management/strategic-change)

In conclusion, Evolution involves gradual and reversible shifts, while Revolution is considered swift and irreversible. Organizations frequently find themselves compelled to choose between these two approaches due to various internal and external influences. Although revolutionary change is often necessary, it may not always be the optimal choice. Organizations that have cultivated a culture of evolutionary change can navigate external shocks without necessitating radical transformations.

A firm can opt to either adopt incremental changes or embrace a revolutionary approach and proceed with it. Alternatively, they can combine these methods using a hybrid approach, wherein the revolutionary technique is initially applied followed by

evolutionary modifications. Guarav Roy (9/11/2021). Evolution Vs Revolution. Viewed on 5/8/2023 (https://www.sortlist.com/blog/evolution-vs-revolution).

2.1.3 Decision Support Systems DSS

The Evolution of Decision Support Systems DSS

Decision Support Systems (DSS) emerged alongside the expansion of computer usage. The evolution of DSS commenced in the late 1960s with the construction of model oriented DSS, followed by theoretical advancements in the 1970s. During the early and mid-1980s, the implementation of financial planning systems and DSS began. This was succeeded by the introduction of Web-based DSS in the mid-1990s, with continuous development up to the present day, particularly in the realms of technology and capabilities (Mohemad et al., 2010).

Arnott & Pervan (2015) state that over three decades of DSS history, it transitioned from a radical movement to a mainstream commercial IT movement embraced by all organizations. The term "decision support systems" was first introduced in a paper by (Gorry & Morton, 1971). The primary aim of DSS was to establish collaboration between human decision-makers and IT-based systems to solve problems. Until today, the objective of developing a decision support system is to enhance the effectiveness of decision-makers. DSS is viewed as a philosophy of information systems development and utilization, rather than just a technology.

Miah (2022) also affirms that the initial development of DSS was introduced in the 1970s, generating management information from the operating system. This era focused on basic data analysis and reporting. During that period, it was determined that DSS commonly relied on four components: model-based systems, databases, user interfaces, and user centrality.

All of the above demonstrates the evolution of DSS across various aspects, starting with an emphasis on simple foundational tools for data analysis. Over time, DSS advanced further by integrating visualization tools and incorporating Big Data analytics to facilitate more sophisticated decision-making.

Decision Support Systems DSS Concept:

DSS, a computerized information system, supports decision-making activities, encompassing various types such as communications-driven DSS, data-driven DSS, document-driven DSS, knowledge-driven DSS, and model-driven DSS. Each type possesses its own advantages and disadvantages, contingent on the complexity of the decision problem (Power, 2008).

DSS can be depicted as a Computer-Based Information System (CBIS) that interacts directly with data and analytical models, aiding decision-makers in addressing strategic challenges. DSS is a system designed not only to enhance productivity but also to lower costs, save time, elevate decision quality, and achieve overall effectiveness and efficiency in performance (Aldhmour & Eleyan, 2012).

It can also be defined as an interactive computer-based system or subsystem that aids decision-makers by employing communication technologies, data, documents, knowledge, and models to recognize and resolve problems, execute decision process tasks, and make informed choices (Arnott & Pervan, 2015).

Al Eid & Yavuz (2022) define decision support systems as systems that directly support the connection between digital technology and decision-makers within the organization, without the requirement for an information expert in the field. DSS is an interactive information system that operates to assist in making decisions in both structured and unstructured contexts. It offers superior information, models, and data manipulation tools,

facilitating online trade. It can assume various forms based on the business's specific needs (Miah, 2022).

Decision Support Systems DSS Objectives & Benefits:

DSS aids in recognizing problems, generating and evaluating alternatives, and ultimately selecting the optimal alternative for effective decision-making, steering clear of cognitive biases. It's regarded as a valuable support tool for fostering further development. Moreover, it offers evidence that the utilization of DSS contributes to enhancements in organizational performance (Aldhmour & Eleyan, 2012).

DSS plays a crucial role in transferring knowledge during the development process, with active engagement from stakeholders. It's an interactive tool that is user-friendly, easily updatable, and capable of providing access to information, analysis, and decision guidance. DSS aligns more effectively with end-users' decision-making processes. Its objective is to deliver multiple benefits, including elevated communication, collaboration, and learning among stakeholders and the development team. The aim is to implement best practices and exert a significant influence on management and policy (Allen & Warburton, 2017).

DSS supports decision-making across the management, operations, and planning levels of an organization by assessing the significance of uncertainties and trade-offs inherent in selecting one decision over another. DSS is categorized into five types based on their primary sources of information: communications-driven DSS, data-driven DSS, document-driven DSS, knowledge-driven DSS, and model-driven DSS (Al Eid & Yavuz, 2022).

The advantage of a DSS system is its ability to be programmed for generating a multitude of report types, all tailored to user requests. An additional objective of

utilizing DSS is to convey information to customers in a manner that is easily understandable. Moreover, DSS analyzes and synthesizes substantial amounts of data, helping in decision-making process. This data assists organizations in generating reports that could predict revenue, sales, or even facilitate inventory management. The outcomes it produces can vary based on the company's historical data and current inputs. Troy Segal (10/7/2022). Decision Support Systems what it is and how business use them. Viewed on 20/8/2023. https://www.investopedia.com/terms/d/decision-support-system.asp). DSS acts as a facilitator in arriving at ultimate decisions. It boosts productivity, accelerates processes, and improves the capacity to grasp and analyze various types of information, all of which collectively lead to optimal decision-making and effective problem-solving.

Differentiating the Roles of Business Analytics and Decision Support Systems in Strategic Decision Making

While there may be some similarities in the roles and objectives of Business Analytics and Decision Support Systems in supporting and enhancing decision-making, it is essential to clarify and differentiate their roles to better understand how each contributes to strategic decision-making and alleviate any potential confusion. It is also important to highlight that both Business Analytics and Decision Support Systems play complementary roles in strengthening the decision-making process and bridging the gap between digital technology and decision-makers. However, the decision to utilize either one of both depends on the organization’s capabilities and objectives. Generally speaking, Business analytics typically involve a collaborative effort between data scientists and decision-makers, providing analyzed data and valuable insights to facilitate the decision-making process for appropriate strategic changes. On the other hand,

Decision Support Systems offer a more comprehensive and specific approach to aiding decision-making real-time. DSS integrate various sources across departments and facilitates information sharing among decision-makers at all managerial level. This process includes problem identification, data analysis, generation of alternative solutions, selection of the best options, and support for real- time decision-making. DSS are designed to be users friendly, ensuring that they can be utilized by everyone within the organization for enhanced effectiveness and efficiency.

2.2 Previous Studies:

1- Aldhmour & Eleyan (2012) study entitles: **Factors influencing the successful adoption of decision support systems: The context of Aqaba special economic zone authority.**

This study aimed to examine the main factors which could affect the successful adoption of Decision Support Systems (DSS) in the Aqaba Special Economic Zone Authority (ASEZA).

This study is a quantitative one applied on Aqaba Special Economic Zone Authority (ASEZA) by distributing questionnaires to a sample of (161) respondents for collecting primary data and the response rate was about 79%. The results were analyzed using the Statistical Package for Social Software (SPSS), with an R2 of 35.3%, linear Multiple Regression analysis which showed that all variables have significant effect on successful adoption of DSS.

The result of this study also showed the importance of using DSS to decrease the lack of communication between top management & the managerial departments that affected in the same time the decision making process which lead to better

change in organization. This come along with our study purpose to use DSS as a moderator.

Dulcic et al., (2012) study entitled: **Evaluating the intended use of Decision Support System (DSS) by applying Technology Acceptance Model (TAM) in business organizations in Croatia**

This study aimed to investigate the intended use of DSS within medium and large business organizations in Croatia by applying Technology Acceptance Model (TAM). While many models suggested to explain and predict the benefit of using the information systems, TAM has been the only one which has got the biggest attention of information systems community. It was applied on managers of medium and large business organizations in Croatia. The questionnaire was analyzed through the SPSS statistical software.

The study results showed the importance of perceived usefulness and perceived ease of use as core factors which influence on the perception of using DSS to support management decision process.

According to the researcher of this study, the usage potential of DSS is still not a fully explored area, and it's not possible to analyze all of the relevant aspects in one paper. Nevertheless, the presented research and facts clearly show the trends and frameworks for the need and expansion of DSS in future.

2- MacKay & Chia (2013) study entitled: **Choice, chance, and unintended consequences in strategic change: A process understanding of the rise and fall of NorthCo Automotive**

This study aimed to examine how unclear view of processes which rise the chance and opportunities for organizations in environmental uncertainty is affecting the choice and adaptation of the best appropriate strategic change in (NorthCo Automotive)

This study was applied in (NorthCo Automotive) company by making 30 real-time semi structured interviews tracking the TMT over five years. Adding to that informal conversations with plant managers, designers, and engineers were made. Participants included the CEO, president, and VP finance, two successive VPs operations, and the VP human resources, VP marketing, and VP Sales. Direct observation relied on extensive note taking to ensure reliability. Internal documents, trade reports and collected media reports and news articles on changes in NorthCo's were used in this study.

Conclusion of this study showed the important role of social entities and various environmental forces that must be taken into consideration and the circumstances brought about by unowned change processes that can play a vital role in shaping organizational destiny.

3- Duan & Li (2015) study entitled: **Linking business analytics to decision making effectiveness: A path model analysis.**

This study aims to explore the appropriate mechanism of business analytics which can be used to improve decision-making effectiveness at the organizational level.

this study also tries to develop a research model linking business analytics to the organizational decision-making effectiveness.

The research model is tested using structural equation modelling based on questionnaires survey which distributed on different level of managers from UK businesses. 740 responses was collected.

The result of this study showed that business analytics, through the mediation of a data-driven environment, positively influences information processing capabilities, which in turn have a positive effect on decision-making effectiveness. Also showed how business analytics should be implemented to improve manager's knowledge and understanding to provide effective decision-making.

4- Müller & Kunisch (2018) study entitled: **Central perspectives and debates in strategic change research.**

This study aimed to shed light on strategic change, and to summarize and evaluate the findings across the deterministic, voluntaristic and dialectical perspectives.

This study is a qualitative one focused on studies published in peer-reviewed journals. And depended on a comprehensive analysis of 119 studies representing more than three decades of research on strategic change.

This study recommended that more researchers can adopt four pathways for future research across the three perspectives that they believe can help foster full understanding of strategic change: (1) examine the different types of strategic change, processes and outcomes; (2) expand the scope of actors which considered in relation to the strategic change; (3) explore the non-linear nature of the strategic change; and (4) investigate the strategic change conundrums.

5- Alasiri & Salameh (2020) study entitled: **The impact of business intelligence (BI) and decision support systems (DSS): exploratory study**

This study aimed to examine the importance of Businesses Intelligence and DSS and the organizational factors that influence the effective use of BI and DSS systems in organizations.

The researcher used the “University Library” and “Google Scholar” in order to find reliable articles with valid information. The researcher also went through more than 20 articles to find the relevant information. The literature review provides an opportunity to find the gaps in the existing research and determine an area for further research. MIS Quarterly’s MISQ review is one of the methods related to the literature review which was used to provide research in information systems.

The result of this study showed that the BI system can affect positively the decision support system. And how the decision-making process also affected by gathering vast amount of data and analyze it. DSS can support and add value to the organization’s performance and work to increase organizational control, personal efficiency, and the effectiveness of problem-solving. This consistent with our study to use the DSS as a moderator to affect the relation between the variables (BA and Strategic change).

6- Lepenioti et al., (2020) entitled study: **Prescriptive analytics: Literature review and research challenges.**

This study aimed to explore how business analytics can enable organizations to make quicker, better, and more intelligent decisions to create business value.

This study depended on literatures using the query term “prescriptive analytics”. The search was limited to include only journals, books and conferences

publications. We exclude any grey literature because their quality may vary and can affect the validity of results. The papers were selected to be reviewed according to the criteria of the literature review methodology.

The result of this study showed how prescriptive analytics which is one of BA levels, seeks to find the best course of action and outcomes for the business future. Also, how Prescriptive analytics is often considered as the next step towards increasing data analytics maturity and leading to optimized decision making ahead of time for business performance improvement which directly related to strategic change needed by organizations to survive and success.

Much research aimed to contribute to the business analytics field in order to enable organizations gain meaningful insights about their performance. It come with our study to use BA as one of its variables.

7- Al-Hamdani & Kadhim (2021) study entitled: **The effect of renewal and modernization.**

As an introduction to strategic change in organizational performance, field research in the Oil Projects Company

This study aimed to explore the impact of renewal and modernization on strategic change and to find the best solution of problems affecting the organization.

The study was applied on 196 managers from all managerial levels working in the Oil projects company in Baghdad. The number of samples was 85 managers.

The results showed that there is a correlation and impact of renewal and modernization on strategic change and organizational performance.

The researcher recommended to have more studies on this topic especially in Oil Company to enhance the effective performance. Also, in other companies in the same and other sectors.

8- Mikalef, & Krogstie,(2020) study entitled: **Examining the interplay between big data analytics and contextual factors in driving process innovation capabilities**

This study aimed to find how big data analytics can impact a firm's incremental and radical process innovation capabilities. This study was ground on a theory-driven conceptualization of big data analytics based on the resource-based view (RBV) of the firm. Based on this conceptualization, the fit was examined between the big data analytics resources that underpin the notion, and their interplay with organizational contextual factors in driving a firm's incremental and radical process innovation capabilities. Survey data from 202 chief information officers and IT managers working in Norwegian large firms are analyzed by means of fuzzy set qualitative comparative analysis (fsQCA).

Results showed that the significance of big data analytics resources will vary under different contextual factors, and with a specific configuration which led to high levels of incremental and radical process innovation capabilities.

Complementary study needed to adopt a qualitative approach which will reveal more insight on how value is produced from such investments through a process perspective. Also, it would have been preferable to benchmark outcomes in relation to objective measures.

9- Duan & Edwards (2020) study entitled: **Understanding the impact of business analytics on innovation.**

This study aimed to address the gap between Business Analytics and innovation, and to examine the use of absorptive capacity theory to inform the development of a research model.

The study model tested by a questionnaire survey of 218 UK businesses by using a seven-point Likert scale. The targeted sample was the senior managers.

The results of this study showed that there is a positive impact of business analytics on innovation and explain the pivotal roles of environmental scanning and data-driven culture. Also, the role of Business Analytics for the needed changes in both external and internal challenges of organizations.

This study recommended to make more studies to explore and identifying appropriate approaches, techniques and methodologies to effectively address challenges and attain optimal outcomes and including BA as one of these techniques to determine its important role on affecting different aspect and sectors.

10- Kamariotou et al., (2021) study entitled|: **Digital strategy decision support systems: Agrifood supply chain management in SMEs.**

This study aimed to identify the stages of the information systems planning (ISP) process and examine its effect on the success of developing a strategic decision support system (DSS) in order to improve the decision-making process in the agrifood supply chains.

Data were collected from Greek (SMEs) depending on 66 IT executives and then analyze it using regression analysis.

The results showed that situation analysis is the only stage of ISP that predicts ISP success, and that DSS assist managers in appreciating the role of ISP for improving the performance of business.

This study recommended for further research to broaden the sample and compare the findings of this article to those of other companies that operate in different sectors and countries. It also recommended to focus on DSS for future different DSS models that will be developed to involve digital tools which depends on environmental changes and a company's data requirements.

11- Baryshnikova et al. (2021) study entitled: **Enterprises' strategies transformation in the real sector of the economy in the context of the COVID-19 pandemic.**

This study aimed to assess the changes in the economic behavior of business during crises such as the COVID-19 pandemic, for analyzing the business practices in adapting different functional strategies towards risks, and to determine the directions related to transforming these functional strategies.

This study showed how pandemic, crises and numerous threats highlighted problems in the ability of companies to adapt and learn quickly in order to survive in a rapidly changing competitive environment.

This study was applied on companies from different industries without mention details about it.

The result of this study explained that any crisis motivates forces companies to reconsider their objectives and restructure their business models. And how the speed of decision-making has become the most important factor determining the sustainability of operations and the survival of the company.

12- Al Eid & Yavuz (2022) study entitled: **The Effect of Using Decision Support Systems Applications and Business Intelligence Systems in Making Strategic Decisions: A Field Study in the City of Gaziantep**

This study aimed to study the importance of business intelligence systems and decision support systems and to study the impact of the dimensions of decision support systems and business intelligence in making strategic decisions for Syrian civil society organizations.

The data was collected by a survey, but 100 correct answers were used to analyze the data. The study data were analyzed by using SPSS and SmartPLS 3 software. The results showed support for the seven hypotheses: the decision support systems and business intelligence are available in Syrian civil society organizations in the city of Gaziantep.

The result showed that there is a strong positive relation between business intelligence and decision support systems which affect in the same time the strategic decisions making.

This study recommended to make more research about the relation between BI or BA with DSS with different variables and in other sectors. This come with our study to enhance the tangible influence of Business Analytics (BA) on Strategic

Change, and to clearly identify a moderator for this relationship which is Decision Support Systems (DSS).

13- Chen et al., (2022) study entitled: **IT-business alignment, big data analytics capability, and strategic decision-making: Moderating roles of event criticality and disruption of COVID-19**

This study aimed to examine the importance of IT-business alignment (ITBA) and big data analytics capability (BDAC) to support the strategic decision-making in organizations under crises and abnormal circumstances.

This study based on two-round by distributing a five-item scale questionnaire. the survey data collected from 175 Chinese firms. It targeted senior managers of each firm (executive manager, marketing manager, and CEO).

The results indicated that the event of COVID-19 strengthens the effects of ITBA on decision speed and quality but in the other side of BDAC it weakened the influence on decision quality. Also the event disruption weakened the influence of ITBA on decision speed and quality but strengthens the effect of BDAC on decision speed and quality.

Adding to that it showed how BDAC plays a critical role in dealing with uncertain and competitive environments to better affect the strategic decision making.

14- Miah (2022) entitled study: **Impact of Business Analytics and Decision Support Systems on e-commerce in SMEs.**

This study aimed to analyze and investigate the impact of business analytics and decision support systems on e-commerce in small and medium enterprises that investigate.

This study is a qualitative study adopted the descriptive analysis approach which depended on different various scholars who adopted different plans and strategies to predict the relationship between e-commerce and business analytics.

Despite the contribution of this study to the literature and providing a comprehensive understanding of its relationship with the decision support system.

The research also highlights some limitations and provide recommendations of using other mediating factors and variables other than just connecting (business analytics and decision support systems) alone. Also, should further research this topic by continuously studying variations in business analytics and decision support systems in other sectors.

15- O'Brien et al., (2022) study entitled: **State of the art review of Big Data and web-based Decision Support Systems (DSS) for food safety risk assessment with respect to climate change**.

This study aimed to analyze the important role of using DSS and Big Data to make better decisions on food safety, especially with the evolving issue of climate change. Large amounts of data are being generated worldwide which can directly and indirectly linked to food safety. It aimed to assist agri-food researchers and stakeholders in taking initiatives insights on the application of Big Data and web-based DSS for food safety, which would relieve challenges and facilitate the Big Data implementation in the food safety risk assessment while considering the possible effects arising from climate change.

The articles were collected from a combination of researches from four literature databases: Web of Science, Scopus and Science Direct and Google Scholar from 1995 to 2021. At the end 92 relevant article were taken and used in this study.

This study aligns with our study in solidifying the central role of DSS in informed Strategic decision-making and achieve the appropriate Strategic Change.

This study advocated for a reorientation of studies on strategic change to determine the most effective strategic change levels and processes by using DSS. And to select the most effective strategies for navigating dynamic environmental changes.

16- Iberaheem (2023) study entitled: **The Role of Business Analysis in Strategic Planning: Discuss How Business Analysis Contributes to the Strategic Planning Process in Businesses.**

This study aimed to discuss the essential role that business analysis plays in strategic planning, by focusing on helping the organizations to understand their current position, envision potential future scenarios, and determine better path in order to achieve the business objectives. The methodology of this study depended on comprehensive literature review and analysis of existing theories, models, and case studies regarding the business analysis and strategic planning. The results showed that organizations need to strongly integrate the business analysis into their strategic planning process in order to achieve their objectives and gain a competitive edge. Also showed that business analysis is not an optional but an essential aspect of strategic planning.

The study recommended for further exploration and investigation. The limitations of the current study provide a need for future research, pushing the boundaries of knowledge in the aspect of business strategy.

17- Kloub (2023) study entitled: **the matching between competitive pressure strategies and competitive environment: strategic vigilance as mediator variable in food import companies in Jordan.**

This study aimed to investigate the level of the matching between competitive pressure strategies and competitive environment using strategic vigilance as mediator variable in food import companies in Jordan.

It was applied on five large companies and the sample population was (421) of mangers. A questionnaire was used as valid tools for measuring the study variables and the analysis of data was done by using descriptive and inferential statistical methods.

The result of this study showed that level of dependent and independent variable with all its dimensions in high, while in the moderator variable the level is medium, and that there is a correlation and an effect between competitive pressure strategies and competitive environment with the presence of strategic vigilance as mediator variable.

This study recommended to expand the research and stressed the criticality of directing attention towards the food sector considering the important role of this sector in affecting the Jordanian economy.

18- Kirtley & O'Mahony (2023) study entitled: **What is a pivot? Explaining when and how entrepreneurial firms decide to make strategic change and pivot.**

This study aimed to examines how entrepreneurs lacking making the appropriate and needed investments in their organizations in early stages. Also, to decide when and how to change their strategies and what constitutes a pivot.

This study used a longitudinal, qualitative field study to examine the triggers to strategic decisions. It was applied on seven entrepreneurial firms in their early stage which specialized in developing hardware in the energy and cleantech sector. All firms employed three people at the time of entering to the study. First author conducted 82 semi-structured interviews consist of top management team, board members, engineers, investors, and other advisors involved in strategic decisions at each firm. This was done over a one to three-year period. Data analysis was done in six phase, inductive and iterative theory building process.

The result of this study showed the important of entrepreneurial action to found opportunity and how it is initiated by getting knowledge about a specific opportunity and belief on having the ability to capture it. It also showed how most theories of strategic change mentioned the importance of firms to invest in their existing capabilities in order to recognize the need for strategic change and how entrepreneurs lacking to make the decision in early stages and to decide when and how to change their strategies. This come with our study objectives to focus on strategic change in all its aspect.

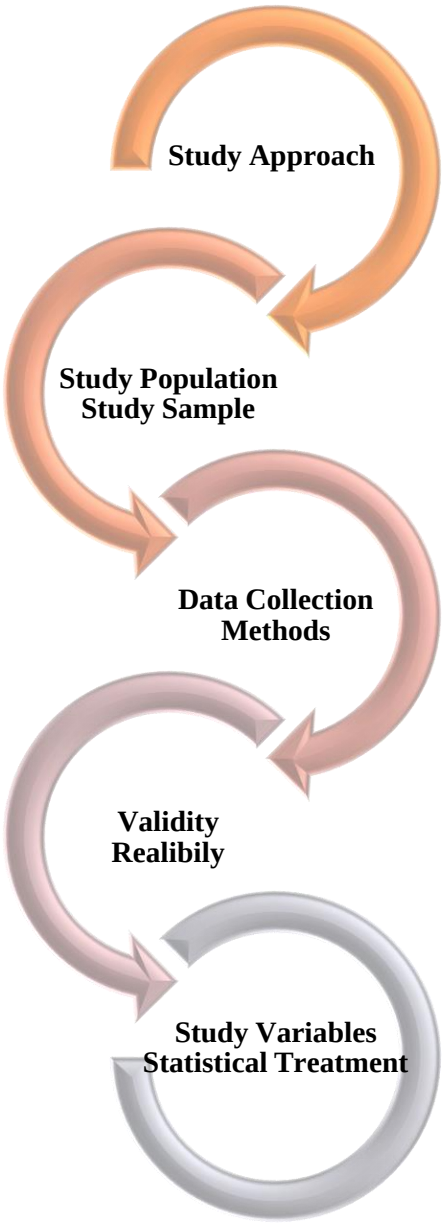
2.3 What makes the current study stand out from previous studies?

This study aims to distinguish itself by utilizing variables used in the previously mentioned studies where they have shown effective. However, they are being used in a distinct manner that aligns with the objectives of the study. The study approach aims to provide a fresh perspective on their impact and enhance the overall analysis. The domain of business analytics, with its three levels (descriptive, predictive, and prescriptive), has been selected as the focal point to explore its potential influence on two types of Strategic Change: Evolution and Revolution. Recognizing gaps in existing knowledge this study aims to emphasize aspects that prior studies have overlooked and investigate the role of Decision Support Systems as a moderator to yield a positive impact that enhances decision-making for strategic changes and narrows the existing knowledge gaps. The anticipated findings hold the promise of enriching the knowledge landscape for future studies. The study is situated within the Arab region, where these particular variables have not been studied together previously. Furthermore, our investigation is centered on a pivotal sector – the Food Import Sector – renowned for its substantial influence on the global economy, notably within Jordan. A unique aspect of our study lies in the inclusion of all three administrative levels (Top, Middle and First-Line Management) setting it apart from prior researchs.

Chapter Three

Methodology (Methods and Procedures)

Figure 3.1: Work plan for the Third Chapter



This chapter comprises the methodology of the study, the population and the sample under consideration, methods employed for data collection, reliability and validity of the study sample, variables of the study, and additional details regarding the statistical processes. Additionally, it outlines the procedures that the researcher used to achieve the outcomes.

3.1 Study Approach:

The current study is a causal quantitative one. It adopts the descriptive analytical method, which is studying reality, phenomena, or scientific problems as they exist in real life. The approach aims to arrive at clarifications supported by logical evidence and observable data, providing the researcher with the ability to develop specific frameworks for addressing the identified problem.

3.2 Study Population:

This study was applied to six large food import companies in Amman. The selection of large companies was based on their characterized significant size, with the number of employees ranging from 500 or more and a capital exceeding 10 million Jordanian dinars. The population under consideration in this study comprises the field of mangers in these companies. Table (3.1) shows the participant companies and employees number which agrees with the study requirements to be considered large companies. The capital and the details of each managerial level are hidden at the request of participant companies.

Table (3.1) Incorporated Large Food Import Companies in Amman

No.	Company Name	Employees No.
1	AlTAHOONEH CHICKEN دجاج الطاحونة	1150
2	JORDINA جوردينا	1827
3	Anabtawi حلويات عنبتاوي	600
4	Castania كاستانيا	500
5	The Jordanian Dairy Company شركة الالبان الاردنية	520
6	MEDICA مديكا	500

Source: Amman chamber of commerce data, the selected companies' management, and companies control department (2023)

There are many food import companies in Amman-Jordan, however, they lack the fundamental requirements needed by the researcher to utilize to achieve the study's goals. These companies vary in size, capital and the extent to which they use Decision Support Systems (DSS) in their business operations. Therefore, the researcher purposively chose six large companies that also expressed its willingness to cooperate.

The requirements of the current study were identified as follows:

1- These companies operate in the food import sector in Amman, playing a distinctive, strategic, and important role in the Jordanian economy. They significantly contribute to achieving Jordanian national food security and play a vital role in meeting the growing nutritional needs of society under all circumstances.

2- The size of these companies ensures an adequate number of sample members required to complete the questionnaire.

3- These companies necessitate such a study more than others because their capital exceeds 10 million JD, and operations and commercial deals are of a big scale.

4- These companies already utilize or implement Business analytics and Decision Support Systems.

Figure No. (3.2) Sampling steps for Study Population and Sample Determination, which shows that the study population is 490 and its distributed across three administrative levels: Top, middle and first line management. All numbers are based on data from the Amman chamber of commerce, the management of the selected companies, and the companies' control department. With reservation of the stratum details of each company upon their request.

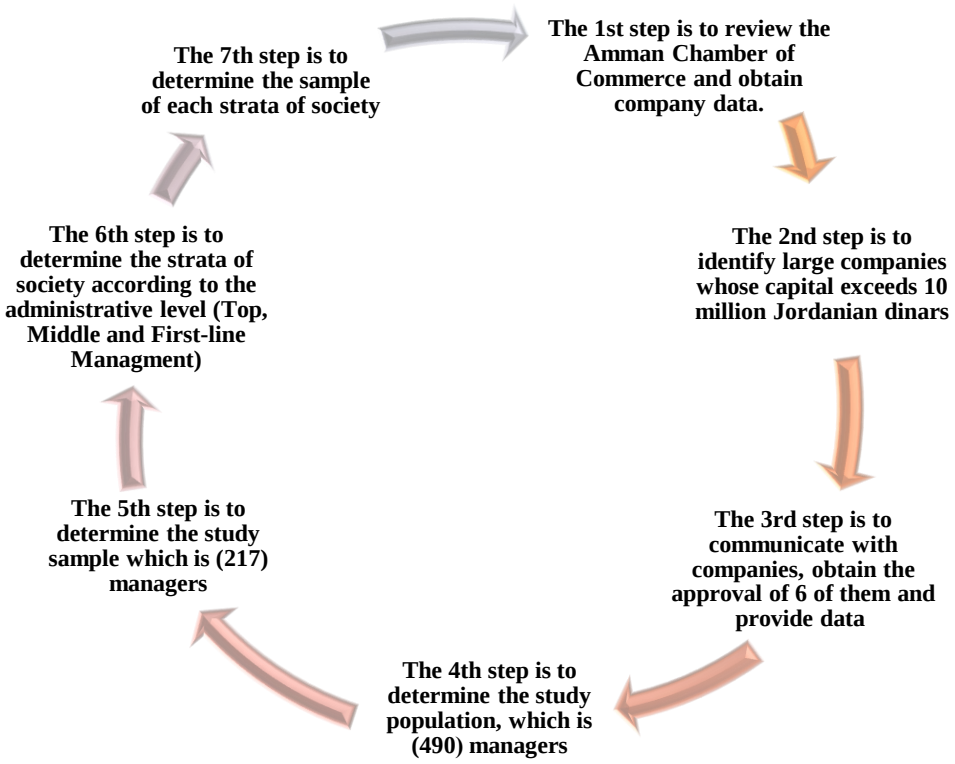


Figure 3.2: Sampling steps for Study Population and Sample Determination

Source: The researcher design as per Amman Chamber of Commerce

3.3 Study Sample:

Data were collected from the field of mangers in Food Import Companies in Amman and was selected through the Proportional Stratified Random Sampling method. The sample size for this study comprises 217 managers from the three management levels according to (Sekaran & Bougie, 2016).

Table (3.2) displays the specifics of the study population, its sample size, and samples within each stratum.

Administrative Level	Population (1)	Sample (2)	Strata Size (3)	Strata Sample 2*3/1 (4)
Top Management	490	217	78	34
Middle Management	490	217	162	72
First-Line Management	490	217	250	111
Total			490	217

Table (3.2) Details of the study population, its sample, and samples within each stratum

Source: Amman chamber of commerce data, the selected companies' management, and companies control department (2023)

3.4 Data Sources:

The data utilized to achieve the goals of this study can be categorized into two types: secondary and primary data.

Secondary data: Secondary data were gathered from researches, theses, and Worldwide Web.

Primary data: Primary data were gathered using a questionnaire that is designed in three parts and defined by three variables - Business Analytics, Decision Support Systems and Strategic Change, and was distributed on Food Import Companies to collect data and information beside several telephone calls and few meetings with key managers.

Table (3.3) The number of questions and its references

Variables	Variables Dimensions	References
Independent Variable **Business Analytics**	**Descriptive** (10 questions) **Predictive** (10 questions) **Prescriptive** (10 questions)	• **Cao et al. (2015)** • **Duan, & Edwards (2020)** • **Al Eid & Yavuz (2022)** • **Mikalef & Krogstie (2020)**
Dependent Variable **Strategic Change**	**Evolution Change** (12 questions) **Revelation Change** (12 questions)	• **Müller & Kunisch (2018)** • **Mikalef & Krogstie (2020)** • **Laine & Galkina (2017).** • **Al-Hamdani & Kadhim (2021)**
Moderator Variable **Decision Support Systems**	(12 questions)	• **Eid & Yavuz (2022)** • **Dulcic et al. (2012)**
	Total questions (66)	

3.5 Validity Test:

3.5.1 Face validity:

In order to assess the face validity of the research, the questionnaire was submitted to nine expert arbitrators from the Department of Business Administration, as indicated in Appendix (1), to gather their insights on the rationality of the questionnaire's content, clarity, relevance of questions, and the suitability of phrases to the scale. According to expert opinions, 18 questions were rejected due to lack of clarity, difficulty in measurement, and ambiguity. Additionally, some questions were modified for clarity, and amendments were made to address similarity of meaning with other questions. The researcher considered the experts' opinions and implemented the necessary changes to enhance the validity of the questionnaire's content, ensuring coherence and diversity of questions. After these modifications, the semi-final number of questionnaire items became 48, as illustrated in Table (3.4)

Table (3.4) Face validity of questionnaire paragraphs

Main Variable	Dimension Variable
Business Analytics Independent Variable	Descriptive: (6) questions Predictive: (6) questions Perspective: (6) questions
Strategic Change Dependent Variable	Evolution Change: (9) questions Revolution Change: (9) questions
Decision Support Systems Moderator Variable	(12) questions
Total	48 questions

3.5.2 Construct Validity

Confirmatory Factor Analysis

This analysis was performed using SPSS v27 and SMART PLS-4.

SPSS v27: (Statistical Package for the Social Science) Is a software package used for the analysis of statistical data, cause and effect relation, Hierarchical multiple regression analysis.

SMART PLS-4: Is a tool for structural equation modelling used for CFA (Confirmatory Factor Analysis)

Table (3.5): CFA analysis for the Independent Variables

Dimensions	Code	Factor loading	AVE	$\chi 2$	Sig	CFI (0 – 1.00)	GFI (0 – 1.00)	RMSEA (0 – 0.08)
IV-1 - Descriptive Analytics	DA.1	0.783	0.52	145.426	0.20	0.992	0.926	0.023
	DA.2	0.671						
	DA.3	0.744						
	DA.4	0.718						
	DA.5	0.699						
	DA.6	0.705						
IV-2- Predictive Analytics	PREDA.1	0.688	0.51					
	PREDA.2	0.718						

	PREDA.3	0.712						
	PREDA.4	0.730						
	PREDA.5	0.697						
	PREDA.6	0.701						
IV-3- Prescriptive Analytics	PRS.1	0.753	0.52					
	PRS.2	0.710						
	PRS.3	0.712						
	PRS.4	0.725						
	PRS.5	0.736						
	PRS.6	0.697						

The results of the Confirmatory Factor Analysis (CFA) for the different dimensions provide valuable insights into the validity and fit of the proposed model. In the dimensions of Business Analytics (BA), all factor loading values (DA.1 to DA.6) surpass the conventional threshold of 0.40, indicating robust convergent validity. Notably, factor loading values range from 0.671 to 0.783, reflecting strong associations between the observed items and the latent construct, where factors loading more than 0.40 are acceptable (Hair et al., 2010). Similarly, for the Predictive Analytics (PREDA), Prescriptive Analytics (PRS), the IV dimensions reveal consistent patterns of strong

factor loadings, meeting criteria for convergent validity. The Average Variance Extracted (AVE) for the dimension's ranges from 0.51 to 0.52 and meets the recommended criterion, confirming convergent validity. However, the chi-square test ($\chi 2$) value of 145.426 is statistically not significant (Sig = 0.2), suggesting a good fit in the model according to recommended guidelines (Hair et al., 2010). Moreover, the high Comparative Fit Index (CFI) of 0.992 and Goodness of Fit Index (GFI) of 0.926, along with a Root Mean Square Error of Approximation (RMSEA) of 0.023 slightly below the threshold, where it should be below 0.05, collectively indicate an overall acceptable fit for the Business Analytics dimensions. These findings collectively suggest a generally sound model (Hair et al., 2010)

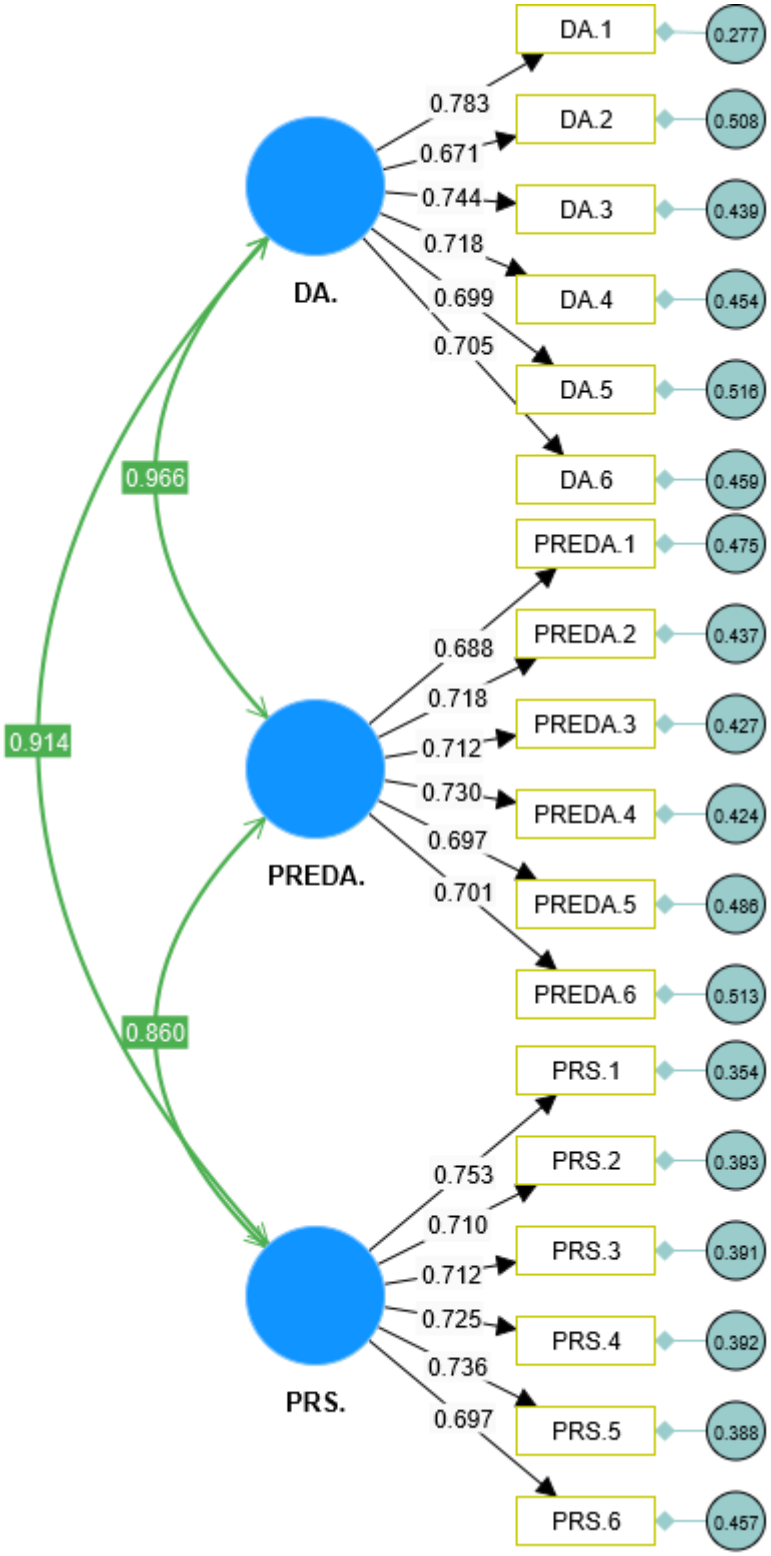


Figure 03.4: Construct Validity of Independent Variable Business Analytics

Table (3.6): CFA analysis for the Dependent Variables

Dimensions	Code	Factor loading	AVE	$\chi 2$	Sig	CFI (0 – 1.00)	GFI (0 – 1.00)	RMSEA (0 – 0.08)
DV -1- Evolution Change	EVO.1	0.711	0.513	132.373	0.524	0.998	0.930	0.001
	EVO.2	0.668						
	EVO.3	0.736						
	EVO.4	0.742						
	EVO.5	0.723						
	EVO.6	0.728						
	EVO.7	0.699						
	EVO.8	0.718						
	EVO.9	0.720						
DV-2- Revolution Change	REVO.1	0.719	0.516					
	REVO.2	0.719						
	REVO.3	0.760						
	REVO.4	0.701						

	REVO.5	0.727						
	REVO.6	0.732						
	REVO.7	0.687						
	REVO.8	0.721						
	REVO.9	0.694						

The results of the Confirmatory Factor Analysis (CFA) for the different dimensions provide valuable insights into the validity and fit of the proposed model. In the dimension of Strategic Change (SC), all factor loading values of Evolution Change (EVO.1 to EVO.9) surpass the conventional threshold of 0.40, indicating robust convergent validity. Notably, factor loading values range from 0.668 to 0.742, reflecting strong associations between the observed items and the latent construct, where factors loading more than 0.40 are acceptable (Hair et al., 2010). Similarly, for the Revolution Change. The DV dimensions reveal consistent patterns of strong factor loadings, meeting criteria for convergent validity. The Average Variance Extracted (AVE) for the dimensions are 0.513 and 0.516, meets the recommended criterion, confirming convergent validity. However,

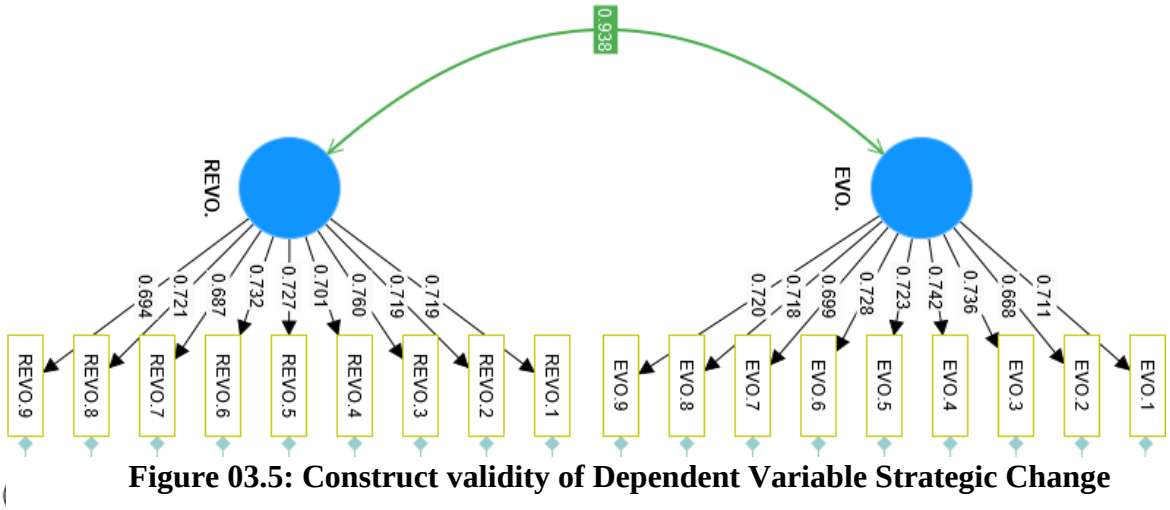


Figure 03.5: Construct validity of Dependent Variable Strategic Change

the chi-square test ($\chi 2$) value of 132.373 and is statistically not significant (Sig = 0.524), suggesting a good fit in the model according to recommended guidelines (Hair et al., 2010). Moreover, the high Comparative Fit Index (CFI) of 0.998 and Goodness of Fit Index (GFI) of 0.930, along with a Root Mean Square Error of Approximation (RMSEA) of 0.001 slightly below the threshold, where it should be below 0.05, collectively indicate an overall acceptable fit for the Strategic Change dimensions. These findings collectively suggest a generally sound model (Hair et al., 2010).

Table (3.7): CFA analysis for the Moderating Variables

Dimensions	Code	Factor loading	AVE	$\chi 2$	Sig	CFI (0 – 1.00)	GFI (0 – 1.00)	RMSEA (0 – 0.08)
W - Decision Support Systems	DSS.1	0.731	0.512	79.497	0.104	0.978	0.936	0.049
	DSS.2	0.734						
	DSS.3	0.682						
	DSS.4	0.734						
	DSS.5	0.716						
	DSS.6	0.694						
	DSS.7	0.685						
	DSS.8	0.726						
	DSS.9	0.722						
	DSS.10	0.722						
	DSS.11	0.719						
	DSS.12	0.723						

The results of the Confirmatory Factor Analysis (CFA) for the different dimensions provide valuable insights into the validity and fit of the proposed model. In the moderating

variable Decision support systems (DSS), all factor loading values (DSS.1 to DSS.12) surpass the conventional threshold of 0.40, indicating robust convergent validity. Notably, factor loading values range from 0.682 to 0.734, reflecting strong associations between the observed items and the latent construct, where factors loading more than 0.40 are acceptable (Hair et al., 2010). In which reveals consistent patterns of strong factor loadings, meeting criteria for convergent validity. The Average Variance Extracted (AVE) for the dimensions are 0.512 meets the recommended criterion, confirming convergent validity. However, the chi-square test ($\chi 2$) value of 79.497 and is statistically not significant (Sig = 0.104), suggesting a good fit in the model according to recommended guidelines (Hair et al., 2010). Moreover, the high Comparative Fit Index (CFI) of 0.978 and Goodness of Fit Index (GFI) of 0.936, along with a Root Mean Square Error of Approximation (RMSEA) of 0.049 slightly below the threshold, where it should be below 0.05, collectively indicate an overall acceptable fit for the DSS variable. These findings collectively suggest a generally sound model (Hair et al., 2010).

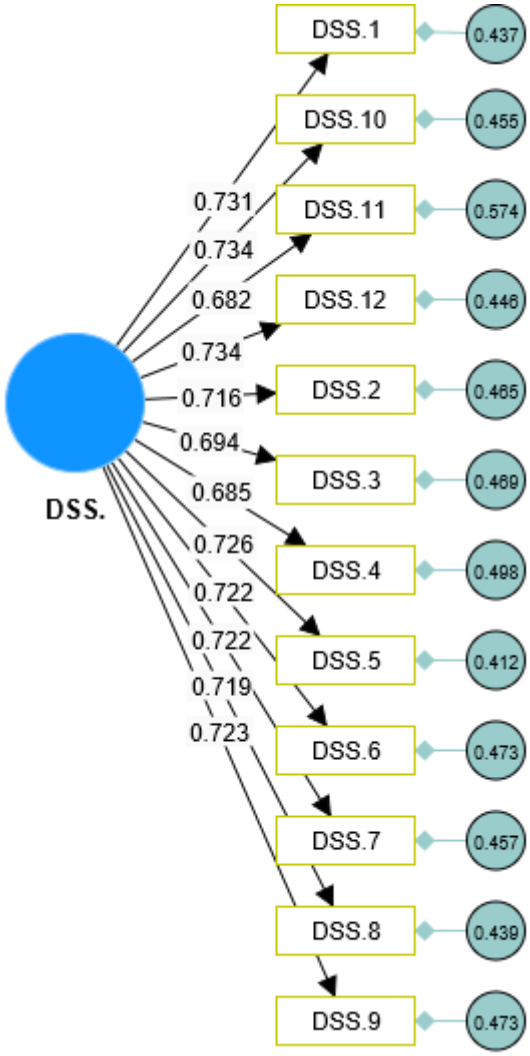


Figure 3.6: Construct Validity of Moderator Variable Decision Support Systems

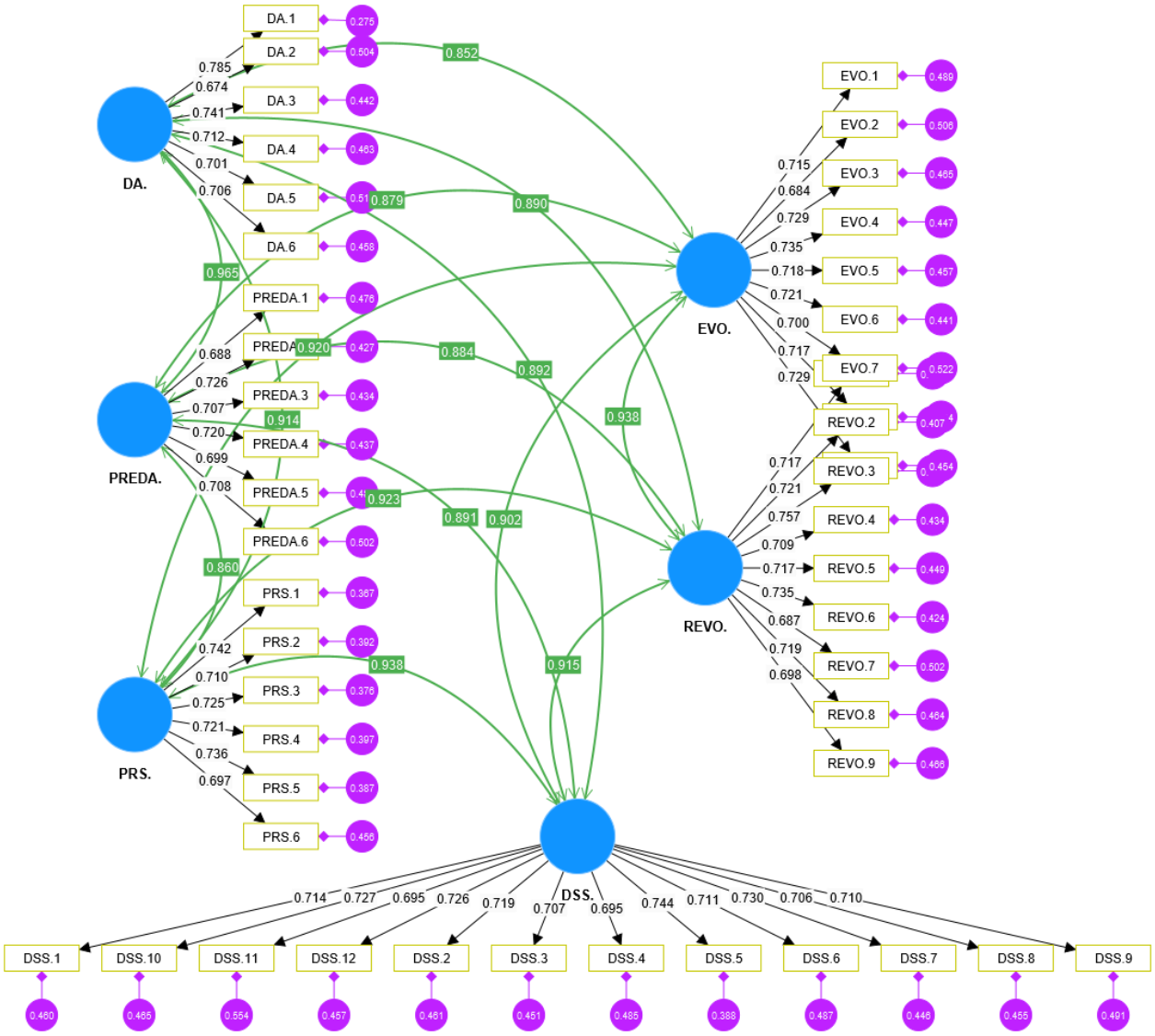


Figure 3.7: Construct Validity of All variable

3.6 Reliability Test:

Reliability was founded in two technique; Reliability test (Cronbach's alpha coefficients of internal consistency) which were used to test the consistency and suitability of the measuring tools, also Composite Reliability CR.

Cronbach's alpha reliability Analysis:

Table (3.8): Cronbach's alpha Reliability Test

No.	Variables	No. of Items	Cronbach Alpha Values	Composite reliability CR
1	Descriptive Analytics	6	0.865	0.864
2	Predictive Analytics	6	0.857	0.858
3	Prescriptive Analytics	6	0.867	0.867
4	Evolution Change	9	0.904	0.905
5	Revolution Change	9	0.905	0.905
6	Decision Support Systems	12	0.926	0.926

The reliability tests for the study variables reveal high internal consistency. The Cronbach's Alpha values for each variable range from 0.857 to 0.926, indicating strong reliability. Additionally, the Composite Reliability values closely align with Cronbach's Alpha values, further confirming the robustness of the measurements. The variables, each measured with a set number of items, consistently demonstrate excellent internal consistency, emphasizing the reliability and trustworthiness of the measurement instruments employed. Overall, these results suggest that the constructs under investigation are reliably and consistently measured, enhancing the credibility of the study's findings and conclusions. (Hair et al., 2010).

Thus the questionnaire in its final form consisted of 48 paragraphs as shown above in Table No. (3.4)

3.7 Distribution of the questionnaire:

An electronic questionnaire has been established to facilitate the distribution process. The questionnaires totaling 225, were distributed across the three administrative levels:

Top, middle- and first-line management, in Food Import Companies in Amman. A total of 187 completed questionnaires were retrieved and validated for analysis.

3.8 Sample Analysis:

Demographic Analyses

Table (3.9): Gender

Gender	Frequency	Percent
Male	134	71.7
Female	53	28.3
Total	187	100.0

Table No. (3.9) provides a gender distribution within the sample of 187 participants, with 71.7% males and 28.3% females, highlighting a notable gender imbalance in the study.

Table (3.10): Educational level

Education	Frequency	Percent
Bachelor	133	71.1
High Diploma	6	3.2
Masters	43	23
Ph.D.	5	2.7
Total	187	100

Table (3.10): Educational Level presents the educational distribution of 187 participants, with the majority holding a bachelor's degree (71.1%), followed by Masters (23%), High Diploma (3.2%), and Ph.D. (2.7%). This highlights the predominantly undergraduate education level in the sample.

Table (3.11): Experience

Experience	Frequency	Percent
16 years & above	30	16
11 - 16 years	42	22.5
6 - 11 years	39	20.9
Less than 6 years	76	40.6
Total	187	100

Table (3.11): Experience reveals the distribution of participants based on their work experience, with 40.6% having less than 6 years, 20.9% within the 6 to less than 11 years range, 22.5% between 11 and less than 16 years, and 16% having 16 years and above. These results provide insights into the diverse professional experience of the sample.

Table (3.12): Managerial Level

Managerial Level	Frequency	Percent
First-Line Level Management	95	50.8
Middle-Level Management	62	33.2
Top-Level Management	30	16.0
Total	187	100.0

Table (3.12): Managerial Level illustrates the distribution of participants across managerial tiers, with 50.8% in First-Level Management 33.2% in Middle-Level Management, and 16% in Top-Level Management. These results offer a snapshot of the hierarchical representation within the sample.

3.9 Statistical Tools

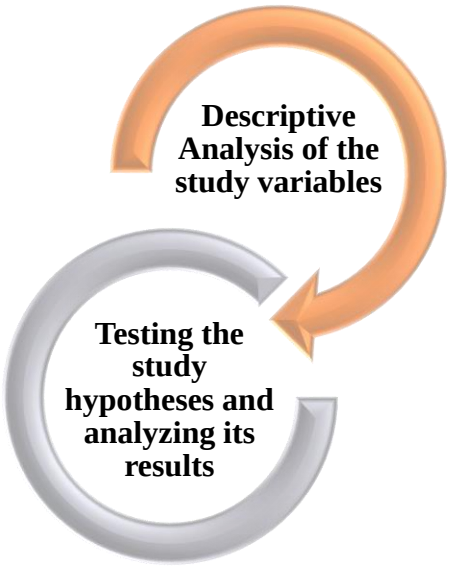
- Frequencies and percentages to explain the characteristics of sample.
- Means: to evaluate the degree of agreement on the sub questions of the independent, dependent and mediator variables.
- Standard deviations to explain the variability of the respondents' answer to the sub questions of the independent, dependent and mediator variables.
- Cronbach's alpha to evaluate the reliability of every item of the independent, dependent and mediator variables and therefore the composite reliability (CR).
- Confirmatory factor analysis explores the loadings on the predefined components (latent variables).
- One sample t test to estimate the differences between the questions means from the theoretical mean.
- Normal distribution tests Shapiro-Wilk
- Multicollinearity test VIF and Tolerance.
- Test the first hypothesis and its sub-hypotheses using the structural equation model.

- Structural Equation model SEM Modeling model using SMART-PLS 4 software.
- Test the second hypothesis and its sub-hypotheses using Hierarchical multiple regression analysis.

Chapter Four

Data Analysis and Results

Figure 4.1: Work plan for the Fourth Chapter



The main purpose of the current study was investigating the impact of Business analytics on Strategic Change with the presence of Decision Support Systems as a moderator in Food Import companies in Amman –Jordan. In accordance with this main objective a related questions and hypotheses were developed to embody these objectives. The researcher will present the analysis of descriptive statistics in the first part then testing the formulated hypotheses in the second part.

4.1 First part: Descriptive Analysis of the study variables

Means and standard deviations were conducted for all variables as below:

The following formula was used to assign the means levels:

Category Length = 5 (highest weight) – 1 (lowest weight) /3 (No. of categories)

Category Length = 1.33

Based on the processing, the degree of implementation was determined according to the following:

Low level: It includes a group of items that have less than 2.34. (Since Category length + lowest weight = 1.33 + 1 = 2.33, where the first degree (1-2.33).

Medium level: It includes a group of items whose mean arithmetic ranges between 2.34 -3.66. (Since 2.33 + 1.33 = 3.66, where the second degree (2.34 -3.66).

High level: It includes the paragraphs that have averages greater than 3.66. (Since 3.66 + 1.33 = 5, where the third approval degree (3.67-5).

4.1.1 Business Analytics (Independent Variable)

Table (4.1): Means for the Dimensions of Business Analytics

Business Analytics	Mean	Rank	Level
Descriptive Analytics	3.62	1	Moderate
Predictive Analytics	3.60	2	Moderate
Prescriptive Analytics	3.52	3	Moderate
Business Analytics	3.58	Moderate	

Table (4.1) outlines rankings and levels for Business Analytics dimensions, indicating Descriptive Analytics as the highest-ranked (1) with a mean of 3.62 and its level is "Moderate." Predictive Analytics follows closely (Rank 2), and Prescriptive Analytics is ranked third. The overall Business Analytics composite, with a mean of 3.58, is also classified as "Moderate," suggesting a balanced and moderately consistent performance across the dimensions.

This can be confirmed based on referring to the questionnaire paragraphs which included all the needed tools and methods related to all Business Analytics Dimensions, but showed how these companies differ in providing and utilizing it, and how they need to focus on some aspect more and ensure having and utilizing all tools and methods in a way suits their objectives and capabilities in order to achieve better strategic decisions which lead also to change in the future.

Descriptive Analytics

Table (4.2): Means, Standard Deviations Test For the Descriptive Analytics

No.	Items	Mean	Std. Deviation	Rank	t	Level
1	The company's management relies on data to diagnose problems	3.63	0.85	3	26.86	Moderate
2	The company's management maintains thorough documentation of all its activities in dedicated databases	3.60	0.96	5	23.33	Moderate
3	The company's management uses graphic shapes to describe data	3.63	0.99	2	23.00	Moderate
4	The company's management utilizes the mean for data analytics	3.58	0.97	6	22.76	Moderate
5	The company's management employs frequencies for data analytics	3.68	1.01	1	23.34	High
6	The company's management incorporates deviations in their decision making	3.61	0.96	4	23.56	Moderate
	General Mean	3.62				Moderate

In Table (4.2) on Descriptive Analytics, the highest mean is found for Item 5: "The company's management employs frequencies for data analytics" (Mean = 3.68), indicating a "High" level, and supported by a significant t-value of 23.34. This suggests a notable reliance on frequency-based analytics. Conversely, the lowest mean is

associated with Item 4: "The company’s management utilizes the mean for data analytics" (Mean = 3.58), reflecting a slightly lower level of utilization, supported by a significant t-value of 22.76. These results underscore both the prominence and variation in specific data analytics methods within the company's management practices, as evidenced by their associated t-values.

This can be confirmed based on referring to the questionnaire paragraphs which included all the needed tools and methods related to descriptive, but showed how companies differ in providing and utilizing these tools and method. Also showed that employing frequencies for data analytics had the highest one, while utilizing the mean for data analytics had the lowest one. This mean that companies need to ensure using all tools and methods especially increasing utilizing the mean for data analytics for enhancing analysis to support making better decisions.

Predictive Analytics

Table (4.3): Means, Standard Deviations Test For the Predictive Analytics

No.	Items	Mean	Std. Deviation	Rank	t	Level
1	The company's management employs predictive analytics to evaluate competitive features	3.60	0.95	3	23.52	Moderate
2	The company’s management employs Predictive modelling to forecast future performance	3.61	0.95	2	23.70	Moderate
3	The company's management defines its approach to environmental adaptation by analysing predictive results	3.56	0.93	6	23.38	Moderate

4	The company's management places trust in data over their own intuition when data contradicts their opinions	3.58	0.95	5	23.25	Moderate
5	The company's management employs information technology to analyse business data with the support of business analytics systems	3.60	0.98	4	22.98	Moderate
6	The company's management utilizes "big data analytics" to achieve its future objectives	3.65	1.01	1	23.00	Moderate
	General Mean	3.60				Moderate

In Table (4.3) for Predictive Analytics, the highest mean is attributed to Item 6: "The company's management utilizes 'big data analytics' to achieve its future objectives" (Mean = 3.65), categorizing it as the highest-ranking item and indicating a "Moderate" level. This is supported by a significant t-value of 23.00. On the other hand, the lowest mean is associated with Item 4: "The company's management places trust in data over their own intuition when data contradicts their opinions" (Mean = 3.58), indicating a slightly lower level and supported by a significant t-value of 23.25. These results highlight the varying emphasis on specific predictive analytics practices within the company's management, with associated t-values signifying statistical significance in mean differences.

This can be confirmed based on referring to the questionnaire paragraphs which included all the needed tools and methods related to predictive analytics, but showed how companies differ in providing and utilizing these tools and methods. Also showed that

utilizing big data analytics to achieve its future objectives had the highest one, while placing trust in data over their own intuition when data contradicts their opinions had the lowest one. This mean that companies need to ensure using all tools and methods especially placing trust in data over their own intuition because it can lead to wrong bias decisions and risk which therefore can affect the company's performance and objectives.

Perspective Analytics

Table (4.4): Means, Standard Deviations Test For the Perspective Analytics

No.	Items	Mean	Std. Deviation	Rank	t	Level
1	The company's management integrates Business analytics into its business processes	3.52	0.91	4	23.61	Moderate
2	The company's management applies Simulation for data analytics	3.44	0.89	6	22.66	Moderate
3	The company's management uses scenarios for data analytics	3.55	0.89	3	24.37	Moderate
4	The company's management uses math for making decisions	3.47	0.91	5	22.66	Moderate
5	The company's management analyses the external environment components using algorithms	3.56	0.92	1	23.76	Moderate
6	The company's management uses Business Analytics to support high-risk decisions	3.56	0.95	2	23.09	Moderate
	General Mean	3.52				Moderate

In Table (4.4) for Prescriptive Analytics, the highest mean is associated with Item 5: "The company's management analyzes the external environment components using algorithms" (Mean = 3.56), ranking it first and indicating a "Moderate" level. This is

supported by a significant t-value of 23.76. Conversely, the lowest mean is attributed to Item 2: "The company's management applies Simulation for data analytics" (Mean = 3.44), suggesting a slightly lower emphasis and supported by a significant t-value of 22.66. These findings illustrate varying degrees of focus on specific prescriptive analytics practices within the company's management, with associated t-values highlighting statistical significance in mean differences.

This can be confirmed based on referring to the questionnaire paragraphs which included all the needed tools and methods related to prescriptive analytics, but showed how companies differ in providing and utilizing these tools and methods. Also showed that analyzing the external environment components using algorithms and using Business Analytics to support high-risk decisions was the highest which mean that these companies really depend on algorithm in their analysis to make decisions especially the high risk one which significantly can affect their future. But at the same time need to increase focusing on applying Simulation for data analytics as it had the lowest utilizing.

4.1.2 Strategic Change (Dependent Variable)

Table (4.5): Means For the Dimensions of Strategic Change

Strategic Change	Mean	Rank	Level
Evolution Change	3.62	1	Moderate
Revolution Change	3.59	2	Moderate
Strategic Change	3.60	Moderate	

In Table (4.5) for Strategic Change, the means for Evolution Change (Mean = 3.62) and Revolution Change (Mean = 3.59) indicate a "Moderate" level, ranking first and second, respectively. The overall Strategic Change composite, with a mean of 3.60, also

falls within the "Moderate" range, highlighting a balanced consideration of both evolutionary and revolutionary aspects in the company's strategic initiatives.

This can be confirmed based on referring to the questionnaire paragraphs which included all aspects and factors needed that can help in create or implement the strategic change, but showed how these companies differ in providing and pay attention to all of it at the same time. Also showed how they need to focus on some aspect more and ensure generalizing it internally and applying it in a way suits their objectives and capabilities in order to achieve better strategic decisions which also lead to better plan for strategic change either to be incremental or radical one.

Evolution Change

Table (4.6): Means, Standard Deviations Test For the Evolution Change

No.	Items	Mean	Std. Deviation	Rank	t	Level
1	The company's management has clear goals for development	3.64	1.00	2	22.94	Moderate
2	The Company's management adopts an action plan that identifies areas of development in performance	3.56	0.98	9	22.38	Moderate
3	The company's management adapts some functions to face environmental changes	3.63	1.00	5	22.88	Moderate
4	The company's management regularly assesses the level of technological development	3.66	0.99	1	23.46	High
5	The company's management use technology to match employees capabilities	3.61	0.97	7	23.16	Moderate
6	The company's management partially adjusts its objectives if necessary	3.63	0.96	6	23.79	Moderate

7	The company's management makes limited adjustments to the strategy depending on the type of environmental changes	3.64	1.01	4	22.61	Moderate
8	The company's management applies comprehensive quality management ideas	3.60	0.96	8	23.38	Moderate
9	The company's management conducts brainstorming sessions to discuss methods of developing its results	3.64	0.99	3	23.31	Moderate
	General Mean	3.62				Moderate

In Table (4.6) for Evolution Change, the highest mean is associated with Item 4: "The company’s management regularly assesses the level of technological development" (Mean = 3.66), ranking it first and indicating a "High" level. This is supported by a significant t-value of 23.46. Conversely, the lowest mean is attributed to Item 2: "The Company's management adopts an action plan that identifies areas of development in performance" (Mean = 3.56), suggesting a slightly lower emphasis and supported by a significant t-value of 22.38. These results highlight varying degrees of focus on specific aspects of evolutionary change within the company's management, with associated t-values signifying statistical significance in mean differences.

This can be confirmed based on referring to the questionnaire paragraphs which included all aspects and factors needed that can help in create or implement the evolution change, but showed how these companies differ in providing and pay attention to all of it at the same time. Also showed that the highest one is regularly assessing the level of technological development which mean they are up to date to compete and increase their competitive advantage and to be ready to adapt to environmental changes and crises. At

the same time, they need to ensure adopting an action plan that identifies areas of development in performance as it had the lowest level which can affect their strategic decision on making the needed changes with strong plan at the appropriate time.

Revolution Change

Table (4.7): Means, Standard Deviations Test For the Revolution Change

No.	Items	Mean	Std. Deviation	Rank	t	Level
1	The company's management has a vision for comprehensive change	3.54	0.95	8	22.71	Moderate
2	The company's management adopts a procedural action plan for comprehensive changes	3.47	0.92	9	22.37	Moderate
3	The company's management is proactive in conducting a comprehensive review of its objectives when deemed necessary	3.67	0.94	1	24.92	High
4	The company's management implements substantial changes to the organizational structure in response to competitive pressures	3.58	0.94	5	23.67	Moderate
5	The company's management re-engineers its procedures to accelerate efficiency	3.64	0.96	3	23.85	Moderate
6	The company's management stimulates creative ideas that lead to changes in work methods	3.60	0.96	4	23.33	Moderate
7	The company's management discontinues products that no longer comply with environmental standards	3.57	0.98	6	22.55	Moderate
8	The company's management employs forward-thinking strategies to	3.66	0.98	2	23.69	High

	anticipate future trends and market growth					
9	The company's management nurtures rising leaders for future responsibilities	3.57	0.96	7	23.08	Moderate
	General Mean	3.59				Moderate

In Table (4.7) for Revolution Change, the highest mean is observed for Item 3: "The company's management is proactive in conducting a comprehensive review of its objectives when deemed necessary" (Mean = 3.67), ranking it first and indicating a "High" level. This is supported by a significant t-value of 24.92. Conversely, the lowest mean is associated with Item 2: "The company's management adopts a procedural action plan for comprehensive changes" (Mean = 3.47), suggesting a slightly lower emphasis and supported by a significant t-value of 22.37. These results emphasize varying degrees of emphasis on specific facets of revolutionary change within the company's management, with associated t-values indicating statistical significance in mean differences.

This can be confirmed based on referring to the questionnaire paragraphs which included all aspects and factors needed that can help in create or implement the Revolution change regardless of its different effecting level and how these companies differ in providing and pay attention to all of it at the same time. Also showed that the highest one they ensure its existence is to be proactive in conducting a comprehensive review of its objectives when deemed necessary and employing forward-thinking strategies to anticipate future trends and market growth which mean they are up to date to compete and increase their competitive advantage and to be ready to adapt to environmental changes and crises. At the same time they need to ensure adopting a procedural action plan for comprehensive changes as it had the lowest level which can

affect their strategic decision on making the needed changes with strong plan at the appropriate time especially in sudden crises and threatening environment or during strong competition and gaining rare opportunities.

4.1.3 Decision Support Systems (Moderating Variable)

Table (4.8): Means, Standard Deviations Test For the Decision Support Systems

No.	Items	Mean	Std. Deviation	Rank	t	Level
1	The company's management policies support the use of DSS	3.57	0.97	12	22.68	Moderate
2	The company's management enables all departments to utilize DSS effectively for problem solving	3.60	0.98	9	22.94	Moderate
3	The Company's management supports the analysis of critical issues with the use of DSS	3.60	0.95	10	23.52	Moderate
4	The company’s management uses advanced computers to share information for decision-making	3.59	0.97	11	22.94	Moderate
5	The company’s management uses DSS for flexible information exchange between departments	3.65	0.94	5	24.67	Moderate
6	The company’s management uses DSS to accelerate strategic decision-making processes	3.65	1.00	3	23.24	Moderate
7	The company's management utilizes DSS to choose the best solutions for problems	3.65	0.98	4	23.63	Moderate
8	The company's management applies DSS to overcome obstacles in achieving its goals	3.63	0.96	8	23.84	Moderate

9	The company's management utilizes DSS to support its strategic plan	3.67	1.00	2	23.40	High
10	The company's management employs DSS to gain greater control over their work	3.65	1.00	6	23.15	Moderate
11	The company's management employs DSS to improve the quality of decisions	3.68	1.04	1	22.72	High
12	The company's management increases its innovations through DSS	3.65	0.99	7	23.41	Moderate
	General Mean	3.63				Moderate

In Table (4.8) for Decision Support Systems, the highest mean is associated with Item 11: "The company's management employs DSS to improve the quality of decisions" (Mean = 3.68), ranking it first and indicating a "High" level, supported by a significant t-value of 22.72. Conversely, the lowest mean is attributed to Item 1: "The company's management policies support the use of DSS" (Mean = 3.57), suggesting a slightly lower emphasis and supported by a significant t-value of 22.68. These findings highlight varying degrees of focus on specific aspects of decision support systems within the company's management, with associated t-values signifying statistical significance in mean differences.

This can be confirmed based on referring to the questionnaire paragraphs which included all aspects and factors needed that can help in using the DSS to support making better strategic decisions and change depending on Business analytics. It also showed how these companies differ in providing and utilizing it, and how they need to focus on some aspect more and ensure having and utilizing all tools and methods that suits their objectives and capabilities in order to facilitate achieving better strategic decisions and change in a smart digital way. This can be emphasized with the paragraph results and

analysis which shows the highest ranking in utilizing DSS to support its strategic plan and employing DSS to improve the quality of decisions. That's why trying to focus on other methods and aspects just like setting policies that support the use of DSS in their companies which had the lowest ranking as shown in analysis which can enhance the decision-making process and ensure achieving the company's future objectives.

4.2 Second part: Testing the study hypotheses and analyzing its results

Testing hypotheses

To test study hypothesis hierarchal multiple linear regressions were applied. Before the application of linear regression there is a need to check for two basic assumptions, the normality of the distribution of the variables and therefore the level of multicollinearity among the independent variables, the results are included within the following table indicate.

Normality test

Table (4.9): The Normal Distribution of Study Variables.

Variables	Shapiro-Wilk	
	Statistic	Sig.
Descriptive Analytics	0.997	0.987
Predictive Analytics	0.993	0.541
Prescriptive Analytics	0.992	0.398
Business Analytics	0.995	0.809
Evolution Change	0.994	0.613
Revolution Change	0.993	0.572
Strategic Change	0.991	0.279
Decision Support Systems	0.989	0.171

The Shapiro-Wilk was conducted to verify that data collected was normally distributed across sample units in order to verify the normality of the collected data. The null hypothesis for the normality test is that data is derived from a specific distribution in order to compare the scores of the search sample with a normally distributed range of results under the same mean and standards deviation. The p-values (sig) in the normal distribution must be greater than 0.05; typically, else will not be normally distributed (Hair et al., 2010).

Table (4.9): The Normal Distribution of Study Variables reveals that the majority of variables exhibit p-values greater than 0.05 for Shapiro-Wilk tests. This suggests that these variables can be considered normally distributed.

Adequacy of the data to test the study hypotheses

Table (4.10): Results of variance inflation factor, tolerance of the independent variables

Variables		Tolerance	VIF
Independent Variable	Descriptive Analytics	0.239	4.178
	Predictive Analytics	0.262	3.815
	Prescriptive Analytics	0.252	3.963
Moderator	DSS	0.224	4.457

Multicollinearity was tested using the Tolerance and Variance Inflation Factory (VIF) test for each independent variable in the study, taking into account that according to Hair et al (2010) the value of (10) should not be exceeded by (VIF). Obviously evident from the findings below regarding the independent variables there was no problematic issue amongst the independent variable dimensions, as indicated by the VIF values of each dimension. The tolerance values were also greater than the value of (0.05) of each

variable, which shows that there was no multicollinearity issue among all the dimensions. This is shown in the table (4.10) above.

The First Main Hypothesis

H01: There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Strategic Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan

In order to test this hypothesis SPSS v27 software (version 20) were applied. This software is SEM-PLS based statistical analysis program, in addition to confirmatory factor analysis CFA and descriptive statistics that can be carried by using this software. The results are included within the following table indicate.

Table (4.11): SEM-PLS Analysis for Testing the Impact of Business Analytics on Strategic Change

IV - Path - DV	B	t	Sig	R^2	Adjusted R^2
Business Analytics -> Strategic Change	0.920	25.85	0.000	0.800	0.797
Descriptive Analytics -> Strategic Change	0.146	2.256	0.024		
Predictive Analytics -> Strategic Change	0.316	5.112	0.000		
Prescriptive Analytics -> Strategic Change	0.501	10.798	0.000		

(Tabulated t =1.96)

Table (4.11) presents the results of the SEM-PLS analysis for testing the impact of Business Analytics on Strategic Change, addressing the First Main Hypothesis in Food Import Companies in Amman, Jordan. The path coefficients (β) indicate the strength and direction of the relationships. Descriptive Analytics has a significant positive impact (β =

0.146, T = 2.256, Sig = 0.024) on Strategic Change. Predictive Analytics exhibits a stronger positive impact (β = 0.316, T = 5.112, Sig = 0.000), while Prescriptive Analytics shows the most substantial positive impact (β = 0.501, T = 10.798, Sig = 0.000), explaining 80% of the variance (R^2 = 0.800) with high model fit (Adjusted R^2 = 0.797). The results suggest that Business Analytics, particularly its predictive and prescriptive dimensions, significantly influences and predicts changes in strategic initiatives within the context of food import companies in Amman, Jordan.

This can be inferred from the questionnaire paragraphs related to descriptive, predictive and perspective analytics, including their tools and methods have been used in participated companies, which showed depending on the study sample (Managers) that the use of these tools and methods have an impact on strategic change regardless the difference of its level.

Therefore, the null hypothesis is rejected which is (There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Strategic Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan)

And the alternative one is accepted which is (There is statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Strategic Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman- Jordan)

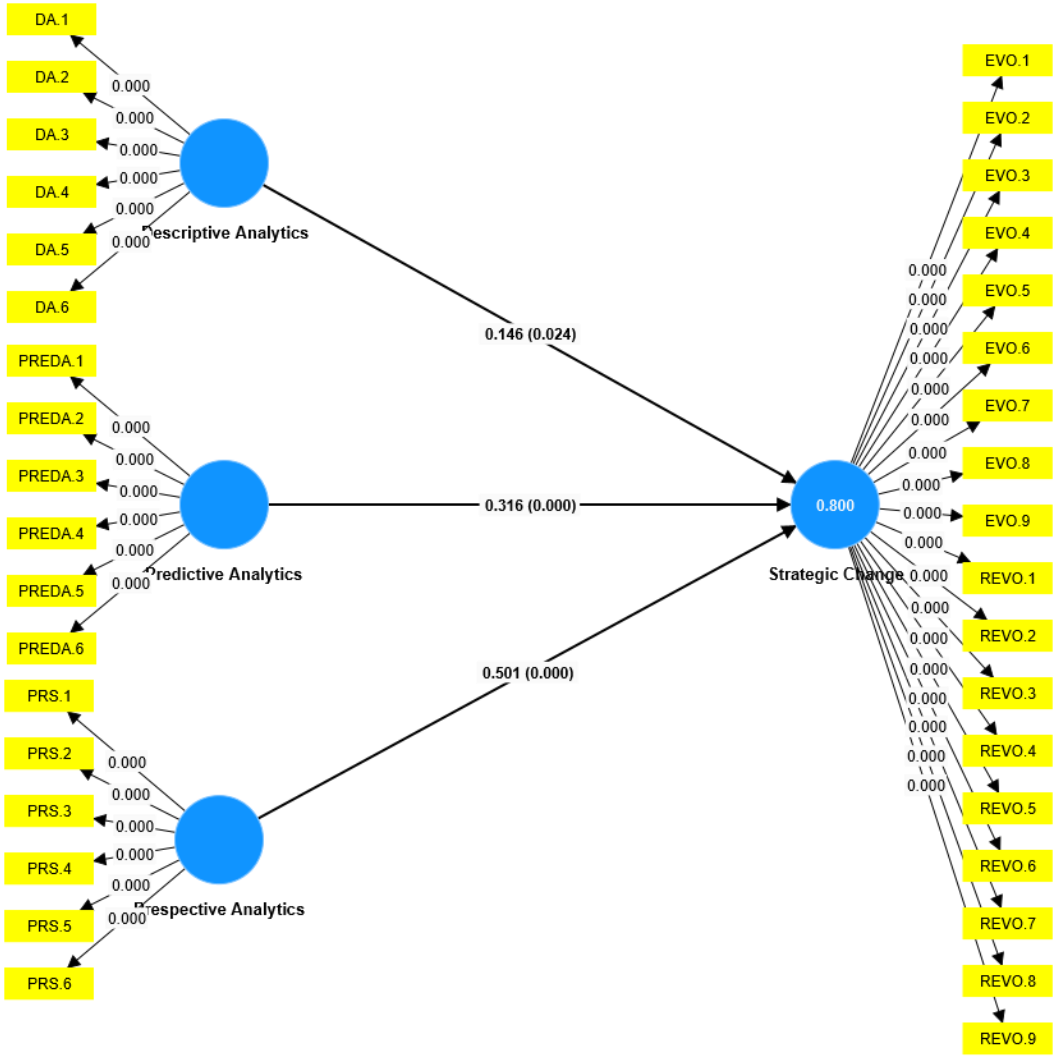


Figure 4.2: The impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Strategic Change

Sub Hypothesis 1

H01.1: There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Evolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan

In order to test this hypothesis SPSS v27 software (version 20) were applied. This software is SEM-PLS based statistical analysis program, in addition to confirmatory

factor analysis CFA and descriptive statistics that can be carried by using this software. The results are included within the following table indicate.

Table (4.12): SEM-PLS Analysis for Testing the Impact of Business Analytics on Evolution Change

IV - Path – DV	β	t	Sig	R^2	Adjusted R^2
Business Analytics -> Evolution Change	0.93	21.32	0.000	0.733	0.729
Descriptive Analytics -> Evolution Change	0.080	1.028	0.304		
Predictive Analytics -> Evolution Change	0.330	4.888	0.000		
Prescriptive Analytics -> Evolution Change	0.508	9.190	0.000		

(Tabulated t =1.96)

Table (4.12) presents the SEM-PLS analysis results for testing the impact of Business Analytics on Evolution Change, addressing Sub Hypothesis 1 in Food Import Companies in Amman, Jordan. The path coefficients (β) indicate the strength and direction of the relationships. Descriptive Analytics shows a non-significant positive impact (β = 0.080, T = 1.028, Sig = 0.304) on Evolution Change. Predictive Analytics exhibits a significantly positive impact (β = 0.330, T = 4.888, Sig = 0.000), while Prescriptive Analytics demonstrates the most substantial positive impact (β = 0.508, T = 9.190, Sig = 0.000). The model is explaining 73.3% of the variance (R^2 = 0.733) with a good model fit (Adjusted R^2 = 0.729). These results suggest that, within the context of food import companies in Amman, Jordan, Business Analytics, especially its predictive and prescriptive dimensions, significantly influences and predicts changes in evolution-related aspects.

This can be inferred from the questionnaire paragraphs related to descriptive, predictive and perspective analytics, including their tools and methods have been used in participated companies, which showed depending on the study sample (Managers) that the use of predictive and perspective analytics tools and methods have an impact on evolution change while the descriptive analytics tools and methods have no impact on evolution change.

Therefore the null hypothesis is rejected for both Predictive and Prescriptive Analytics which is (There is no statistically significant impact of Business Analytics with its dimensions (Predictive and Prescriptive Analytics) on Evolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan)

And the alternative one is accepted which is (There is statistically significant impact of Business Analytics with its dimensions (Predictive and Prescriptive Analytics) on Evolution Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman- Jordan)

While for Descriptive Analytics the null hypotheses is not rejected which is (There is no statistically significant impact of Descriptive Analytics on Evolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan).

Figure 4.3: The impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Evolution Change

Sub hypothesis 2

H01.₂: There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Revolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan

In order to test this hypothesis SPSS v27 software (version 20) were applied. This software is SEM-PLS based statistical analysis program, in addition to confirmatory factor analysis CFA and descriptive statistics that can be carried by using this software. The results are included within the following table indicate.

Table (4.13): SEM-PLS Analysis for Testing the Impact of Business Analytics on Revolution Change

IV - Path – DV	β	t	Sig	R^2	Adjusted R^2
Business Analytics -> Revolution Change	0.92	22.84	0.000	0.748	0.744
Descriptive Analytics -> Revolution Change	0.199	2.995	0.003		
Predictive Analytics -> Revolution Change	0.278	3.779	0.000		
Prescriptive Analytics -> Revolution Change	0.455	8.009	0.000		

(Tabulated t =1.96)

Table (4.13) outlines the SEM-PLS analysis results for testing the impact of Business Analytics on Revolution Change, addressing Sub Hypothesis 2 in Food Import Companies in Amman, Jordan. The path coefficients (β) show the strength and direction of the relationships. Descriptive Analytics demonstrates a significantly positive impact (β = 0.199, T = 2.995, Sig = 0.003). Predictive Analytics displays a statistically significant positive impact (β = 0.278, T = 3.779, Sig = 0.000), while Prescriptive Analytics exhibits

the most substantial positive impact ($\beta = 0.455$, T = 8.009, Sig = 0.000), explaining 74.8% of the variance ($R^2 = 0.748$) with a good model fit (Adjusted $R^2 = 0.744$). These findings suggest that, within the context of food import companies in Amman, Jordan, Business Analytics, particularly its prescriptive dimension, significantly influences and predicts changes associated with revolutionary transformations.

This can be inferred from the questionnaire paragraphs related to descriptive, predictive and perspective analytics, including their tools and methods have been used in participated companies, which showed depending on the study sample (Managers) that the use of these tools and methods have an impact on Revolution change regardless the difference of its level, which lean more to the side of prescriptive analytics.

Therefore, the null hypothesis is rejected which is (There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Revolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan)

And the alternative one is accepted which is (There is statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Revolution Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman- Jordan).

Figure 04.4: The impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Rvolution Change

The second main hypothesis

H02: Decision Support Systems does not moderate the impact of Business Analytics on Strategic Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan.

To test the second main and sub hypothesis hierarchal multiple regressions analysis program were applied.

Table (4.14): Results of Hierarchical Multiple Regression Analysis to assess the moderating role of DSS on the impact of Business Analytics on Strategic Change

Dependent Variable	Independent Variable	First Model			Second Model		
		β	t	Sig*	β	t	Sig*
Strategic Change	Business Analytics	0.92	25.85	0.00	0.566	8.468	0.000
	Decision Support Systems				0.378	6.106	0.000
	R	0.885			0.905		
	R^2	0.783			0.820		
	Δ R	0.783			0.037		
	Δ F	667.977			37.279		
	Sig. Δ F	0.000			0.000		

(Tabulated t =1.96)

Table (4.14) reveals the results of the hierarchical multiple regression analysis for testing hypothesis H0.2, which examines whether Decision Support Systems moderates the impact of Business Analytics on Strategic Change in Food Import Companies in Amman, Jordan. The First Model, including only Business Analytics, demonstrates a significant positive impact on Strategic Change (β = 0.92, T = 25.85, Sig = 0.00). Introducing Decision Support Systems in the Second Model reveals a significant moderating effect (β = 0.378, T = 6.106, Sig = 0.000). The R and R^2 values indicate the predictive power of the models, with the Second Model (R = 0.905, R^2 = 0.820) surpassing the First Model (R = 0.885, R^2 = 0.783). The ΔR and ΔF values demonstrate the incremental contribution of Decision Support Systems, with ΔR (change in R) at 0.037 and ΔF (change in F-statistic) at 37.279, both statistically significant (Sig. ΔF = 0.000). These findings suggest that Decision Support Systems significantly moderates the impact of Business Analytics on Strategic Change, enhancing the overall explanatory power of the model.

This can be inferred from the questionnaire paragraphs related to Decision support systems including its tools and methods have been used in participated companies, which showed depending on the study sample (Managers) that the use of these tools and methods is important in moderating the impact of Business Analytics on strategic change which in turn enhancing the company's overall performance.

This also indicates the importance and necessity of relying on Decision support systems to support the strategic decision-making process and needed changes in these companies.

Therefore, the null hypothesis is rejected which is (Decision Support Systems does not moderate the impact of Business Analytics on Strategic Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan).

And the alternative one is accepted which is (Decision Support Systems does moderate the impact of Business Analytics on Strategic Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman- Jordan)

Sub Hypothesis 1

$H02._1$: Decision Support Systems does not moderate the impact of Business Analytics on Evolution Change at a level of significance ($a \geq 0.05$) in Food Import Companies in Amman- Jordan.

Table (4.15): Results of Hierarchical Multiple Regression Analysis to assess the moderating role of DSS on the impact of Business Analytics on Evolution Change

Dependent Variable	Independent Variable	First Model			Second Model		
		β	t	Sig*	β	t	Sig*
Evolution Change	Business Analytics	0.93	21.32	0.00	0.56	6.68	0.000
	Decision Support Systems				0.39	5.03	0.000
	R	0.843			0.863		
	R^2	0.711			0.746		
	Δ R	0.711			0.035		
	Δ F	454.33			25.313		
	Sig. Δ F	0.000			0.000		

(Tabulated t =1.96)

Table (4.15) reveals the results of the hierarchical multiple regression analysis for testing hypothesis H0.2.1, examining whether Decision Support Systems moderates the impact of Business Analytics on Evolution Change in Food Import Companies in Amman, Jordan. In the First Model, Business Analytics exhibits a significant positive impact on Evolution Change (β = 0.93, T = 21.32, Sig = 0.00). Introducing Decision Support Systems in the Second Model indicates a significant moderating effect (β = 0.39, T = 5.03, Sig = 0.000). The R and R^2 values indicate the predictive power of the models, with the Second Model (R = 0.863, R^2 = 0.746) surpassing the First Model (R = 0.843, R^2 = 0.711). The ΔR and ΔF values demonstrate the incremental contribution of Decision Support Systems, with ΔR (change in R) at 0.035 and ΔF (change in F-statistic) at 25.313, both statistically significant (Sig. ΔF = 0.000). These findings suggest that Decision Support Systems significantly moderates the impact of Business Analytics on Evolution Change, enhancing the overall explanatory power of the model.

This can be inferred from the questionnaire paragraphs related to Decision support systems including its tools and methods have been used in participated companies, which showed depending on the study sample (Managers) that the use of these tools and methods is important in moderating the impact of Business Analytics on Evolution change which in turn enhancing the company's overall performance. Also indicates the importance and necessity of relying on Decision support systems to support the strategic Evolution change in these companies.

Therefore, the null hypothesis is rejected which is (Decision Support Systems does not moderate the impact of Business Analytics on Evolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan).

And the alternative one is accepted which is (Decision Support Systems does moderate the impact of Business Analytics on Evolution Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman- Jordan)

Sub hypothesis 2

H02.$_2$: Decision Support Systems does not moderate the impact of Business Analytics on Revolution Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman- Jordan.

Table (4.16): Results of Hierarchical Multiple Regression Analysis to assess the moderating role of DSS on the impact of Business Analytics on Revolution Change

Dependent Variable	Independent Variable	First Model			Second Model		
		β	t	Sig*	β	t	Sig*
Revolution Change	Business Analytics	0.92	22.84	0.000	0.57	7.42	0.000
	Decision Support Systems				0.37	5.11	0.000
	R	0.859			0.878		
	R^2	0.738			0.771		
	Δ R	0.738			0.033		
	Δ F	521.585			26.138		
	Sig. Δ F	0.000			0.000		

(Tabulated t = 1.96)

Table (4.16) reveals the results of the hierarchical multiple regression analysis for testing hypothesis H0.2.₂, evaluating whether Decision Support Systems moderates the impact of Business Analytics on Revolution Change in Food Import Companies in Amman, Jordan. In the First Model, Business Analytics shows a significant positive impact on Revolution Change (β = 0.92, T = 22.84, Sig = 0.000). Introducing Decision Support Systems in the Second Model indicates a significant moderating effect (β = 0.37, T = 5.11, Sig = 0.000). The R and R^2 values demonstrate the predictive power of the models, with the Second Model (R = 0.878, R^2 = 0.771) surpassing the First Model (R = 0.859, R^2 = 0.738). The ΔR and ΔF values signify the incremental contribution of Decision Support Systems, with ΔR (change in R) at 0.033 and ΔF (change in F-statistic) at 26.138, both statistically significant (Sig. ΔF = 0.000). These findings suggest that Decision Support Systems significantly moderates the impact of Business Analytics on Revolution Change, enhancing the overall explanatory power of the model.

This can be inferred from the questionnaire paragraphs related to Decision support systems including its tools and methods have been used in participated companies, which showed depending on the study sample (Managers) that the use of these tools and methods is important in moderating the impact of Business Analytics on Revolution change which in turn enhancing the company's overall performance.

Also indicates the importance and necessity of relying on Decision support systems to support the strategic Revolution change in these companies.

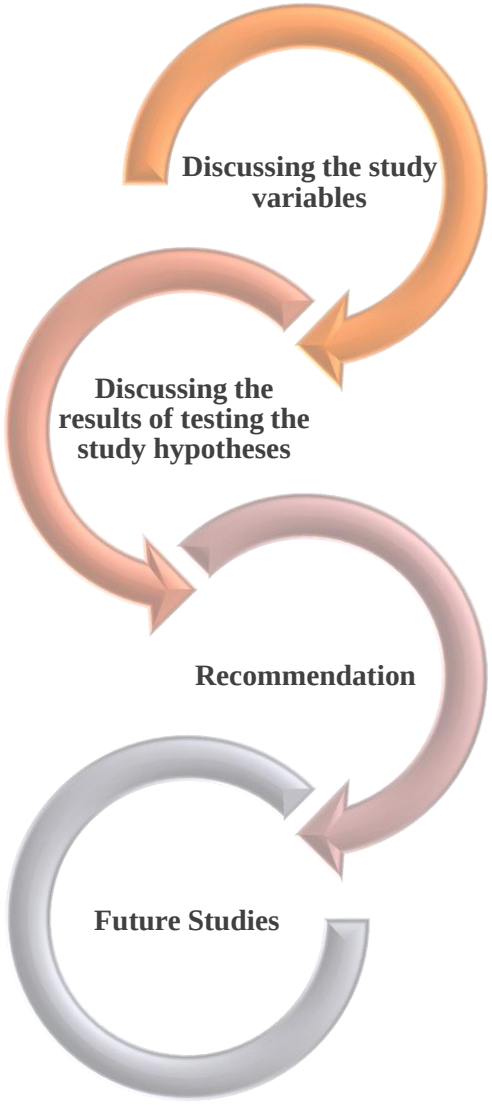
Therefore, the null hypothesis is rejected which is (Decision Support Systems does not moderate the impact of Business Analytics on Revolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman- Jordan).

And the alternative one is accepted which is (Decision Support Systems does moderate the impact of Business Analytics on Revolution Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman- Jordan).

Chapter Five

Results Discussion, Recommendations and Future studies

Figure 5.1: Work plan for the Fifth Chapter



Building on the information presented in Chapter Four, this chapter aims to provide a clear and accurate perception and understanding. It seeks to analyze and test the study hypotheses through logical explanations of the analysis results and then present a summary of the most prominent findings reached in light of the results of the statistical analysis. Additionally, similar recommendations and future proposals have been developed.

5.1 Discussion of the descriptive analysis results of the variables

Analyzing the responses to the independent variable Business Analytics and its dimensions (Descriptive, Predictive and Prescriptive Analytics)

The study results revealed that the level of Business Analytics dimensions in Food Import Companies in Amman, Jordan, was moderate, reaching (3.58). This indicates a lack in these companies in providing and utilizing the most suitable new tools, methods, and technologies for data analysis. This deficiency hinders managers at all levels from understanding and using data to make better strategic decisions and change that adapt to and align with continuously changing conditions. The results also revealed that Descriptive analytics had the highest ranking, comprising all its tools and methods, as indicated in the questionnaire paragraphs, despite variations in the level of provision or utilization among participant companies. The responding paragraph clarified how these companies heavily rely on data to diagnose problems and employ frequencies for data analytics. They also moderately use other tools and methods, supporting in facilitating the decision-making process and serving as a means of providing a comprehensive

analysis for big data base. However, this doesn't necessarily imply that Descriptive analytics has the greatest impact on making strategic decisions and driving change.

As for predictive and prescriptive analytics the results also revealed their strong presence and participation in business and big data analysis process, in addition to facilitate the decision-making process including all tools and methods related to them which has been mentioned in the questionnaire paragraphs. Especially in utilizing the "big data analytics" to achieve its future performance and objectives and in using algorithm to analyze the external changing environment and in taking the high-risk decisions. Although they ranked less than Descriptive analytics, but their effect on Strategic change either the Evolution or Revolution one was greater specifically the Perspective analytics.

These findings align with Chen et al.'s (2022) study, which sheds the light on the importance of using business analytics as a digital technology and suggests providing the necessary capabilities to enhance quality and speed of strategic decision-making, especially during crises.

This is also in agreement with Duan & Edwards' (2020) study, which recommends covering and utilizing all tools and technologies related to each dimension of business analytics. Doing so can significantly enhance decision-making and innovation across all aspects.

Below are the result discussions of Business Analytics dimensions:

Descriptive Analytics: the study results revealed that the level of Descriptive Analytics was moderate (3.62) which indicates that these companies lack some of tools or methods related to descriptive analytics, hindering their ability to support its role in making better strategic decisions and changes, especially during crises. Although there was a deficiency

in most areas, the frequencies of employing data analytics were high (3.68). This clearly indicates its widespread use in most companies. It also demonstrates their ability to exploit other tools, such as graphics, means, and deviations, during their analysis process. However, there is a significant need for encouragement and understanding of the importance of these tools, particularly from the stakeholders.

Predictive Analytics: The study results indicated that the level of Predictive Analytics was also moderate (3.60), meaning that these companies also lack some tools or methods related to predictive analytics. This inadequacy hampers their ability to support the role of predictive analytics in making better strategic decisions and changes, especially during crises. The entire paragraph showed consistently moderate results, suggesting a uniform lack of the needed tools and methods for predictive analytics in these companies. The presence of it indicates that these companies pay attention to it. Concerning predictive and prescriptive analytics, the results also unveiled their robust presence and involvement in the business and big data analysis process, along with facilitating the decision-making process through the utilization of all associated tools and methods mentioned in the questionnaire paragraphs. This is particularly evident in their use of "big data analytics" to achieve future performance and objectives, employing algorithms to analyze the external changing environment, and making high-risk decisions. Although they ranked lower than Descriptive analytics, their impact on Strategic Change, whether Evolution or Revolution, was more significant, specifically in the realm of Perspective analytics.

Perspective Analytics: The study results revealed that the level of Perspective Analytics was also moderate (3.52), suggesting that these companies also lack some tools or methods related to perspective analytics and its supportive role in making better strategic decisions and changes, especially during crises. All paragraphs showed the same

moderate results, which means that the lack is at the same level in these companies to provide the needed tools and methods for perspective analytics, Despite differences in certain aspects depending on the company's circumstances and the degree of integration into business processes, such as scenarios, mathematics, algorithms, and simulations, its impact was highest on strategic change, specifically revolution change. This finding contrasts with Lepenioti et al., (2020) study, which confirmed the important role of perspective analytics and considered it to be the best dimensions of business analytics for making better strategic decisions and changes for the company's future.

Analyzing the responses to the dependent variable Strategic Change and its dimensions (Evolution and Revolution Change)

The study results revealed that the level of Strategic Change dimensions in Food Import Companies in Amman, Jordan, was moderate, reaching (3.60). This indicates a deficiency in these companies in providing the needed foundation and preparation, which includes tools and technology, as well as clear organizational objectives and culture. These elements are crucial for being proactive and dynamically adapting to crises and other sudden changes. They play a vital role in deciding the most suitable types of change, whether it's Evolution or Revolution, based on the company's capabilities, conditions, and competitive environmental factors. The presence of certain aspects, such as always adopting a procedural plan for comprehensive change or an action plan that identifies areas of development in performance, whether in technology or human capabilities, as well as in objectives, strategy, and structure, and re-engineering procedures, all serve as positive indicators. However, there is a need to increase their provision and utilization for more significant effects and support in the strategic change process.

This finding aligns with the conclusions drawn by Kirtley & O'Mahony (2023), illustrating that companies lacking the necessary investments in their capabilities during the early stages struggle to determine when and how to change their strategies and what constitutes a pivot.

Below are the results' discussions of Business Analytics dimensions:

Evolution Change: The study results revealed that the level of Evolution Change was moderate (3.62), indicating that these companies lack certain tools, methods, and aspects related to Evolution Change for building the necessary foundation in strategic decisions and changes. This deficiency hinders their ability to be proactive and ready to adapt to dynamic changes, especially during crises. This is such as lacking in adopting an action plan that identifies areas of development in performance and ensures fitting the technology with capabilities, even applying comprehensive quality management ideas. Although there was a lack in most areas, the assessment of technological development was high (3.66), highlighting the importance of staying updated in most companies.

This observation aligns with MacKay & Chia (2013) study, which demonstrated how an unclear view of processes or objectives which increase the chance and opportunities for organizations in environmental uncertainty will affect the choice and adaptation of the most appropriate strategic change.

Revolution Change: The study results revealed that the level of Revolution Change was moderate (3.59), indicating that these companies lack certain tools, methods, and aspects related to Revolution Change, hindering the establishment of a foundation necessary for strategic decisions and changes, also to be better proactive and ready to adapt quickly and in a professional way to the dynamic changes. This deficiency also impacts their ability to be more proactive and prepared to adapt quickly and professionally to dynamic

changes, especially in crises. Although there was a lack in most areas, such as consistently reviewing their objectives comprehensively, addressing competitive pressures, and identifying rising leaders for future responsibilities. It was high in two crucial aspects: proactive in conducting a comprehensive review of objectives when deemed necessary (3.67) and employing forward-thinking strategies to anticipate future trends and market growth (3.66). This emphasizes the importance of consistently following these aspects in most companies. This finding aligns with Baryshnikova et al. (2021) study, highlighting the need for analyzing business practices to adapt different functional strategies towards risks. The study emphasizes how crisis motivate and forces companies to reconsider their objectives and restructure their business models, enabling quick decision-making for sudden changes and determining the sustainability of operations and the survival of the company.

Analyzing the responses related to the moderating variable represented by Decision Support Systems

The study results revealed variations in the level of Decision Support Systems among Food Import Companies in Amman, Jordan, across different all paragraphs and aspects. The focus on these aspects differed between companies, with the highest emphasis on employing DSS to improve the quality of decisions (3.68) and the lowest on existing policies that support the use of DSS (3.57). This indicate that the need for these companies to focus on balancing the utilization of all DSS tools and aspects, ensuring they stay updated with the newest versions, facilitate understanding and usage, and possess all the necessary abilities and capabilities such as providing advanced computer to share information and enable solving critical problems even overcome obstacles and accelerating the decision-making process and achieving goals.

This approach will contribute to the continuous improvement in strategic decisions, fostering better change. This emphasis is in line with the findings of O'Brien et al., (2022) and Alasiri & Salameh (2020) studies. Both of which encourage the use of DSS and explores its relationship with Business Analytics and Strategic Change for better outcomes. These studies aim to determine the most effective strategic change levels and processes for navigating dynamic environmental changes, leading to increasing organizational control, personal efficiency, and the effectiveness of problem-solving.

Moreover, Dulcic et al., (2012) study supports the notion that the usage potential of DSS remains an area that is not a fully explored. It also highlights how various core factors of DSS can significantly influence the decision-making process.

5.2 Discussing the results of testing the study hypothesis

First main Hypotheses

H0.1: The results of testing analysis of the first main hypothesis showed that the null hypothesis is rejected, which is states that: “There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Strategic Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman, Jordan”. The alternative hypothesis is accepted, indicating: “There is statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Strategic Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman, Jordan”.

This finding aligns with Duan & Li (2015) study, which supports the notion that Business analytics can be used to improve decision-making effectiveness at the organizational level, aiding managers in making optimal choices for strategic change during

environmental changes. It is also in line with Chen et al., (2022) study, which confirmed the use of Business Analytics to support strategic decision-making in organizations facing crises and abnormal circumstances.

Sub-Hypothesis 1

H0.1.$_1$: The results of testing analysis of the first sub-hypothesis showed that the null hypothesis is rejected for both Predictive and Prescriptive Analytics, which states: "There is no statistically significant impact of Business Analytics with its dimensions (Predictive and Prescriptive Analytics) on Evolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman, Jordan". The alternative hypothesis is accepted, indication: "There is statistically significant impact of Business Analytics with its dimensions (Predictive and Prescriptive Analytics) on Evolution Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman, Jordan". However, for Descriptive Analytics, the null hypotheses is not rejected, suggesting: "There is no statistically significant impact of Descriptive Analytics on Evolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman, Jordan".

This can be enhanced by considering the finding of Lepenioti et al., (2020), which demonstrated how prescriptive analytics seeks to identify the best course of action and outcomes for a business's future. Furthermore, prescriptive analytics is often regarded as the next step in increasing data analytics maturity, leading to optimized timely decision-making for business performance improvements. As such, timely business performance improvements are crucial for the survival and success of strategic changes in organizations.

Sub-Hypothesis 2

H0.1.$_2$: The results of testing analysis of the second sub-hypothesis showed that the null hypothesis is rejected: “There is no statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Revolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman, Jordan”. The alternative hypothesis is accepted, indicating: “There is statistically significant impact of Business Analytics with all its dimensions (Descriptive, Predictive and Prescriptive Analytics) on Revolution Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman, Jordan”.

Iberaheem, M. (2023), emphasized the essential role that business analysis plays in strategic planning. This involves focusing on assisting organizations in understanding their current position, envisioning potential future scenarios, and determine a better path to achieve business objectives. This approach allows organizations to be proactive in adapting to sudden revolutionary changes.

Second Main Hypothesis

H0.2: The results of testing the second main hypothesis indicate the rejection of the null hypothesis, suggesting that: “Decision Support Systems does not moderate the impact of Business Analytics on Strategic Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman, Jordan”. Conversely, the alternative hypothesis is accepted, signifying that: “Decision Support Systems does moderate the impact of Business Analytics on Strategic Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman, Jordan”.

The interpretation of this suggests that Decision Support Systems effectively moderate the effect of Business Analytics on Strategic Change. It is considered a partial moderator variable in this relationship. Therefore, the influence relationship is fully integrated in its

true form through the presence of Decision Support Systems as part of this this relationship. The surveyed companies must invest in this tripartite relationship because the results will be beneficial and positive in facilitating and achieving the best strategic decision and changes, ensuring its long-term survival and growth.

This is consistent with Al Eid & Yavuz (2022) study, which emphasizes the importance of enhancing the tangible influence of Business Analytics (BA) on Strategic Change. The study also advocates for clearly identifying a moderator for this relationship, namely, the success of developing a strategic decision support system (DSS) to improve the decision-making process. This is in line with Kamariotou et al., (2021) study, which encourages the use of decision support system (DSS) to enhance the strategic decision-making process in the face of dynamic environmental changes and various company's requirements.

Sub-Hypothesis 1

H0.2.$_1$: The null hypothesis: "Decision Support Systems does not moderate the impact of Business Analytics on Evolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman, Jordan", is rejected. Conversely, the alternative hypothesis, stating that: "Decision Support Systems does moderate the impact of Business Analytics on Evolution Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman, Jordan", is accepted.

The interpretation of these results suggests that Decision Support Systems effectively moderate the effect of Business Analytics on Evolution Change. It is considered a partial moderator variable of this relationship.

Sub Hypothesis 2

H0.2.$_2$: The null hypothesis, stating that: “Decision Support Systems does not moderate the impact of Business Analytics on Revolution Change at a level of significance ($\alpha \geq 0.05$) in Food Import Companies in Amman, Jordan”, is rejected. Conversely, the alternative hypothesis, stating that: “Decision Support Systems does moderate the impact of Business Analytics on Revolution Change at a level of significance ($\alpha \leq 0.05$) in Food Import Companies in Amman, Jordan”. Is accepted.

The interpretation of these results suggests that Decision Support Systems effectively moderate the effect of Business Analytics on Revolution Change. It is considered as a partial moderator variable in this relationship.

5.3 Recommendations

After discussing and interpreting the results, the study proposes several recommendations to enhance the operations of large food import companies in Amman. These recommendations address the challenges identified in the study and aim to improve the companies' performance. Therefore, the following suggestions and recommendations are put forward:

Recommendations for Enhancing Business Analytics Across All Dimensions: Descriptive, Predictive, and Prescriptive Analytics

Ensuring a forceful utilization of Business Analytics is essential for the Food Import Companies in Amman. A strategic recalibration of tools and technologies across all Business Analytics levels (Descriptive, Predictive and Prescriptive Analytics) becomes imperative, ensuring seamless alignment with the company's goals, capabilities, and operational environment.

Descriptive Analytics

- As the results indicate, food import companies in Amman are actively utilizing descriptive analytics tools and methodologies. To maintain this momentum, in line with the results and observations of the thesis study, they should prioritize staying updated on advanced software solutions, dedicated computational resources, and specialized databases. This ensures more accurate documentation and processing of substantial datasets and Big Data.

Predictive Analytics

- It is highly recommended to expand the strategic focus within these companies by enhancing the widespread use of statistical models and forecasts. Moreover, prioritize the integration of business intelligence and advanced analytics platforms with essential components in predictive analytics. These tools employ both historical and real-time data, propelling companies towards proactively anticipating future performance and fostering informed decision-making across the organization.

Perspective Analytics

- Organizations need to continuously equip itself with advanced technologies and tools to support Perspective Analytics. This entails embracing simulation programs, scenario planning, and various improvement methodologies.

Recommendations related to Decision Support Systems Integration

- To optimize the utilization of Decision Support Systems (DSS), it is recommended to garner enthusiastic support from stakeholders within food

import companies and across other sectors. This endorsement should be coupled with the provision of advanced computers and technologies tailored to meet the specific requirements of DSS. Generalizing the utilization of DSS across all departments for every decision and process will contribute to nurturing a culture of innovation and reaching a higher overall quality of decision-making processes.

Recommendations Related to Strategic Evolution: Enhancing Business Analytics and Organizational Transformation

- Continuous Training and Development: Implement ongoing training programs for employees to enhance their skills in utilizing Business Analytics tools effectively.
- Regular Technological Audits: Conduct regular technological audits to assess the relevance and efficiency of the tools and technologies employed for Business Analytics
- Benchmarking and Comparative Analysis: Engage in benchmarking activities to compare the company's Business Analytics practices with industry leaders or competitors.
- Scenario Planning Workshops: Conduct scenario planning workshops regularly, involving key stakeholders in exploring potential future scenarios and challenges.

5.4 Future Studies

- Conduct a comprehensive study by applying the variables explored in the current research to a difference sector, such as the pharmaceutical industry. This

cross-sector analysis aims to uncover universal or context-specific aspects of the identified variables.

- Broaden the scope of on Business Analytics research within a study, specifically focusing on its Predictive and Perspective dimensions. Recognizing their crucial role in enhancing strategic decision-making and facilitating organizational change, particularly during crises.

- Explore the same variables under the influence of a different moderator in a dedicated study. Consider potential moderators, including Artificial Intelligence (AI) or Organizational Culture, to unveil nuanced insights into the interplay of variables.

- Further studies are needed to dig deeper into the complexities of Strategic Change. A comprehensive exploration can reveal emerging patterns, contributing to a more robust theoretical framework.

- Last but not least, reflect on the necessity of incorporating Predictive and Perspective analyses within the context of this thesis. This consideration ensures a thorough and holistic examination of the chosen variables, aligning with the evolving needs of the research landscape.

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Appendices

Appendix (1)

Panel of Experts

No	Name	Specialization	University
1	Prof. Ali Adailah	Business Administration	Middle East university(MEU)
2	Prof. Azzam Abu Mughli	Business Administration	Middle East university(MEU)
3	Prof. Hani Al khaldi	Business Administration	Al Israa' University
4	Prof. Mohammad Alnaemi	Business Administration	University of Jordan
5	Prof. Ratip Sweiss	Business Administration	University of Jordan
6	Prof. Rashad Alssaed	Business Administration	Amman Arabic University
7	Associate Dr. Al Hareth Abu Hussain	Business Administration	Amman Arabic University
8	Associate Prof. Mohamad Al Maayta	Business Administration	Al-Balqa University
9	Associate Dr. Yanal Kilani	Business Administration	Al yarmouk University

Appendix (2)

Questionnaire

جـــامـعـــة الـــشـرق الأوسـط
MIDDLE EAST UNIVERSITY
Amman - Jordan

Ladies and Gentlemen,

The powerful influence of globalization resonates globally, especially during times of crisis, affecting nations worldwide. This impact is compounded by the rapid advance of digitalization and technological innovation, as well as increased competition and challenges. Organizations need to swiftly adapt to both external shifts and internal intricacies. Strategic change is a fundamental and initial factor that underpins the success and survival of organizations. Business Analytics (BA), as emphasized by numerous studies, emerges as a pivotal variable with the potential to significantly influence strategic change. Moreover, it found evident that Decision Support Systems (DSS) can substantially reinforce and facilitate the prominent role of BA in the realm of decision-making. With this in mind, this study aims to investigate the influence of Business Analytics on Strategic Change within the context of the Jordanian environment, with the presence of Decision Support Systems as a moderating factor, particularly within the Food Import sector.

Given the importance of this topic, the researcher is currently conducting a study entitled: **: (The Impact of Business Analytics on Strategic Change: The Moderating**

Role of Decision Support Systems - A Field Study on Food Import Companies in Amman, Jordan) as part of my master's degree in the Business Administration Department at Middle East University, Amman, Jordan.

In acknowledgment of your esteemed, well known, and extensive experience, the researcher will highly appreciate your effort in evaluating the attached questionnaire. Your opinion and directive will enrich the questionnaire's paragraphs, making them more valid for the purpose they were composed for. Therefore, the researcher requests that you to put a mark (√) in front of the answer you deem appropriate for each question.

I assure you that all responses will be treated with the utmost confidentiality.

Thank you for your cooperation with the utmost respect and appreciation.

Yours Sincerely,

Researcher name: Zeinab Hammouqah Supervisor name: Prof. Ahmad Ali Salih

General Information (Demographics Characteristics)

Please choose the appropriate answer by ticking (✓) the appropriate place:

1) Gender:

Male	( )	Female	( )

2) Educational level:

Bachelor's	( )	Master's	( )
High Diploma	( )	PhD	( )

3) Years of Experience:

Less than 6 years	( )	6 - 11 years	( )
11 - 16 years	( )	16 years & above	( )

4) Management level:

Top-Level Management	( )	Middle-Level Management	( )
First-Level Management	( )		

Questionnaire

The questionnaire relates to all the information related to the subject of the study, choosing the appropriate answer by placing a sign (✓) in the appropriate place:

NO.	The topics of the questionnaire and its operational definitions and paragraphs	Strongly agree أوافق بشدة	Agree أوافق	Somewhat agree أوافق الى حد ما	Disagree لا أوافق	Strongly disagree لا أوافق بشدة
Independent Variable: Business Analytics Is a spectrum of techniques and methodologies employed to extract valuable insights from data, facilitating more informed strategic decision-making through the utilization of various functions and tools tailored to its specific context especially in Food Import Companies. Business Analytics can be classified into three distinct .levels: Descriptive, Predictive, and Prescriptive. **المتغير المستقل: تحليلات الأعمال** هي مجموعة من التقنيات والمنهجيات المستخدمة لاستخراج رؤى قيمة من البيانات، مما يسهل اتخاذ قرارات استراتيجية أكثر استنارة من خلال استخدام وظائف وأدوات مختلفة مصممة وفقا لسياقها الخاص، خاصة في شركات استيراد الأغذية. ويمكن تصنيف تحليلات الأعمال إلى ثلاثة مستويات مختلفة: وصفية وتنبؤية وتوجيهية.						
Dimension 1: Descriptive Analytics Descriptive analytics is the most commonly used toolset for data analysis. It helps us understand past and current business performance by sorting, describing, and organizing data. These tools reveal new patterns through calculations like means, frequencies, variations, rankings, and deviations. This helps to create charts, reports, dashboards, scorecards, and data warehouses, showing patterns and trends in the data, which, in turn, provide insights into past and current events. **البعد الاول: التحليلات الوصفية** التحليلات الوصفية هي مجموعة الأدوات الأكثر استخدامًا لتحليل البيانات. فهي تساعدنا على فهم أداء الأعمال السابقة والحالية من خلال فرز البيانات ووصفها وتنظيمها. تكشف هذه الأدوات عن أنماط جديدة من خلال المتوسطات الحسابية والتكرارات والاختلافات والتصنيفات والانحرافات. والتي تساعد بالتالي إلى إنشاء مخططات وتقارير ولوحات معلومات وبطاقات أداء ومستودعات بيانات، تعرض الأنماط والاتجاهات في البيانات، والتي بدورها توفر رؤى حول الأحداث الماضية والحالية						
1	The company's management relies on data to diagnose problems. تعتمد ادارة الشركة على تحليل البيانات في تشخيص المشكلات					
2	The company's management maintains thorough documentation of all its					

	activities in dedicated databases. تحتفظ ادارة الشركة بجميع أنشطتها موثقة جيدًا في قواعد بيانات خاصة					
3	The company's management uses graphic shapes to describe data تستخدم ادارة الشركة الاشكال البيانية في وصف البيانات .					
4	The company's management utilizes the mean for data analytics. تتعامل ادارة الشركة مع المتوسطات الحسابية في تحليلات البيانات					
5	The company's management employs frequencies for data analytics. توظف ادارة الشركة استعمال التكرارات في وصف البيانات					
6	The company's management incorporates deviations in their decision making. تحدد ادارة الشركة مستوى الاتفاق على قراراتها باعتماد الانحرافات المعيارية					
NO.	The topics of the questionnaire and its operational definitions and paragraphs	Strongly agree أوافق بشدة	Agree أوافق	Somewhat agree أوافق الى حد ما	Disagree لا أوافق	Strongly disagree لا أوافق بشدة
Dimension 2: Predictive Analytics Predictive analytics is a data-driven approach that utilizes historical and current data to forecast future performance and reveal statistical trends and indicators. This is achieved through the application of statistical models and forecasts, along with the use of business intelligence and advanced analytics platforms. The primary goal is to facilitate decision-making, strategy development, and the application of predictive analytics to data. **البعد الثاني: التحليلات التنبؤية**						

التحليلات التنبؤية هي نهج يعتمد على استخدام البيانات التاريخية ومعطيات الحاضر للتنبؤ بالأداء المستقبلي والكشف عن التوجهات والمؤشرات الحاكمة من خلال تطبيق النماذج والتنبؤات الإحصائية بما في ذلك ذكاء الأعمال ومنصات التحليلات المتقدمة. وتهدف بشكل رئيسي الى تسهيل عملية صنع القرار وتطوير الاستراتيجيات والتحليلات التنبؤية للبيانات						
7	The company's management employs predictive analytics to evaluate competitive features. تعتمد ادارة الشركة التحليلات التنبؤية في تحديد ملامح المنافسة					
8	The company's management employs Predictive modelling to forecast future performance. تتعامل ادارة الشركة مع النمذجة التنبؤية للتنبؤ بالأداء المستقبلي					
9	The company's management defines its approach to environmental adaptation by analyzing predictive results. تختار ادارة الشركة طريقة تكيفها مع البيئة بناء على نتائج التحليلات التنبؤية .					
10	The company's management places trust in data over their own intuition when data contradicts their opinions. تثق ادارة الشركة بالبيانات بدلاً من شعورها الحدسي عندما تتعارض البيانات مع آرائها					
11	The company's management employs information technology to analyze business data with the support of					

	business analytics systems. تؤمن ادارة الشركة باستخدام تكنولوجيا المعلومات لتحليل بيانات الأعمال بمساعدة أنظمة تحليلات الأعمال					
12	The company's management utilizes "big data analytics" to achieve its future objectives. تصيغ ادارة الشركة اهدافها المستقبلية بناءا على تحليلات البيانات الضخمة					
NO.	The topics of the questionnaire and its operational definitions and paragraphs	Strongly agree أوافق بشدة	Agree أوافق	Somewhat agree أوافق الى حد ما	Disagree لا أوافق	Strongly disagree لا أوافق بشدة
Dimension 3: Prescriptive Analytics Prescriptive analytics covers a range of technologies and tools, such as simulation programs, scenarios, and various improvement methods. It employs mathematics, algorithms, and data analysis to assess various strategies and options for change. The primary objective is to identify the most effective ways to achieve business objectives and make optimal decisions in each unique situation. **البعد الثالث: التحليلات المنظورية** هي مجموعة من التقنيات والأدوات والتي تتمثل ببرامج المحاكاة والسيناريوهات وطرق التحسين المختلفة عن طريق استخدام وتطبيق الرياضيات والخوارزميات وتحليل البيانات لتقييم الخيارات والاستراتيجيات المختلفة من اجل التغيير. وتهدف بشكل رئيسي الى العثور على الطرق الأكثر فعالية لتحقيق أهداف العمل وأفضل القرارات لكل موقف.						
13	The company's management integrates Business analytics into its business processes تدمج ادارة الشركة تحليلات الأعمال في عملياتها التجارية					
14	The company's management applies Simulation for data analytics تتعامل ادارة الشركة مع انظمة المحاكاة لتحليل البيانات					
15	The company's management uses scenarios for data analytics					

	تستخدم ادارة الشركة السيناريوهات لتحليل البيانات					
16	The company's management uses math for making decisions تصنع ادارة الشركة قراراتها الاستراتيجية باعتماد تطبيقات الرياضيات					
17	The company's management analysis the external environment components using algorithms تحلل ادارة الشركة مكونات البيئة الخارجية باستخدام الخوارزميات					
18	The company's management uses Business Analytics to support high-risk decisions. تستخدم ادارة الشركة تحليلات الأعمال لدعم القرارات عالية المخاطر.					
NO.	The topics of the questionnaire and its operational definitions and paragraphs	Strongly agree أوافق بشدة	Agree أوافق	Somewhat agree أوافق الى حد ما	Disagree لا أوافق	Strongly disagree لا أوافق بشدة

Dependent variable: Strategic Change

Strategic change is an integrated methodology for making major adjustments and improvements in the intellectual and organizational building of companies in response to the requirements of adapting to the pressures of the external environment and the accelerated competitive challenges in order to reduce threats and raise the organization's effectiveness in obtaining opportunities, either using evolutionary (gradual) change or revolutionary (radical) change based on the type of environmental pressures and the scope and speed of change and measured by the response of sample .members to the paragraphs of the questionnaire

المتغير التابع: التغيير الاستراتيجي

التغيير الاستراتيجي هو منهجية متكاملة لأجراء التعديلات والتحسينات الكبيرة في البناء الفكري والتنظيمي للشركات استجابة لمتطلبات التكيف مع ضغوط البيئة الخارجية والتحديات التنافسية المتسارعة بهدف تقليل التهديدات ورفع مستوى فاعلية المنظمة في الحصول على الفرص، اما باستخدام التغيير التطوري (التدريجي) او التغيير الثوري (الجذري) بناء على نوع الضغوط البيئية ونطاق التغيير وسرعته ويقاس بدرجة استجابة افراد العينة على فقرات الاستبانة .

Dimension 1: Evolution Change

Evolution Change is a systematic approach that involves gradual and slow changes, characterized by step-by-step progress and ability to reverse the path if necessary. It does not fundamentally change the company's management 's core beliefs or values, but rather focuses on making specific adjustments that include reviewing and evaluating managers' roles, improvements in performance methods, completion of tasks, and changes in the organizational and functional structure through the adoption of technologies of technical-social systems, comprehensive quality management, and flexible work teams, and is measured by the response of sample members to survey paragraphs.

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البعد الأول: التغيير التطوري

هو أسلوب منهجي يتضمن تغييرات تدريجية وبطيئة، تتميز بالتقدم خطوة بخطوة والقدرة على عكس المسار إذا لزم الأمر. إنه لا يغير بشكل أساسي المعتقدات أو القيم الأساسية للشركة، انما يركز على إجراء تعديلات محددة تتضمن مراجعة وتقييم أدوار المديرين وتحسينات في طرائق الأداء وإنجاز المهام وتحويرات في الهيكل التنظيمي والوظيفي باعتماد تقنيات النظم التقنية – الاجتماعية ، وإدارة الجودة الشاملة ، وفرق العمل المرنة ويقاس بدرجة استجابة افراد العينة على فقرات الاستبانة .

19	The company's management has clear goals for development تمتلك ادارة الشركة أهداف واضحة للتطوير					
20	The Company's management adopts an action plan that identifies areas of development in performance. تتبنى ادارة الشركة خطة عمل تحدد مجالات التطور في الأداء.					
21	The company's management adapts some functions to face environmental changes. تكيف ادارة الشركة بعض الوظائف لمواجهة التغيرات البيئة .					
22	The company's management regularly assesses the level of technological development					

	تقيم ادارة الشركة مستوى التطور التكنولوجي بانتظام					
23	The company's management use technology to match employees capabilities توظف ادارة الشركة التكنولوجيا بشكل يتوافق وقدرات العاملين					
24	The company's management partially adjusts its objectives if necessary تعدل ادارة الشركة في أهدافها بشكل جزئي إذا تطلب الامر					
25	The company's management makes limited adjustments to the strategy depending on the type of environmental changes تجري ادارة الشركة تعديلات محدودة على الاستراتيجية تبعا لنوع التغيرات البيئية					
26	The company's management applies comprehensive quality management ideas تتبنى ادارة الشركة أفكار إدارة الجودة الشاملة					
27	The company's management conducts brainstorming sessions to discuss methods of developing its results تجري ادارة الشركة جلسات عصف ذهني لمناقشة أساليب تطوير نتائج الاداء					
NO.	The topics of the questionnaire and its operational definitions and paragraphs	Strongly agree أوافق بشدة	Agree أوافق	Somewhat agree أوافق الى حد ما	Disagree لا أوافق	Strongly disagree لا أوافق بشدة
Dimension 2: Revolution Change						

Revolutionary change represents a systematic approach adopted by the company's management to drastically transform its goals, working methods, organizational structure, and strategy. This transformation is aimed at achieving the most effective response to environmental changes and addressing competitive pressures. It involves the adoption of methods such as re-engineering, restructuring, fostering creativity, embracing high-risk activities, fostering effective readiness for managing great resistance to change. The measurement of this method is based on the responses of sample members to the questionnaire's paragraphs.

البعد الثاني: التغيير الثوري

هو أسلوب منهجي تتبناه ادارة الشركة لأحداث لتحول الجذري في أهدافها او طرائق عملها او هيكلها واستراتيجيتها. يهدف هذا التغيير الى تحقيق افضل استجابة للمتغيرات البيئية ومواجهة الضغوط التنافسية باعتماد وتبني تقنيات إعادة الهندسة ، إعادة الهيكلة، الابداع، المخاطرة العالية ويحتاج ايضا الى مستوى جاهزية فاعلة لمواجهة مقاومة التغيير الكبيرة ، ويقاس بدرجة استجابة افراد العينة على فقرات الاستبانة .

28	The company's management has a vision for comprehensive change. تمتلك ادارة الشركة رؤية للتغيير الشامل					
29	The company's management adopts a procedural action plan for comprehensive changes. تتبنى ادارة الشركة خطة عمل إجرائية لأحداث التغييرات الشاملة					
30	The company's management is proactive in conducting a comprehensive review of its objectives when deemed necessary. تبادر ادارة الشركة لإعادة النظر بأهدافها كليا إذا تطلب الامر.					
31	The company's management implements substantial changes to the organizational structure in response to competitive pressures.					

	تجري ادارة الشركة تغييرات شاملة على الهيكل التنظيمي استجابة للضغوط التنافسية.					
32	The company's management re-engineers its procedures to accelerate efficiency. تعيد ادارة الشركة هندسة إجراءاتها لتسريع الفاعلية .					
33	The company's management stimulates creative ideas that lead to changes in work methods. تحفز ادارة الشركة الأفكار الإبداعية التي تغير من أساليب العمل					
34	The company's management discontinues products that no longer comply with environmental standards. تتخلى ادارة الشركة عن بعض منتجاتها التي أصبحت لا تلبي المتطلبات البيئية.					
35	The company's management employs forward-thinking strategies to anticipate future trends and market growth. تستخدم ادارة الشركة رؤى التفكير المستقبلي لتوقع الاتجاهات المستقبلية لنمو السوق.					
36	The company's management nurtures rising leaders for future responsibilities. تصنع ادارة الشركة قيادات واعدة للمهام المستقبلية					
NO.	The topics of the questionnaire and its	Strongly agree أوافق بشدة	Agree أوافق	Somewhat agree	Disagree لا أوافق	Strongly disagree

	operational definitions and paragraphs			أوافق الى حد ما		لا أوافق بشدة
Moderator variable: Decision Support Systems A Decision Support System (DSS) is a computerized information system designed to facilitate decision-making. It comes in various types, each tailored to the complexity of the decision problem, including communications-driven, data-driven, document-driven, knowledge-driven, and model-driven systems. DSS directly interfaces with data and analytical models to assist decision-makers in addressing crucial challenges, enhancing productivity, saving time, reducing costs, improving decision quality, and increasing organizational effectiveness and efficiency. It employs technology, data, documents, knowledge, and models to identify and resolve issues related to decision-making. DSS provides enhanced information, models, and tools for data manipulation, making it valuable for a range of business needs. **المتغير المعدل : نظم دعم القرارات** نظم دعم القرارات (DSS) هو نظام معلومات محوسب يساعد في اتخاذ القرار. ويأتي في أنواع مختلفة اعتمادًا على مدى تعقيد مشكلة القرار بما في ذلك القائمة على الاتصالات، والقائمة على البيانات، والقائمة على المستندات، والقائمة على المعرفة، والقائمة على النموذج. وهي تعمل بشكل مباشر مع البيانات والنماذج التحليلية لمساعدة صناع القرار على مواجهة التحديات المهمة وتحسين الإنتاجية وتوفير الوقت وخفض التكاليف وتعزيز جودة القرار وجعل المنظمة أكثر فعالية وكفاءة. ويستخدم التكنولوجيا والبيانات والوثائق والمعرفة والنماذج لتحديد وحل المشكلات المتعلقة باتخاذ القرار. توفر نظم دعم القرارات DSS معلومات ونماذج وأدوات أفضل لمعالجة البيانات، مما يجعلها مفيدة لاحتياجات الأعمال المختلفة.						
37	The company's management policies support the use of DSS. توفر ادارة الشركة سياسات لاستخدام نظم دعم القرارات					
38	The company's management enables all departments to utilize DSS effectively for problem solving. تدرب ادارة الشركة جميع الإدارات على استخدام نظم دعم القرارات لحل مشاكلهم بشكل فعال.					
39	The Company's management supports the analysis of critical issues with the use of DSS. تساند ادارة الشركة تحليلاتها للقضايا الحرجة باستخدام نظم دعم القرارات					
40	The company’s management uses advanced computers to					

	share information for decision-making. تتعامل ادارة الشركة مع أجهزة كمبيوتر متقدمة لمشاركة المعلومات لاتخاذ القرارات					
41	The company's management uses DSS for flexible information exchange between departments تستخدم ادارة الشركة نظم دعم القرارات لتبادل المعلومات بشكل مرن بين مختلف الإدارات					
42	The company's management uses DSS to accelerate strategic decision-making processes. تسرع ادارة الشركة من خلال نظم دعم القرارات عمليات اتخاذ القرارات الاستراتيجية					
43	The company's management utilizes DSS to choose the best solutions for problems. تتبنى ادارة الشركة نظم دعم القرارات لتوليد أفضل الحلول للمشاكل					
44	The company's management applies DSS to overcome obstacles in achieving its goals. تعتمد ادارة الشركة نظم دعم القرارات لإزالة العقبات التي تعترض تحقيق الأهداف.					
45	The company's management utilizes DSS to support its strategic plan.					

	تستفيد ادارة الشركة من نظم دعم القرارات لخدمة خطتها الاستراتيجية.					
46	The company's management employs DSS to gain greater control over their work. توظف ادارة الشركة استعمال نظم دعم القرارات لسيطرة أكبر على العمل.					
47	The company's management employs DSS to improve the quality of decisions تعتمد إدارة الشركة على نظم دعم القرارات لتحسين جودة القرارات					
48	The company's management increases its innovations through DSS. تزيد ادارة الشركة من ابداعاتها عن طريق نظم دعم القرارات.					

Appendix (3)

Task Facilitation Book

جـامـعـة الـشـرق الأوسـط
MIDDLE EAST UNIVERSITY
Amman - Jordan

مكتب رئيس الجامعة
Office of the President

الرقم: د ر/خ/321
التاريخ: 2023/11/06

إلى من يهمه الأمر

تحية طيبة وبعد،،،

لغايات توفير وربط أسس التعاون مع خدمة المجتمع المحلي؛ نرجو التكرم بالموافقة على تقديم التسهيلات الممكنة للطالبة **زينب هاني حموقة** ورقمها الجامعي (402220062)، المسجلة في برنامج ماجستير إدارة الأعمال/ كلية الأعمال في جامعة الشرق الأوسط، والتي تتولى القيام بإعداد دراسة بحثية أكاديمية في رسالتها المعنونة بـ " أثر تحليلات الاعمال على التغيير الاستراتيجي :الدور المعدل لأنظمة دعم القرارات – دراسة ميدانية على شركات استيراد المواد الغذائية في عمان–الأردن"، علماً بأن المعلومات سيتم استخدامها لأغراض البحث العلمي وبصورة سرية.

وتفضلوا بقبول فائق الاحترام والتقدير...

رئيسة الجامعة

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