The Impact of Big Data on Decision-Making Quality: A Field Study on the Jordanian Pharmaceutical Manufacturing Companies

أثر البيانات الضخمة على جودة اتخاذ القرار: دراسة ميدانية على شركات تصنيع الأدوية الأردنية

Prepared by

Yazeed Reyad Haddadin

Supervised by
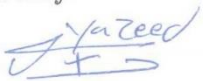
Prof. Dr. Abdel-Aziz Ahmad Sharabati

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Business Department
Business Faculty
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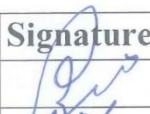**Name:** Yazeed Reyad Haddadin

Signature:

Date: 10/1/2024

Thesis Committee Decision

This thesis of the student Yazeed Reyad Haddadin, which studied "The Impact of Big Data on Decision-Making Quality on the Jordanian Pharmaceutical Manufacturing Companies" has been defined, accepted, and approved on 7/1/2024.

Committee Members:

No.	Name	Title	Signature
1	Prof. Dr. Abdel-Aziz Ahmad Sharabati	Supervisor and Member	
2	Prof. Dr. Ali Mohammad AlAdaileh	Internal Member & Chairman	
3	Prof. Dr. Azzam Azmi Aboumoghli	Internal Member	
4	Dr. Mohammad Qasem AlRosan	External Member	

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Yazeed Reyad Haddadin

Dedication

I would like to dedicate this thesis to my beloved parents, whose love and guidance are with me in whatever I pursue and achieve. You both make me want to capture the entire world.

Most importantly, I wish to thank my loving and supportive siblings and nephews, your support is highly appreciated.

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Yazeed Reyad Haddadin

Table of Contents

Chapter Three:Study Methodology

Chapter Four:Analysis and Results

Chapter Five:Results' Discussion, Conclusion & Recommendations

List of Tables

List of Figures

List of Model

List of Appendices

The Impact of Big Data on Decision-Making Quality: A Field Study on the Jordanian Pharmaceutical Manufacturing Companies

Prepared by: Yazeed Reyad Haddadin

Supervised by: Prof. Dr. Abdel-Aziz Ahmad Sharabati

Abstract

Purpose: This study aims to investigate the impact of Big Data on Decision-Making Quality in Jordanian Pharmaceutical Manufacturing Companies.

Design/Methodology/Approach: This study is considered a quantitative, descriptive, and causality study. To actualize this study, the data was collected from 170 managers who are working at the Jordanian Pharmaceutical Manufacturing Companies by using a questionnaire tool. After confirming the normality, validity, and reliability of the tool, descriptive analysis was carried out, and the correlation between variables was checked. Finally, the impact was tested by multiple regressions.

Findings: The result shows that the Jordanian Pharmaceutical Manufacturing Companies implement both Big Data sub-variables and Decision-Making Quality sub-variables. It also reveals that there is a strong correlation between Big Data sub-variables and Decision-Making Quality sub-variables. Finally, it shows that there is a significant and positive impact of Big Data sub-variables (Variety, Veracity, and Value) on Decision-Making Quality in Jordanian Pharmaceutical Manufacturing Companies, where Value has rated the highest impact on Decision-Making Quality, Veracity, and Variety. Big Data sub-variables (Volume and Velocity) do not show a significant impact on Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies.

Practical and Managerial Implications: Implementing Big Data in Pharmaceutical Manufacturing Companies is mandatory not an option. Therefore, including Big Data within the strategic taken decisions will directly achieve the desired outcome towards achieving the goals of the Company.

Limitations/Recommendations: The current study was conducted on Jordanian Pharmaceutical Manufacturing Companies. Therefore, it is recommended that future researchers collect more data over a longer time to check the current model validity and measuring instrument. It also recommends carrying out similar studies on other industries in Jordan and the same industry outside Jordan to test its result's generalizability.

Originality/Value: This study may be considered as one of few studies that tackle the issue of Big Data, and investigates its impact on Decision-Making Quality at the Jordanian Pharmaceutical Manufacturing Companies.

Keywords: Big Data, Decision-Making Quality, Jordanian Pharmaceutical Manufacturing Companies.

أثر البيانات الضخمة على جودة اتخاذ القرار: دراسة ميدانية على شركات تصنيع الأدوية الأردنية

إعداد: يزيد رياض الحدادين

إشراف: الأستاذ الدكتور عبد العزيز أحمد الشرباتي

الملخص

الغرض: تهدف هذه الدراسة إلى معرفة أثر البيانات الضخمة على جودة اتخاذ القرار في شركات تصنيع الأدوية الأردنية.

التصميم/الاجراءات: لتفعيل هذه الدراسة، تم جمع البيانات من 170 مديراً يعملون في شركات تصنيع الأدوية الأردنية باستخدام أداة الاستبيان. وبعد التأكد من طبيعية وصلاحية وثبات الأداة، تم إجراء التحليل الوصفي وفحص العلاقة الارتباطية بين المتغيرات. وأخيرا، تم اختبار التأثير من خلال الانحدارات المتعددة.

النتائج: أظهرت النتائج أن شركات تصنيع الأدوية الأردنية تطبق كلا من المتغيرات الفرعية للبيانات الضخمة والمتغيرات الفرعية لجودة اتخاذ القرار. كما تبين أن هناك علاقة قوية بين المتغيرات الفرعية للبيانات الضخمة والمتغيرات الفرعية لجودة اتخاذ القرار. وأخيرا، تبين أن هناك تأثير معنوي وإيجابي للمتغيرات الفرعية للبيانات الضخمة (التنوع، الصدق، والقيمة) على جودة اتخاذ القرار في شركات تصنيع الأدوية الأردنية، حيث كان للقيمة التأثير الأكبر على جودة اتخاذ القرار في شركات تصنيع الأدوية الأردنية ثم الصدق وأخيرا التنوع. في حين أن المتغيرات الفرعية للبيانات الضخمة (الحجم والسرعة) لا تظهر تأثيرا كبيرا على جودة اتخاذ القرار في شركات تصنيع الأدوية الأردنية.

التطبيقات العملية والإدارية: أصبح اليوم تنفيذ البيانات الضخمة في شركات تصنيع الأدوية أمرًا إلزاميًا وليس خيارًا. ولذلك، فإن إدراج البيانات الضخمة ضمن القرارات الإستراتيجية المتخذة سيحقق بشكل مباشر النتيجة المرجوة نحو تحقيق أهداف الشركة.

المحددات/التوصيات: أجريت الدراسة الحالية على شركات تصنيع الأدوية الأردنية. ولذلك، توصي الأبحاث المستقبلية بجمع المزيد من البيانات على مدى فترة أطول للتحقق من صحة النموذج الحالي وأداة القياس. كما توصي بإجراء دراسات مماثلة على الصناعات الأخرى في الأردن وعلى نفس الصناعة خارج الأردن لاختبار إمكانية تعميم نتائجها.

الأصالة / القيمة: يمكن اعتبار هذه الدراسة من الدراسات القليلة التي تتناول موضوع البيانات الضخمة، وتبحث تأثيرها على جودة اتخاذ القرار في شركات تصنيع الأدوية الأردنية.

الكلمات المفتاحية: البيانات الضخمة، جودة اتخاذ القرار، شركات تصنيع الأدوية الأردنية.

Chapter One
The Background & Significance of the Study

1.1 Background

Data acts as the cornerstone that sustains the organization. Since the invention of computers, a lot of data has been created rapidly, basic information like customer names, addresses, and personal details would be lost if not stored properly. This kind of information is crucial for organizations to function smoothly every day and make proper decisions that will lead the firm to achieve its goals.

The progression of digitized technologies has enabled data to be collected at an unprecedented pace (Tushman and Anderson, 2018). The Knowledge of big data has emerged as a prominent research focus, the fast expansion of data surpasses their current capabilities to develop adequate technologies for data storage and analysis, compelling them to create efficient solutions (Yaqoob et al, 2016).

On another hand, Big Data is anticipated to direct the changing of different aspects of the companies. For case, a change in considering about infrastructure of data, Intelligence of Business, and Knowledge strategy is known to utilize data (Fiaz et al., 2016). The primary various among Information and other source advances is that huge Information beside assessment or keeping information but is also about managing this information (Bello-Orgaz et al., 2016).

According to Elgendy and Elragal (2014), Having this kind of information is important for organizations to keep running smoothly daily. Data is the foundation that holds up organizations and enhances decision-making using predictive analytics software, as well as engaging in real-time offers to retain valuable customers, big data exhibits the

capability to gather an extensive array of data from both current and past customers (Wang et al, 2018).

Technology has caused organizations to be built and functioning differently, which has made them require new ideas and various working instruments (Brunswicker et al., 2015). Kościelniak and Puto (2015) mentioned that the massive changing areas, with the grouping of IT, telecommunications and video/media utilizing the technology has a large impact on the process of the decision-making of projects. Decision-Making is joined by a huge stock of data and applications for their. He also focused on the significance of Big Data in the quality and process that contribute the decision-making and the importance of fully data management in projects.

According to Russom (2011), big data sizes are continuously growing and can contain anything from a few dozen Tera-bytes (TB) to several Peta-bytes (PB) of information in a single data set. Therefore, gathering, keeping, looking, sharing, managing, analyzing, and visualizing huge stocks of data that can be motivated and challengeable. Businesses these days are examining lots quantity of extremely specific data to learn new facts. Additionally, he defines big data as the sophisticated methods used to oversee and manage large data volumes. Business change is revealed and leveraged by management through massive data sample analysis. Nonetheless, managing a greater collection of data gets more challenging.

Using Big Data able organizations to deal with the changes of environments around them and have the power to transfer information, which can improve decision-making of the enterprises (McAfee et al., 2012).

According to Adrian et al. (2016), The way to keep-up with Big Data comes from the characteristics of the data itself which symbolize the "5Vs" (Volume, Velocity, Variety, Veracity, and Value).

Consequently, this thesis is directed to identify the impact of Big Data on Decision-Making Quality. It will be applied to Jordanian Pharmaceutical Manufacturing Companies that are well-known and leading the market.

1.2 Study Purpose & Objectives

The main purpose of this study is to find and examine the impact of big data on decision-making quality in the Jordanian Pharmaceutical Manufacturing Companies through achieving these objectives:

1- To identify the level of implementing the Big Data (Volume, Velocity, Variety, Veracity, and Value) in the Jordanian Pharmaceutical Manufacturing Companies.

2- To identify the level of implementing the Decision-Making Quality (Decision-Making Effectiveness and Decision-Making Efficiency) in the Jordanian Pharmaceutical Manufacturing Companies.

3- To identify the relationship between Big Data (Volume, Velocity, Variety, Veracity, and Value) and Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies.

4- To identify the impact of Big Data (Volume, Velocity, Variety, Veracity, and Value) on Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies.

1.3 Study Significance & Importance

This study has significant knowledge since it is the origin study that deals with big data and decision-making quality in the Arab world mainly in Jordan and especially covering pharmaceutical manufacturing companies.

The importance of this study is considered from both scientific and operational points of view as follows:

Theoretical Importance

This study could be regarded as a groundbreaking exploration into the impact of big data on decision-making quality. Furthermore, its objective extends beyond the pharmaceutical sector to offer insightful guidelines on the impact of Big Data Management across multiple different industries and companies.

It will also provide a huge benefit in the academic field of big data and it is related to the quality of decision-making.

Practical and Operational Importance

The Jordanian Pharmaceutical Manufacturing sector includes prominent companies known for their diligent endeavors to enhance medical treatments and accessibility to patients. The result of this research holds the potential to offer substantial advantages to pharmaceutical companies. By supporting their capacity to utilize current resources and attract superior ones, these companies can enhance their decision-making processes, ultimately boosting their efficacy and efficiency. This, in turn, enables them to achieve their objectives and gain a competitive advantage. This study will be of great benefit for both top managerial level and soon-to-be managers working in the pharmaceutical manufacturing field.

1.4 Problem Statement

After meeting the pharmaceutical manufacturing companies' managers and discussing the problems they face in decision-making process, they stated that "Problems appear in making a proper decision, especially when dealing with big data that it is difficult to manage to achieve our goals". Big Data is becoming gradually more and more important as storing data becomes an essential process to help keep firms on the right track.

In clarify of the previous statements and discussion the maximum selection of Big Data in companies, many Jordanian Pharmaceutical Manufacturing Companies confirm and demand the presence of integration among Managing Big Data and the Quality of Decision-Making.

The enormous data that is produced using innovative technology has become a challenge for companies in managing data to make the optimum decision. On the other hand, the proper decision is one taking into consideration a fact-based decision not based on a random or emotional decision so understanding the relation between big data and decision-making will help in deciding with evidence-based data.

Based on the below studies statements, results and their recommendations, there should be more studies to assess the relationship among managing the big data and the quality of decision-making filling the gap between them.

Elbanna (2006) and Larrick (2012) suggest that to enhance our understanding of strategic decision-making, decision-makers must generate a diverse array of options, thereby broadening their search for alternatives. Furthermore, Shankar Narayanan and Cai (2006) as well as Lansing et al, (2018) advocate for the inclusion of contextual factors when evaluating data quality, asserting the importance of decision-makers being granted

the ability to consider these factors. Given decision-makers' continuous access to data, their responsiveness and efficiency are of paramount importance.

According to Gudivada et al, (2015) and Hmoud et al, (2023) big data Mentors in several objections, including how to gather, collect, store, clean, analyze, strain, search, share, secure, adopt business intelligence, and visualize data. Consider the problem of storing and recovering big data especially once unlimited by the volume of available data.

So, this study has been developed to solve this problem by responding the main question:

What is the impact of Big Data (Volume, Velocity, Variety, Veracity, and Value) on Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies?

1.5 Study Questions

Depending on the section of the problem statement, the main question is developed:

What is the impact of Big Data (Volume, Velocity, Variety, Veracity, and Value) on Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies?

To answer this question, the following sub-questions have been developed:

Q1: What is the level of implementing Big Data (Volume, Velocity, Variety, Veracity, and Value) in Jordanian Pharmaceutical Manufacturing Companies?

Q2: What is the level of implementing the Decision-Making Quality (Decision-Making Effectiveness and Decision-Making Efficiency) in the Jordanian Pharmaceutical Manufacturing Companies?

Q3: What is the relationship between Big Data (Volume, Velocity, Variety, Veracity, and Value) and Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies?

Q4: What is the impact of Big Data (Volume, Velocity, Variety, Veracity, and Value) on Decision-Making Quality in Jordanian Pharmaceutical Manufacturing Companies?

The first two questions will be evaluated through the Descriptive statistic means, standard deviations, t-value, ranking, and importance.

The third question will be measured through Bivariate Pearson correlation analysis.

The fourth question will be measured by analyzing the following main hypothesis.

1.6 Study Hypotheses

The fourth question will be measured and responded by examining the following main hypothesis.

H0: Big Data (Volume, Velocity, Variety, Veracity, and Value) does not impact Decision-Making Quality in Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

This main hypothesis is divided into the following sub-hypotheses:

H0.1: Big Data Volume does not impact Decision-Making Quality in Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

H0.2: Big Data Velocity does not impact Decision-Making Quality in Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

H0.3: Big Data Variety does not impact Decision-Making Quality in Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

H0.4: Big Data Veracity does not impact Decision-Making Quality in the Jordanian

Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

H0.5: Big Data Value does not impact Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

1.7 Study Model

This study requires to achieve its main concerns of verifying the impact of big data on decision-making quality in the Pharmaceutical Firms in Jordan, based on the study hypotheses this model has been created and shaped to see the relationship between the independent and dependent variables and their components. As is shown in the following study model Figure (1).

The features of big data are: Volume, Velocity, Variety, Veracity, Value, Venue, Variability, Validity, Vulnerability, and Visualization which symbolize the "10Vs", This study model will cover the five important and more frequent Vs according to previous studies which are: Volume, Velocity, Variety, Veracity, and Value.

According to Havakhor (2016), Moyne and Iskandar (2017) and Hariri et al, (2019), suggested in their papers that the independent variables for big data are: Volume, Velocity, Variety, Veracity, and Value abbreviated as 5Vs. According to Shamim et al., (2019), Spetzler et al., (2016) & Nisar et al., (2021), suggested in their papers that the components of the dependent variable for decision-making quality are: effectiveness and efficiency.
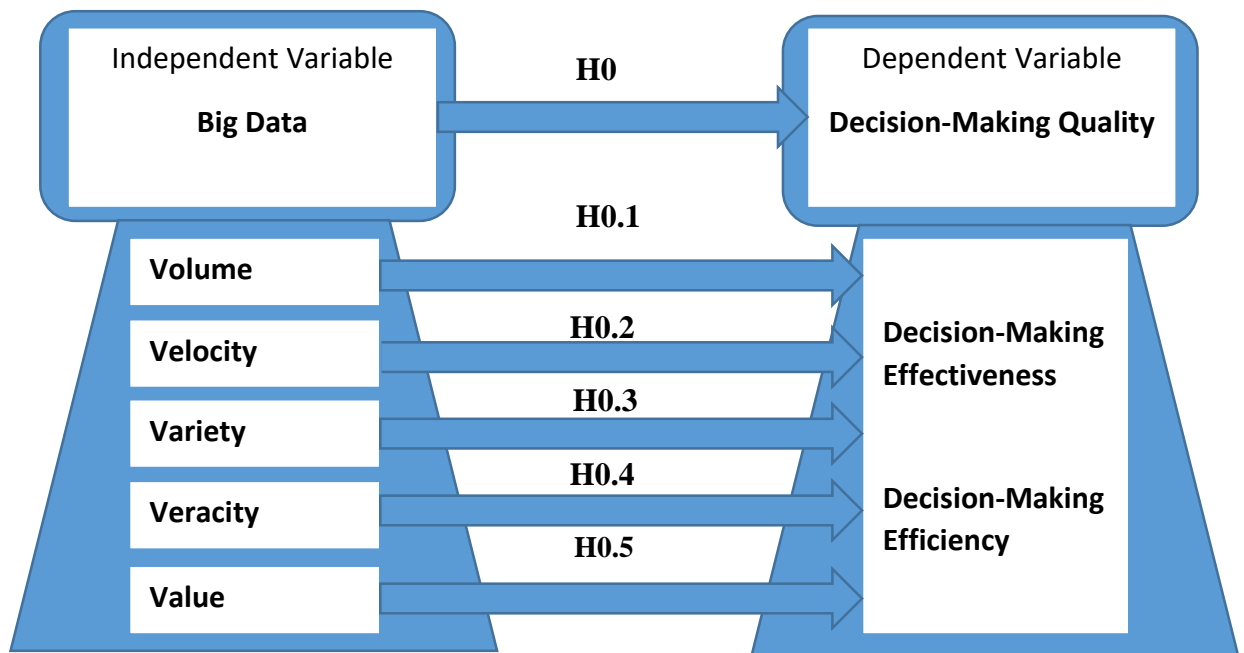
Figure 1: Study Model

Source for independent variable: (Havakhor, 2016; Moyne and Iskandar, 2017; Hariri et al, 2019). Source for dependent variable: (Spetzler et al., 2016; Shamim et al., 2019; Nisar et al., 2021).

1.8 Operational Definitions

Independent Variables:

Big Data: This is defined as the distinctive attributes and properties of large and complex datasets managed by processes, technologies, and strategies employed by companies to collect, store, process, and manage massive and complex datasets. These are often characterized using the "5 Vs" framework.

In this study, Big Data is a way to identify the data handling by the organization through verifying the Vs characteristic resulting in the end high-quality decision-making.

Big Data will be evaluated by the five important and more frequent Vs according to previous studies which are:

1. **Volume:** defined as the huge size and quantity of data generated either consumes huge warehouses or consists of a massive number of records. The huge information in Big Data itself characterizes the Volume and it will be measured by the questions (1-5) of the questionnaire.

2. **Velocity:** defined as the speed or sheer of creating very fast data and the lower time to gather it and the fast of the data collected from multiple sources, the velocity of the data isn't bounded to the fast of given data but likewise the sheer at which the information collected and managed and it will be measured by the questions (6-10) of the questionnaire.

3. **Variety:** is defined as the multiple sources of gathering diverse data. A variety of data points out the diverse range of data types, arrangements, and sources that big data encompasses and it will be measured by the questions (11-15) of the questionnaire.

4. **Veracity:** defined as the truthiness and credibility of the generated data and the trust of the data sources and it will be measured by the questions (16-20) of the questionnaire.

5. **Value:** defined as the extraction of hidden knowledge from the data gathered for getting a competitive advantage (Data is separating to discover high value) and it will be measured by the questions (21-25) of the questionnaire.

Dependent Variables:

Decision-Making Quality: is defined as the contribution a decision makes to achieving organizational goals.

Decision-Making Quality will be evaluated by the two dimensions according to previous studies which are:

1. **Decision-Making Effectiveness:** This is defined as the degree to which a data-driven decision allows a business to understand customers effectively, make decisions in real time, and react to change more quickly and it will be measured by the questions (26-30) of the questionnaire.

2. **Decision-Making Efficiency:** defined as the quality of achieving the desired results using the lowest resources such as time, cost, etc. Which leads to making a quality decision efficient and it will be measured by the questions (31-35) of the questionnaire.

1.9 Study Limitations

The purpose of the thesis is arranged as follows:

- **Place limitation:** This study will be implemented to Jordanian Pharmaceutical Manufacturing Companies including MS Pharma, Hikma and Dar El-Dawa.

- **Humanity limitation:** The managers in the pharmaceutical companies.

- **Time limitation:** The Academic year of 2022/2023.

- **Scientific limitations:** In this study, the relationship between big data (Volume, Velocity, Variety, Veracity and Value) on decision-making quality is going to be analyzed.

1.10 Study Delimitations

- This study will be applied in the Jordanian Pharmaceutical Manufacturing Companies, and it is difficult to generalize the results to other field organizations.

- This study will be connected to the Middle East environment; this may be particular to its outcomes in other remote regions.

- Study outcomes based on the objectiveness and truthiness of the sample members to the degree of their reactions to the survey.

Chapter Two
Theoretical Framework & Previous Studies

2.1 Introduction

This chapter includes a theoretical framework for the independent and the dependent variables and their sub-variables. Also, this chapter will cover the previous models and the previous studies related to the research.

2.2 Definitions of Variables

Definition of Independent Variable (Big Data):

Big Data: defined as top size, high sheer speed, and high variety of data information that need new forms of managing to enable enhanced decision-making by gathering a set of information from multiple sources and multiple formats. Big Data is classified as Unstructured Data and structured Data (Mannava, 2015). The challenges of dealing with data that is big, messy, and changes too quickly make it difficult to handle. It takes place with big data analytics and predictive analytics (Jeble et al, 2018). Big data characteristics and analytics consider the methodologies of analyzing a large amount of data using advanced statistical techniques such as regression classification and decision tree analysis (Elgendy and Elragal, 2014). Massive volume, high speed, and wide variety are characteristics of big data. By assembling strategic resources, organizations gain a competitive advantage. The combination of resources creates capabilities that are necessary for an organization and depend on the operating environment (Dash et al, 2019; Zakir et al, 2015). Big Data can help with reducing costs and improving efficiency, responding more rapidly to changing circumstances, giving suppliers greater power in supplier relationships, and improving sales and

operational planning capabilities (Gunasekaran et al, 2017). We may conclude that Big Data is achieving and controlling insights from huge datasets by applying certain techniques and skills (Rahmani et al, 2021).

In summary, Big Data is defined as the distinctive attributes and properties of large and complex datasets managed by processes, technologies, and strategies employed by organizations to gather, keep, prepare, analyze and manage large and complex datasets.

The study of Havakhor (2016); Moyne and Iskandar (2017) and Hariri et al., (2019) mentioned that the Volume, Velocity, Variety, Veracity, and Value are characteristics and dimensions of the Big Data.

- **Volume:** The kind of information and the huge quantity of data collected or created is known as frame data except it is data that contains files, photos, music, video, and media platforms content known as unstructured information or Big information. Big Data is a method of extracting benefit from these tremendous volumes of data, and it directs new market potentials and increase customer retention. (Zakir et al,2015). Huge information size is used to build occasions and deploy working manner with improving data quality (Sookhak et.al, 2017). According to Baoan (2014) stated that using large quantity of data allows predicting the outlook for many strategic decisions. According to Cai and Zhu (2015), the data volume ranges between megabytes and gigabytes, but because of the massive volume of the information companies deal with it, terabytes or more magnitudes are usually used to measure this data volume.

In summary, Volume is defined as the massive amount of data generated either consumes huge storage or consists of a large number of enrollments. The massive information in Big Data itself characterizes the Volume.

- **Velocity:** According to Chardonnens et al. (2013), explores the integration of fast-paced and massive industrial data using distributed in-memory storage and analytics. The main focus is on addressing the challenges of managing data characterized by both high velocity (rapid influx) and high volume (large quantities). The author discusses how distributed in-memory storage systems facilitate efficient data handling and analysis in real-time. By utilizing this approach, industries can effectively bridge the gap between the demanding speed and scale of new data processing in high-velocity scenarios. Moreover, Erickson and Rothberg, (2014) said big data demands to be shaped to able utilizing the knowledge of data effectively, also embracing big data velocity achieves many values and continuous profitability and provides quick manners in accomplishing tasks.

In summary, Velocity is defined as the speed or sheer of creating very fast data and the lower time to gather it and the fast of the data collected from multiple sources, the velocity of the data isn't bounded to the fast of given data but likewise the sheer at which the information collected and managed.

- **Variety:** Shneiderman and Plaisant (2015) emphasized methods for managing the challenges of the enormous volume of big data. They focus on the necessity of improving approaches to handle this data situation. A variety of data points out the diverse range of data types, arrangements, and sources that big data encompasses. He highlights the significance of customized visualization methods and analytic instruments to understand and extract insights from such varied data, helping researchers and professionals in adapting to the complexity of big data. Moreover, Sridhar and Dharmaji (2013) stated that Variety shows different types of data that are being collected and created. They connect former organized data

and be under the umbrella of semi-organized and unstructured data. Pharmaceutical companies gather data from various sources so it will make it easy for them to use analytics science to handle the Varieties of data. big data shapes a variety of significant support for organizations and can push companies to be more strategic (Zhan et al. 2016).

In summary, Variety is defined as the multiple sources of data which are diverse. A variety of data points out the diverse range of data types, arrangements, and sources that big data encompasses.

- **Veracity:** The reliability, precision, and truthiness of the information gathered and processed, which is pointed out as the veracity of data, helps in facilitating decision-making (Rubin and Lukoianova 2013). Hariri et al. (2019) directs the challenges related to ensuring that enormous amounts of data are credible, accurate, and free from biases. By focusing on these concerns, his study highlighted a roadmap for improving the credibility and objectivity of big data, allowing firms to make more professional decisions based on available information.

In summary, Variety is defined as the truthiness and credibility of the generated data and the trust of the data sources.

- **Value:** The meaningful information, knowledge, and applicable information that can be taken from enormous and complicated datasets is considered the major source of impact on decision-making quality (Saggi and Jain, 2018). He also focuses on utilizing advanced analytics methods to find valuable insights from big data, leading to optimum decision-making and innovation. His study made it clear that the process of converting raw data into applicable information is the right

means of creating value within multiple domains. The survey stated that utilizing big data achieves value-creation objectives. According to Zhan et al. (2016), Big data forms a significant value for the firms and can improve companies' strategic plans. Also Silwattananusarn and Tuamsuk, (2012) characterized that insights extracted from big data can discover the hidden relation between big data and decision-making and its performance.

In summary, Value is defined as the extraction of hidden knowledge from the data gathered to get a competitive advantage (Data is separated to discover high value).

Definition of Dependent Variable (Decision-Making Quality):

Decision-Making Quality: defined as the contribution a decision makes to achieving organizational goals (Wills, 2022). The goal of decision analysis is to facilitate improved decision-making which takes time and effort to make decisions (Keeney, 2004). Decision-making stands out as a perpetually evolving, challenging, and engaging focus of leadership investigation. Leaders face the ongoing task of discerning optimal choices while also ensuring the engagement of all relevant stakeholders due to the far-reaching implications of their decisions. The prosperity of any organization fundamentally hinges on the quality of decisions made by its leadership (Ejimabo, 2015). Utilizing big data allows decision-makers to enhance their understanding and make informed choices grounded in factual information rather than assumptions. The effectiveness of decisions derived from data hinges on the methodologies employed for data collection and analysis, along with the inherent quality of the data. Employing big data for improved decision-making presents notable managerial obstacles. To harness the benefits of big data in decision processes, addressing issues related to leadership, skillful workforce, technological availability, and the prevailing

organizational culture is vital (Shamim et al, 2019). Five steps may be identified in the big data process, which begins with data collection and ends with decision-making; problem awareness, data serving, data converting, data resolution, and solving the issues. The decision's quality is influenced by the inputs' quality as well as the process's quality in converting inputs into outputs (Janssen et al, 2017).

In summary, Decision-Making Quality is defined as the contribution a decision makes to achieving organizational goals.

The study of Spetzler et al, (2016); Shamim et al, (2019) and Nisar et al, (2021) mentioned that the Effectiveness and Efficiency are features and outcomes of the Decision-Making Quality.

- **Decision-Making Effectiveness:** The extent to which a data-centric choice empowers a business to gain a comprehensive comprehension of its customers, make prompt decisions, and swiftly respond to shifts is emphasized in prior research (Cao and Duan, 2014). Effective decision-making contributes to an improved understanding of customers, subsequently bolstering their satisfaction and loyalty. The capacity of businesses to make strategic choices is heightened when armed with comprehensive and precise insights into the correlations between options and outcomes (Cao, et al, 2019). Organizations should align their structural setup, processes, and operational procedures with data analysis strategies to diminish environmental uncertainties and intricacies of problem scenarios, thereby elevating the decision-making quality. The enhancement of decision-making effectiveness is positively influenced by the augmentation of information processing capabilities within a data-driven environment (Wang et al., 2018). On the contrary, intuitive decision-making contrasts significantly with

analytical decision-making, as the latter involves the identification and assessment of pertinent data, the weighing of costs and benefits, and the eventual selection after thorough contemplation (Dane, et al, 2012).

In summary, Decision-Making Effectiveness is defined as the degree to which a data-driven decision allows a business to understand customers effectively, make decisions in real time, and react to change more quickly.

- **Decision-Making Efficiency:** The effectiveness of incorporating resources seamlessly into the decision-making process, including factors like time and cost, contributes to arriving at high-quality decisions (Shamim et al, 2019). Every decision-making process culminates in a final selection, which can manifest as an action, viewpoint, or choice. Particularly in a production context, decision-makers are tasked with selecting the most suitable advanced manufacturing technique. This necessitates an assessment of various alternative options characterized by conflicting attributes (Sarkar, et al, 2015). The quality and process of the decision-making hinges on a trade-off between the efficacy and thoroughness of decisions alongside their associated costs. Global decisions tend to be more effective due to their comprehensive analysis of extensive data, even though they involve resource-intensive procedures carried out by a sizable workforce. On the other hand, local decisions are less expensive and simpler, relying on limited data inputs. In terms of efficiency, the quality of automatically made (online) decisions during operation is measured against decisions made (offline) without complete access to pertinent state information. High efficiency holds significant importance in practical applications (Doboli, et al, 2018).

In summary, Decision-Making Efficiency is defined as the quality of achieving the desired results using the lowest resources such as time, cost, etc. Which leads to making a quality decision efficient.

2.3 Previous Models

- **Spetzler, el al. (2016) Model:** This study shows the requirement of decision-making quality.
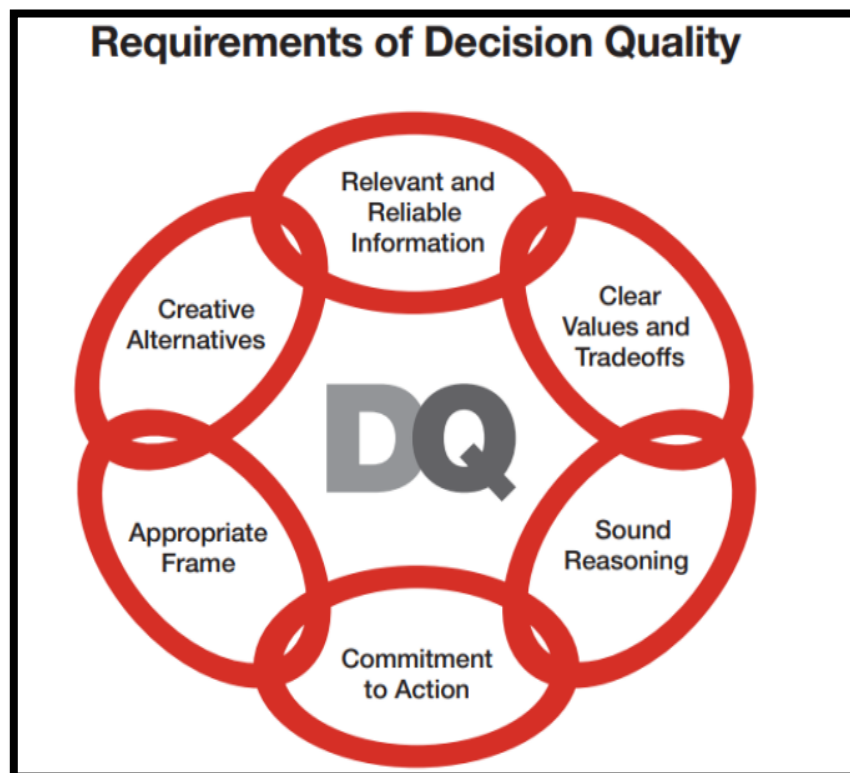
Model 1: Spetzler, el al. (2016) Model

The model (1) is added because it understands the requirement to improve the quality of the decisions.

- **Al-Hinn (2018) Model:** This study purposed to understand the impact and relation between Big Data (volume, veracity, velocity, and value) and Knowledge Management Process.
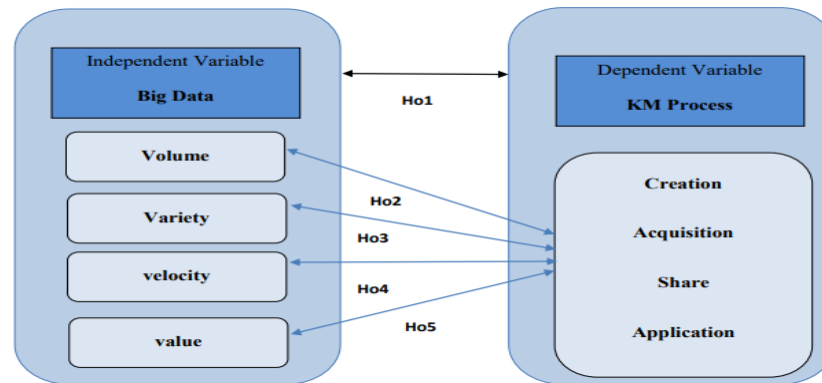
Model 2: Al-Hinn (2018) Model

The model (2) is added because it investigates the connect between Big Data Sub-Variables and the process of Information Management in Jordanian Commercial Banks.

- **Nafi and Ibrahim (2018) Model**: This study aimed to understand the impact of big data (volume, velocity, and variety) on the intelligence of business (organizational, process, and technology).
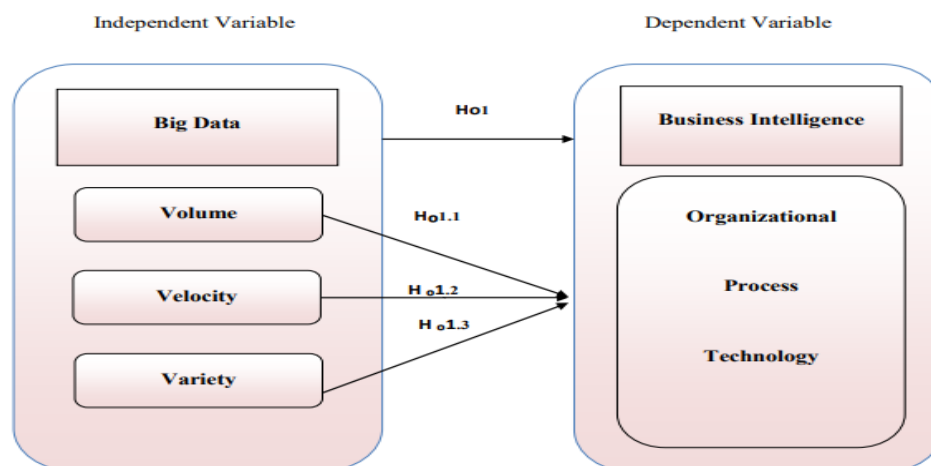
Model 3: Nafi and Ibrahim (2018) Model

The model (3) is added because it investigates the impact of big data on business intelligence.

- **Shamim et al. (2019) Model:** This study implements the understanding of the impact of big data challenges on the decision-making capability and its effect on the quality of the decisions.
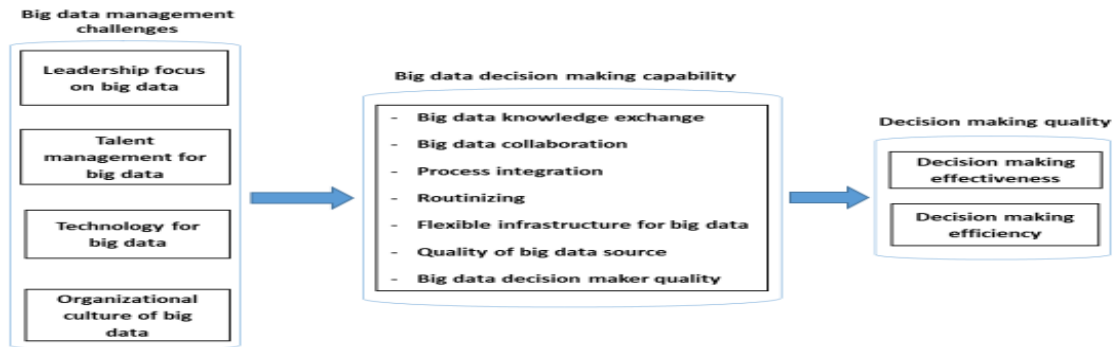
Model 4: Shamim et al. (2019) Model

The model (4) is added because it investigates the function of Big Data in improving Capability of Decision-Making and Quality.

- **Conboy et al. (2020) Model:** in their research, they managed to discover the connect between the dynamic capabilities of the (organization structure, technology, people, and process) and the relationship with analytics characteristics (volume, velocity, variety, variability, veracity, and visualization).
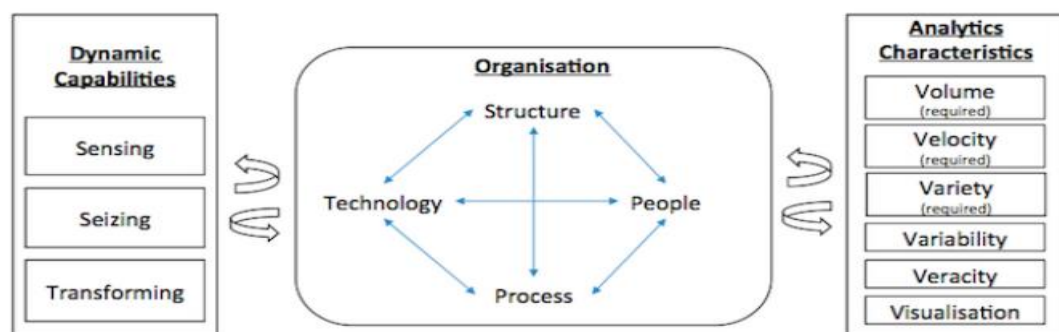
Model 5: Conboy et al. (2020) Model

The model (5) was quoted to study the embracing of Business Analytics to improve Dynamic Capabilities in Practical Research.

- **Al-Nimer (2022) Model**: is a study aimed on understanding the implementation of business intelligence on the process and quality of decision-making in the telecommunication industry in Jordan.
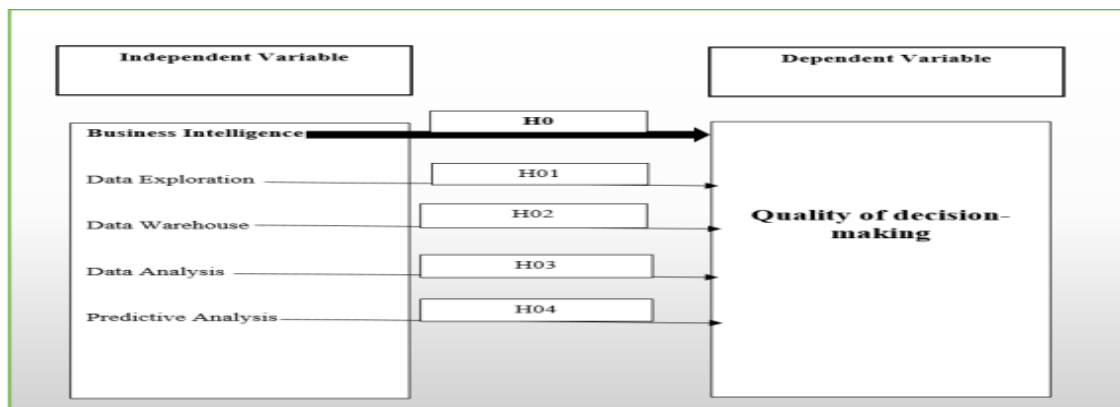
Model 6: Al-Nimer. (2022) Model

The model (6) is added because it understands the implementation of business intelligence on the quality of decision-making in the telecommunication sector in Jordan.

2.4 Previous Studies:

Gandomi and Haider (2014) study titled "Big Data Concepts, methods, and Analytics"

The research investigated the fundamental concepts relating to information with Big Data characteristics. The study tries to characterize Big Data and talks about the methods and technologies that occur to tackle the potential of Huge Data. A key participation of this paper is to bring the unwanted components of Big Data. The prevalence rejected on Big Data, which is overwhelmed and impacted by the marketing power of large hardware and program designer, focuses on structured information and surmise analytics. The study reflected the reality that size is one of the features of Big Data. Other highlights, such as the recurrences with which data are created, are closely significant in defining Big Data.

The paper at that point expands the dialog on different types of Big Data, photo, sound, image, and platform media.

Negulescu and Doval (2014) study titled "The quality of decision-making process related to organizations effectiveness"

The reason of Creating a demonstrate that joins decision-making quality to organizational objectives and effectiveness, this study examines the point of managers' and workers' views in Romania. A questionnaire was collected to have vision information from the research sample. It was watched that there was approval among participants about the correlation between qualitative decision-making and perfect organizational performance. The study makes recommendations for further research on the basic of the organization's decision-making process.

Donelan, et. al. (2015) Study titled "Factors influencing quality decision-making: Regulatory and pharmaceutical industry perspectives"

The purpose was to find into the reasons that are essential in making great choices. Semi-structured interviews were conducted with best decision-makers and administrative bodies. A few of the decision-making-related issues that were looked at in this consider were the validity, reliability, and quality of the data, time theorization, experience, and capability, and subjective and personal concerns. The outcomes illustrated the discovery of links among the distinctive subjects. The quality of the decision-making system should be examined, the report exhorts.

Ejimabo (2015) research titled "The influence of decision making in organizational leadership and management activities"

The primary purpose of this study is to measure the impact of decision-making in companies Leadership and management activities on advancement, development and

effectiveness, victory, and goal attainment in existing businesses, the research methodology involved four hundred past trade administrators and administration taken part in this consider and information in this study was collected through structured interviews and questionnaire. The results that risen from the data shown that there is a good demand for change and enhancement in decision-making among firms' executives while accommodating advanced professional tool and technology, diversity, globalization, approaches, teamwork, and leadership effectiveness with the recommendation to utilize the leadership skills within the organizations.

Marshall, et al. (2015) research titled "How Leading Organizations Use Big Data and Analytics to Innovate"

The concern of this study is to know how the great successful organizations utilize big data and analytics to improve, the research methodology measured by a qualitative approach by asking the managers about advanced goals and limitation to improve, and a quantitative approach utilizing measurement professional outcomes, treatment and sorts of development venture and the part of big data and analytics in advancement forms. Three distinct punches developed as an end result of the study: Pioneers, Strivers, and Strugglers. Pioneers are extraordinarily distinctive as a group that innovates in overseeing big data and management within a structured information approach, and they focus in particular on integration. the suggestion to be a driving organization is to take after the three basic strategies that center on data, data management skills, and data analytics capabilities.

Fiaz, et al. (2016) study titled "Data Visualization: Enhancing Big Data More Adaptable and Valuable"

The investigate examined the Information Visualization manners and Big Data which binding make the utilization of information administration more important and proficient. The study mentioned the features symbolize as the 3 V's (Volume, Variety and Velocity) of Big Data, as follows, the estimate of information presently is bigger than terabytes and beta bytes. peed demonstrates the time term for analyzing the information. Variety-Big Information comes from at least 35 assortments of roots. Furthermore, the study argued the contrasts between Big Data and Data traditional storages.

Havakhor (2016) study titled "Big Data and Organizational Impacts a Study of Big Data Ventures"

The paper examines the esteem suggestion of a Big Data Ventures as a basic constituent of its trade demonstrate and tries to understand how it effect the capital raised by Big Data in their first eras of improved. Then, the paper looks at the part that the organize embeddedness Big Data Ventures plays in its success. The paper hypothesizes that the positive affiliation between the degree of a Big Data Wander (volume, velocity, and veracity) strain and showcase returns for the contributing investing firm based on the approval of investing in the Big Data Ventures is necessary by the range of Big Data Ventures advancement. Finally, the paper showed that Big Data ventures methodology within the administration of its visual strategy with the possible impact on platform media.

Wang, et al. (2016) research titled "Towards Felicitous Decision Making: An Overview on Challenges and Trends of Big Data"

The period of Big Data has reached along with huge volume, complex, and expanding data created by many different sources. Nowadays, approximate every side of modern society is affected by Big Data components (5Vs) involving drugs, health care, business, administration, and government. The overarching reason and purpose of Big Data is focused on making decision. The last mentioned can happened in intelligent decisions based on crude information that we can clarify and make choices based on the discoveries. The results of this paper are the decision-making tools after Big Data facilitate decision-making in each stage of handling since the necessity of preparing a massive data within approved times and taking SMART decisions.

Ashraf (2017) study titled "Organizational Development and Big Data: Factors that impact successful Big Data Implementations"

The study includes operational clue through achieving a blended strategies study with both types of data. This research explores the required question with this study, "What impacts successful Big Data Implementations?" As portion of this inquire address a few of the following hypotheses were inspected: Big Data Features (volume, variety, velocity, veracity and value) emphatically impact effective Enormous Data Executions. To successfully achieves the study methodology, a qualitative section implements interviews with individuals and firms in the region then by a quantitative section using a questionnaire tool to examine connections between center definition derived from the qualitative section. Finally, the study considers start list for Big Data Implementations and lists that can impact that start level.

Oncioiu, et al. (2019) research titled "The Impact of Big Data Analytics on Company Performance in Supply Chain Management"

The essential objective of this consider was to look at how the application of huge information analytics and management can support Romanian supply-chain companies in evaluating their professional capabilities, strategies, and effectiveness for the successful integration of big data. Moreover, the study aimed to utilize the requisite tools important to accomplish these goals. The research methodology employed included a sampling survey, using a questionnaire as the method for data collection. The questionnaire comprised of closed-ended questions, evaluated through SPSS. A total of 205 managers provided comprehensive and profitable reactions, forming the fundamental of this research. The gathered data underwent analysis using SPSS software, utilizing procedures such as frequency tables, descriptive tables, and principal component analysis. The discoveries underscored companies' intrigue in distinguishing novel statistical techniques, methods, and methodologies, including cloud computing and security innovations. These developing avenues warrant thorough exploration and examination.

Pugna, et al. (2019) research titled "Corporate attitudes towards big data and its impact on performance management"

The essential objective of this study is to examine the Big Data and its effect on the environment surrounding the business with a center on execution administration is the reason for the organizational problems. Furthermore, investigates managers' recognitions, understanding, and states of mind relating to Huge Information and its management. The research methodology included a subjective inquire about strategy conducted with a see to recognize the pathway in which members see circumstances and occasions. then comes about gotten from senior administrators from 21 Romanian companies found that the foremost basic regions requiring mediation lie within the zone

of mindfulness and understanding, objective setting, evaluating benefits and impediments, learning to accept data, and commitment to an inserted data-driven culture in order to make proper decision that improves corporate performance management. The suggestion of this paper is that any activity to execute a data-driven culture within firm need to be number one in priority considered from a managerial approach.

Shamim, et al. (2019) research titled "Role of big data management in enhancing big data Decision-making capability and quality among Chinese firms"

The main concern of this paper is to investigate the organizational management raised by Enormous Information and its effect on the commerce and quality of decision-making with a center on enormous information capability. The research methodology involved quantitative strategy based on the organized survey that was used to gather the information from Chinese firms that utilized enormous information for decision-making. The results that this study achieved about that this think about accomplished is that superior adequacy is the result of quality decision-making encouraged by big data and knowing how to make esteem from the noteworthy sum of data they as of now have owing to its volume, velocity, variety, Veracity, and Value Esteem to form a quality choice that improves effectiveness and efficiency of corporate performance management resulted in the maximum satisfaction. The recommendation of this paper is to grasp the behavior of utilizing huge information administration in corporate vital choices.

Alkatheeri, et al. (2020) research titled "The Effect of Big Data on the Quality of Decision-Making in Abu Dhabi Government Organizations"

This study investigated the body of composing concerning the caliber of wide data sets, commonly alluded to as huge information, and its impact on the precision of decision-making quality. The approach utilized was clear, wrapping a comprehensive

study of both disseminated and unpublished coherent request. Moreover, a survey was submitted to directors inside Abu Dhabi Police Workplaces to pick up their experiences and point of view on this subject matter. The results of this examination wrapped up within the proposition of a hypothetical and conceptual system, fulfilled through a quantitative and numerical methodological approach. Furthermore, the think around brought to light that the quality of tremendous data serves as a prescient calculate for decision-making quality. Particularly, it was famous that inside Abu Dhabi Authoritative Organizations, the quality of tremendous data bears a critical impact on the by and huge quality of decision-making works out.

Nisar, et al. (2021) study titled "Big Data Management and Environmental Performance: Role of Big Data Decision-Making Capabilities and Decision-Making Quality"

This objective is attempted to look at the predecessors and portion of big data decision-making capabilities toward decision-making quality and common execution among Chinese open and private healing centers. The target populace comprised of administrative workers (IT specialists and officials) in clinics. Data collected utilizing an outline study from 752 respondents (374 respondents from open healing centers and 378 respondents from private healing centers) was subjected to PLS-SEM for examination. The comes about of the consider revealed that data organization challenges (administration center, ability administration, innovation, and organizational culture for huge information) are vital forerunners for enormous information decision-making capabilities in both open and private healing centers. Besides, it was moreover found that enormous information decision-making capabilities played a crucial and set up part in improving the decision-making quality (adequacy and proficiency), which emphatically contributes toward natural execution in open and private healing centers of China. Open

healing centers are paying more critical thought to gigantic data organization for the purpose of quality decision-making and natural execution than private clinics.

Ayokanmbi, (2021) study titled "The Impact of Big Data Analytics on Decision Making"

It highlights the significant size of data created different advanced gadgets like portable phones, social systems, computers, and wearables. Viably overseeing, analyzing, and leveraging this information is essential for supporting strategic processes and improving overall performance. The conversion of this data into value information and knowledge serves as a basic for shaped decision-making. The central center of the paper spins around investigating how professional analytical techniques and big data impact decision-making quality and hence contribute to attain greatness so a compelling method to achieve excellence so an effective technique for extracting knowledge and significant bits of knowledge from enormous data can upgrade vital decision-making to realize execution brilliance and competitive advantage.

Qaffas, et al. (2022) study titled "The impact of big data analytics talent capability on business intelligence infrastructure to achieve firm performance"

The objective of this research is to examine the impact of huge information ability competence on trade insights infrastructure to improve firm performance. The analysts conducted an examination utilizing auxiliary condition modeling and partial least squares based on overview reactions from 272 IT managers and big data professionals in Chinese companies. The discoveries uncover that a solid capability in big data talent significantly contributes to the improvement of commerce insights foundation, along these lines driving to made strides monetary and showcasing execution for the firm. The study concludes by suggesting that managers and industry experts should prioritize the

development of cultivation of commerce insights foundation capabilities through the improvement of big data skills professional staffs.

Fanelli, et al. (2023) study titled "Big data analysis for decision-making processes"

The primary objective discusses the challenges and openings for the administration of healthcare organizations. This research points to supply a picture of the current state of the craftsmanship within the utilize of big information for the method of decision-making for the management of healthcare organizations. Their methodology was carried out by a systematic literature review (SLR), The inquire about employments two analysis: descriptive analysis, describing the advancement of citations; and keywords; and the top ten persuasive papers, and bibliometric examination, for substance assessment, for which a cluster examination was performed. An include up to of 48 articles were chosen for bibliographic coupling out of a starting test of more than 5,000 papers. Of the 48 articles, 29 are relevant and related based on their bibliography. The findings are that healthcare organizations believe emphatically that huge information can ended up the foremost viable device for accurately affecting the decision-making forms. In this way, increasingly companies must improve to contribute in huge information administration and this consider is extraordinary sufficient for an examination to be made and donate directors with valuable bits of knowledge on potential openings.

Summary of Previous Studies

Many researchers have discussed the connection among Big Data and Decision-Making Quality and its dimensions or elements. It is important to study the components of Big Data (Volume, Velocity, Variety, Veracity, and Value) and the components of Decision-Making Quality (Effectiveness and Efficiency). Decision-making quality is considered one of the key factors, especially when carefully implemented in the

workplace. This, in turn, contributes to the growth and competitive advantage of companies in the markets. Big Data are crucial factor in the success of businesses, leading to prosperity and growth in the markets by understanding then managing the data in order to analyze it for taking decisions based on the data. The relationship between free and subordinate factors isn't consistent and changes from one case to another. For example, Fiaz, et. al., (2016) examined the importance of data analysis especially visualization depending on the characteristics of big data for industrial warehouses. Bhardwaj and Singh, (2018) focus in determining how decision-making in the Indian public sector's e-governance system relates to intellectual capital. Havakhor, (2016) investigates the relationship between big data (Volume, Velocity, Variety, Veracity, and Value) and organizational impact to enhance managerial decision-making and encourage taking decisions. Wang, et. al., (2016) was more focused on the challenges and trends of Big Data and how can be handled and implemented in order toward felicitous decision-making. Ashraf (2017) highlighted the impacts of successful big data implementation on organizational development by identifying success criteria for big data. Shamim, et. al., (2019) mentioned the importance of Big Data on Decision-Making Quality by Chinese businesses. Alkatheeri, (2020) aimed to investigate the impact between business big data and decision-making quality in Abu Dhabi Organizations, the study result was that the quality of big data impacts the overall decision-making quality. Qaffas et al., (2022) focused on the capability of big data and its impact on business intelligence to achieve firm performance by influencing big data talent competence. Fanelli, et al., (2023) sought to demonstrate the link between big data analysis and the process of quality decision-making.

All the mentioned studies above found an impact of Big Data (Volume, Velocity, Variety, Veracity, and Value) on Decision-Making Quality (Effectiveness and Efficiency).

What Distinguishes the Current Study from Previous Studies?

This consider will center on factors collected from above-mentioned considers to look at their impact, such as the consider of the impact of big data on decision-making quality.

Agreeing to previous studies, there are information crevices in these factors, so this consider will emphasize the ranges that were not considered in past considers which trusts the discoveries will improve the information for future thinks about.

This consider will be connected to the Arabic environment, where these factors have not been examined within the Arabic environment in previous studies. Other than the current study will center on an awfully imperative division which is the pharmaceutical field in Jordan which has not been considered however in past thinks about.

The current consider moreover may have the taking after commitment compared to past thinks about:

- Purpose: Most of the past considers were conducted to measures huge information administration from an IT viewpoint. While this study considered other points of view.
- Industry: Past investigate was conducted on distinctive businesses, but exceptionally few considered the pharmaceutical industry in them investigate. This study is committed to the Pharmaceutical Manufacturing businesses.
- Environment: Most of the past inquire about have been carried out in several nations exterior Middle easterner locale, whereas the current think about was conducted in Jordan, as one portion of the Middle easterner locale.
- Comparison: The analyst was compared the result of current investigate with past considers that specified prior to highlight the similitudes and contrasts which will emerge.

Chapter Three
Study Methodology

3.1 Introduction

This chapter includes the design for the study, population of the sample and sampling unit of analysis, data collection methods include study tool and statistical treatment include validity and reliability test then then end of this chapter will include the respondents' demographic statistics description.

3.2 Study Design

This study is considered a quantitative, descriptive, and causality study. The purpose of the current study is to examine the impact of big data on decision-making quality at the Jordanian pharmaceutical manufacturing companies. The questionnaire will be developed based on previous studies, then refereed by a Panel of Judge, then will be distributed online to sample a cross-sectional sample. Data will be collected, checked then coded against SPSS. After that, the validity and reliability will be tested then correlation and hypothesis testing. Finally, the results will take into consideration the previous studies.

3.3 Study Population and Sample

According to the Jordanian Association of Pharmaceutical Manufactures website (2015), the number of Jordanian pharmaceutical manufacturing companies are 14 which will be the number of the population for this study and the samples will be selected from this population by utilizing survey to gather the primary data and look at the subject of big data and its impact on the quality of decision-making.

3.4 Study Unit of Analysis

Data will be collected from the managers working within the Jordanian Pharmaceutical Manufacturing Companies (Director Level, Managerial Level and Supervisor Level) which can be chosen by Random Sampling and who will be accessible at the time of dispersing the surveys and prepared to take an interest and filling it.

3.5 Data Sources

The data that will be utilized to realize the purposes of the consider can be isolated into two bunches: Secondary information and Primary information. Secondary information will be collected from diaries, books, research, theses, dissertations, articles, working papers, annual reports, previous studies and the Worldwide Web. Primary data will be created using the questionnaires tool that will distribute to the Jordanian Pharmaceutical Manufacturing Companies.

3.5.1 Study Tool (Questionnaire)

The correct tool was chosen and tried to suit the current study and to coordinate the consider hypothesis and research model. Essentially the beginning survey things were created depending on previous studies. after planning the survey, a board of judges and arbitrators were chosen from both recognized academicians and proficient experienced pioneers within the pharmaceutical manufacturing organizations for the reason of judgment.

The questionnaire includes the demographic features of the sample (Gender, age, experience, education and position). In addition, it includes the questions about independent variable which is big data and its five components: Volume, Velocity, Variety, Veracity and Value (5Vs) and the dependent variable which is decision-making quality with its two components (decision-making effectiveness and decision-making

efficiency). Both independent and dependent variables will be measured by five items which in turn will be measured by Likert-type scale of the five-point varying from value 1 (strongly disagree) to value 5 (strongly agree) that was used through the study questionnaire

3.6 Data Collection

Research data have been gathered from the beginning of the first week to of October 2023 and spent 3 weeks to finish collecting. The researcher emailed and phoned all the 14 targeted pharmaceutical manufacturing companies in Jordan. The questionnaire has been sent online to the targeted companies and the total number of questionnaires collected back from the managers of the targeted manufacturing companies were 170 questionnaires. After checking the responses, the data were coded against SPSS to analyze the impact of big data on decision-making quality at pharmaceutical manufacturing companies. Then the following statistical methods is used.

3.6.1   Validity Test

Three strategies were utilized to affirm the validity (Content, Face, and Construct Validity). To begin with: content validity, different sources of information (writing such as previous studies, master interviews) were utilized to create and refine the demonstrate and measures. Second: Face validity, board of judges was carried out to alter the finale form of the survey (Sekaran 2003). At last, construct validity affirmed by Investigation the Principal Component Factor with Kaiser Meyer Olkin (KMO).

Construct Validity (Factor Analysis)

The construct validity affirmed utilizing Vital Component Calculate Examination with Kaiser Meyer Olkin (KMO). The information illustrative and similarity inspected utilizing Principal Factor Analysis. Factor loading more than 0.50 is good and

acknowledged in the event that it is surpassing 0.40 (Hair, et. al. 2014). In any case, Kaiser Meyer Olkin (KMO) is utilized to degree inspecting ampleness, concordance and inter-correlations, KMO values between 0.8 and 1 show that a tall examining is ampleness, and acknowledged on the off chance that it is surpassing 0.6. Another pointer is Bartlett's of Sphericity utilized for the assurance of appropriateness of information and relationship, where in the event that the critical esteem of information is less than 0.05 at 95% certainty level, that's demonstrates for a valuable calculate examination. Change rate appears clarification control of components (Cerny & Kaiser, 1977).

Factor Analysis with KMO for Volume Sub-Variable

Table (1) appears that the Volume loading factor items ranged between 0.831 and 0.905. Hence, the construct validity is accepted. KMO esteem is 0.883, which demonstrates great ampleness and the Chi2 is 554.994, which demonstrates the wellness of model. In addition, variance percentage is 74.054, so it can clarify 74.1% of variation. At last, the significance is less than 0.05, which shows the calculate examination is valuable.

Table 1: Factor Principal Component Analysis for Volume

No.	Item	F1	KMO	Chi²	BTS	Var%	Sig.
1	The company uses big data volume to develop job opportunities.	0.846					
2	The company utilizes big data volume to improve data quality.	0.905					
3	The company employs big data volume to optimize decisions.	0.831	0.883	554.994	10	74.054	0.001
4	The company embraces big data volume to increase decision effectiveness.	0.878					
5	The company uses big data volume to generate useful information.	0.841					

Factor Analysis with KMO for Velocity Sub-Variable:

Table (2) shows that the Velocity loading factor items ranged between 0.811 and 0.868. Therefore, the construct validity is accepted. KMO esteem is 0.864, which

demonstrates great ampleness and the Chi2 is 504.518, which indicates the wellness of model. Moreover, variance percentage is 71.678, so it can clarify 71.7% of variation. Finally, the significance is less than 0.05, which shows the calculate examination is valuable.

Table 2: Factor Principal Component Analysis for Velocity

No.	Item	F1	KMO	Chi²	BTS	Var%	Sig.
1	The company uses big data velocity to accomplish tasks quickly.	0.865					
2	The company employs big data velocity to gather data quickly.	0.811					
3	The company utilizes big data velocity to update data quickly.	0.857	0.864	504.518	10	71.678	0.001
4	The company develops big data velocity to increase decision effectiveness.	0.830					
5	The company develops big data velocity to increase decision efficiency.	0.868					

Factor Analysis with KMO for Variety Sub-Variable

Table (3) shows that the Variety loading factor items ranged between 0.763 and 0.878. Therefore, the construct validity is accepted. KMO value is 0.837, which demonstrates great ampleness and the Chi2 is 518.786, which indicates the perfection of model. Moreover, variance percentage is 70.741, so it can clarify 70.7% of variation. Finally, the significance is less than 0.05, which demonstrates the factor analysis is helpful.

Table 3: Factor Principal Component Analysis for Variety

No.	Item	F1	KMO	Chi²	BTS	Var%	Sig.
1	The company embraces big data variety to improve the decision-making process.	0.763					
2	The company utilizes big data variety to improve decision effectiveness.	0.846					
3	The company uses big data variety to meet market needs.	0.831	0.837	518.786	10	70.741	0.001
4	The company employs big data variety to gather various data.	0.878					
5	The company uses big data variety to extract useful insights.	0.865					

Factor Analysis with KMO for Veracity Sub-Variable:

Table (4) shows that the Veracity loading factor items ranged between 0.812 and 0.863. Therefore, the construct validity is approved. KMO value is 0.883, which demonstrates valuable adequacy and the Chi2 is 454.291, which indicates the fitness of constitute. Moreover, variance percentage is 70.079, so it can recognize 70.1% of variation. Finally, the significance is less than 0.05, which shows the factor analysis is great.

Table 4: Factor Principal Component Analysis for Veracity

No.	Item	F1	KMO	Chi^2	BTS	Var%	Sig.
1	The company embraces big data veracity to increase satisfaction.	0.812					
2	The company employs big data veracity to avoid data manipulation.	0.845					
3	The company uses big data veracity to maximize the quality of data.	0.863	0.883	454.291	10	70.079	0.001
4	The company utilizes big data veracity to improve data accuracy.	0.825					
5	The company uses big data veracity to secure data sources.	0.841					

Factor Analysis with KMO for Value Sub-Variable

Table (5) demonstrates that the Value loading factor items ranged between 0.757 and 0.897. Therefore, the construct validity is assumed. KMO value is 0.869, which demonstrates valuable adequacy and the Chi2 is 510.640, which shows the binding of model. Moreover, variance percentage is 71.204, so it can recognize 71.2% of variation. Finally, the significance is less than 0.05, which shows the factor analysis is useful.

Table 5: Factor Principal Component Analysis For Value

No.	Item	F1	KMO	Chi²	BTS	Var%	Sig.
1	The company uses big data value to provide insight.	0.757					
2	The company utilizes big data value to support the decision-making process.	0.897					
3	The company embraces big data value to increase decision performance.	0.874	0.869	510.640	10	71.204	0.001
4	The company employs big data value to increase decision effectiveness.	0.801					
5	The company uses big data value to improve decision quality.	0.881					

Factor Analysis with KMO for Decision-Making Effectiveness Sub-Variable

Table (6) points that the Decision-Making Effectiveness loading factor items ranged between 0.757 and 0.897. Therefore, the construct validity is approved and accepted. KMO value is 0.875, which indicates valuable capacity and the Chi2 is 632.078, which shows the fitness of pattern. Moreover, variance percentage is 77.124, so it can recognize 77.1% of variation. Finally, the significance is less than 0.05, which shows the factor analysis is helpful.

Table 6: Factor Principal Component Analysis for Decision-Making Effectiveness

No.	Item	F1	KMO	Chi²	BTS	Var%	Sig.
1	The company utilizes decisions based on big data.	0.871					
2	The company develops decisions to reach the desired outcome.	0.891					
3	The company uses decisions to achieve the planned strategy.	0.885	0.875	632.078	10	77.124	0.001
4	The company aims to improve maximum satisfaction.	0.873					
5	The company employs decisions to improve target performance.	0.870					

Factor Analysis with KMO for Decision-Making Efficiency Sub-Variable

Table (7) shows that the Decision-Making Efficiency loading factor items ranged between 0.757 and 0.897. Therefore, the construct validity is accepted. KMO value is

0.866, which demonstrates great ampleness and the Chi2 is 572.939, which demonstrates the wellness of model. In addition, variance percentage is 73.695, so it can clarify 73.7% of variation. Finally, the significance is less than 0.05, which shows the factor analysis is valuable.

Table 7: Factor Principal Component Analysis for Decision-Making Efficiency

No.	Item	F1	KMO	Chi²	BTS	Var%	Sig.
1	The company reduces operational costs.	0.785					
2	The company lowers response time.	0.900					
3	The company minimizes operational effort.	0.838	0.866	572.939	10	73.695	0.001
4	The company reduces delivery time.	0.901					
5	The company lowers transportation cost	0.863					

Factor Analysis with KMO for Big Data Independent Variable

Table (8) shows that the big data loading factor items ranged between 0.887 and 0.931. Therefore, the construct validity is accepted. KMO has rated 88.7%, which demonstrates great ampleness, and the Chi2 is 805.956, which indicates the wellness of model. In addition, variance percentage is 82.365, so it can clarify 82.36% of variation. Finally, the significance is less than 0.05, which shows the factor analysis is valuable.

Table 8: Factor Principal Component Analysis for Big Data

No.	Item	F1	KMO	Chi²	BTS	Var%	Sig.
1	Volume	0.891					
2	Velocity	0.905					
3	Variety	0.887	0.887	805.956	10	82.365	0.001
4	Veracity	0.922					
5	Value	0.931					

Factor Analysis with KMO for Decision-Making Quality Dependent Variable

Table (9) shows that the decision-making quality loading factor items ranged between 0.945 and 0.954. Therefore, the construct validity is accepted. KMO has rated 86.9%, which demonstrates great ampleness, and the Chi2 is 330.377, which indicates the wellness of model. In addition, variance percentage is 81.936, so it can clarify 81.93% of

variation. Finally, the significance is less than 0.05, which shows the factor analysis is valuable.

Table 9: Factor Principal Component Analysis for Decision-Making Quality

No.	Item	F1	KMO	Chi^2	BTS	Var%	Sig.
1	Decision-Making Effectiveness	0.954	0.869	330.377	10	81.936	0.001
2	Decision-Making Efficiency	0.945					

3.6.2 Reliability Test

The current study utilized Cronbach's Alpha coefficients of inside consistency to test the consistency and reasonableness of the measures. the Cronbach's Alpha coefficients esteem is between 0 and 1. Table (10) appears that Cronbach's alpha for the study autonomous factors ranges between 0.892 and 0.912, and for the think about subordinate factors ranges from 0.910 to 0.925, on the off chance that the Cronbach's Alpha coefficients are more than 0.6, at that point unwavering quality is considered tall and not damaged (Sekaran 2003).

Table 10: Reliability

No.	Sub-Variable	No. of Items	Cronbach's Alpha
1	Volume	5	0.912
2	Velocity	5	0.900
3	Variety	5	0.895
4	Veracity	5	0.892
5	Value	5	0.897
	Big Data	**5 Sub-Variables**	**0.945**
6	Decision-Making Effectiveness	5	0.925
7	Decision-Making Efficiency	5	0.910
	Decision-Making Quality	**2 Sub-Variables**	**0.900**

3.7 Respondents' Demographic Description

The general demographic analysis presented in Table (11) is depends on the characteristics of the substantial respondent i.e. recurrence and rate of members in terms of Gender, Age, Years of Experience, Educational Qualification and Job Level. Furthermore, noted that the total number of responses is 170:

- Gender: The majority of respondents are male with 95 respondents which represent (55.9%) while the female is 75 respondents which represents (44.1%).

- Age: It is obvious that the majority respondents ages are below 30 years' old with 50 respondents (29.4%), whereas the slightest respondents ages are above 45 years' old with 15 respondents (8.8%) which demonstrates that the Jordanian people is young related to the age.

- Years of Experience: It's obvious that majority respondent having experience between (10 – 14 years) with 49 respondents (28.8%), while the least respondents having experience more than 20 years with 23 respondents (13.5%).

- Educational Qualification: The larger part of respondents holds a tall instructive level and this came from the logic of scientific background for pharmaceutical industry, which emphasizing on ceaseless learning and enhancement. It appears that the foremost respondents hold Bachelor degree with 91 (53.5%) respondents, whereas the slightest academic capability degree is PhD with 2 respondents (1.2%).

- Job Level: Its obviously marked that the foremost respondents are from the supervisor level with 88 respondents (51.8%), whereas the slightest respondents from the director level with 20 respondents (11.8%).

Table 11: Respondents' Demographic Statistic Description

Demographic Characteristics		Frequency	Percent%
Gender	Male	95	55.9
	Female	75	44.1
	Total	**170**	**100.0**
Age	Below 30 Years old	50	29.4
	30 – 34 Years old	36	21.2
	35 – 39 Years old	42	24.7
	40 – 44 Years old	27	15.9
	Above 45 Years old	15	8.8
	Total	**170**	**100.0**
Years of Experience	Less Than 5 Years	32	18.8
	5 - 9 Years	32	18.8
	10 - 14 Years	49	28.8
	15 - 19 Years	34	20.0
	More Than 20 Years	23	13.5
	Total	**170**	**100.0**
Education Qualification	High Diploma	13	7.6
	Bachelor's Degree	91	53.5
	Master's Degree	64	37.6
	Ph.D. Degree	2	1.2
	Total	**170**	**100.0**
Job Level	Supervisor Level	88	51.8
	Managerial Level	62	36.5
	Director Level	20	11.8
	Total	**170**	**100.0**

Chapter Four
Analysis and Results

4.1 Introduction

The extreme objective of this investigate is to examine the impact of big data on decision-making quality at Jordanian pharmaceutical manufacturing companies. In this chapter the analyst will appear the comes about and related investigation with centering on the noteworthy results with its statistical treatment. To begin with, the study factors will be analyzed and depicted from statistical point of view by utilizing implies, standard deviations, t-value, significance and positioning. he analyst will speak to correlation among independent variables, at that point their correlation with dependent variables. Finally, study hypothesis will be tried using multiple regressions test.

4.2 Description of Study Variables

This segment of investigation will portray both independent and dependent variables from measurable point of view through: Standard Deviations, Positioning, t-value and Significance of each variable, sub-variables and its items that utilized to depict the test.

The importance is calculated based on the following equation: 5-1/3 = 1.33, Therefore:

1. Implementation is considered low if it is within range (1 to 2.33),

2. Implementation is considered medium if it is within range (2.34 to 3.66),

3. If the range of Implementation within (3.67 to 5) it will be considering High.

4.2.1 Independent Variable (Big Data)

Table (12) demonstrates that the means of Big Data sub-variables ranges from 4.04 to 4.13 and between 0.713 and 0.793 for the standard deviation values. This shows that respondents concur on high execution of Big Data sub-variables that is bolstered by high t-value compared to T-tabulated. The average mean is 4.08 with standard deviation of

0.679, demonstrates that the respondents exceedingly mindful and concern approximately about Big Data, where t-value is 20.748 > T-tabulated = 1.960.

Table 12: Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Big Data

No.		M.	S.D.	t	Sig.	Rank	Impl.
1	Volume	4.05	0.793	17.586	0.001	4	High
2	Velocity	4.04	0.763	17.066	0.001	5	High
3	Variety	4.06	0.741	18.759	0.001	3	High
4	Veracity	4.11	0.713	20.435	0.001	2	High
5	Value	4.13	0.730	20.225	0.001	1	High
	Big Data	**4.08**	**0.679**	**20.748**	**0.001**		**High**

T-tabulated=1.960

- **Volume**

Table (13) demonstrates that the Volume items means ranges from 4.01 to 4.08 and ranges from 0.874 to 0.910 for the standard deviation. This shows that respondents concur on high execution of volume items at the pharmaceutical manufacturing companies; this bolstered by high t-value compared to T-tabulated for Volume items. The means of the items also demonstrates that there's an understanding among the managers approximately for the significance of Volume on enhancing the quality of Decision-Making especially by using volume to generate useful information and improve data quality at the Jordanian Pharmaceutical Manufacturing Companies. The average mean is 4.05 with standard deviation of 0.793, demonstrates that the respondents exceedingly mindful and concern approximately about Volume, where t-value is 17.586 > T-tabulated = 1.960.

Table 13: Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Volume

No.		M.	S.D.	t	Sig.	Rank	Impl.
1	The company uses big data volume to develop job opportunities.	4.01	.890	14.816	0.001	4	High
2	The company utilizes big data volume to improve data quality.	4.08	.877	16.003	0.001	2	High
3	The company employs big data volume to optimize decisions.	4.01	.874	15.012	0.001	5	High
4	The company embraces big data volume to increase decision effectiveness.	4.06	.888	15.534	0.001	3	High
5	The company uses big data volume to generate useful information.	4.08	.910	15.420	0.001	1	High
	Volume	**4.05**	**0.793**	**17.586**	**0.001**		**High**

T-tabulated=1.960

- **Velocity**

Table (14) shows that the means for Velocity items ranges from 3.93 to 4.15 and ranges from 0.889 to 1.035 for the standard deviation. This shows that respondents concur on high execution of velocity items at the pharmaceutical manufacturing companies; this bolstered by high t-value compared to T-tabulated for Velocity items. The means of the items also indicates that there is an agreement among the managers about the importance of Velocity on enhancing the quality of Decision-Making especially by using velocity to gather and update data at the Jordanian Pharmaceutical Manufacturing Companies. The average mean is 4.04 with standard deviation of 0.763, demonstrates that the respondents exceedingly mindful and concern approximately about Velocity, where t-value is 17.066 > T-tabulated = 1.960.

Table 14: Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Velocity

No.		M.	S.D.	t	Sig.	Rank	Impl.
1	The company uses big data velocity to accomplish tasks quickly.	3.93	1.035	11.705	0.001	5	High
2	The company employs big data velocity to gather data quickly.	4.02	.926	14.327	0.001	3	High
3	The company utilizes big data velocity to update data quickly.	4.01	.917	14.393	0.001	4	High
4	The company develops big data velocity to increase decision effectiveness.	4.09	.889	15.954	0.001	2	High
5	The company develops big data velocity to increase decision efficiency.	4.15	.923	16.284	0.001	1	High
	Velocity	**4.04**	**0.763**	**17.066**	**0.001**		**High**

T-tabulated=1.960

• **Variety**

Table (15) shows that the means for Variety items ranges from 4.04 to 4.14 and ranges from 0.866 to 0.915 for the standard deviation. This shows that respondents concur on high execution of variety items at the pharmaceutical manufacturing companies; this bolstered by high t-value compared to T-tabulated for Variety items. The means of the items also indicates that there is an agreement among the managers about the importance of Variety on enhancing the quality of Decision-Making especially by using variety to extract insights and improve the process of decision-making at the Jordanian Pharmaceutical Manufacturing Companies. The average mean is 4.06 with standard deviation of 0.741, demonstrates that the respondents exceedingly mindful and concern approximately about Variety, where t-value is 18.759 > T-tabulated = 1.960.

Table 15: Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Variety

No.		M.	S.D.	t	Sig.	Rank	Impl.
1	The company embraces big data variety to improve the decision-making process.	4.06	.915	15.092	0.001	2	High
2	The company utilizes big data variety to improve decision effectiveness.	4.04	.866	15.678	0.001	5	High
3	The company uses big data variety to meet market needs.	4.05	.905	15.164	0.001	3	High
4	The company employs big data variety to gather various data.	4.05	.889	15.353	0.001	4	High
5	The company uses big data variety to extract useful insights.	4.14	.824	17.575	0.001	1	High
	Variety	**4.06**	**0.741**	**18.759**	**0.001**		**High**

T-tabulated=1.960

• **Veracity**

Table (16) shows that the means for Veracity items ranges from 4.08 to 4.16 and ranges from 0.797 to 0.910 for the standard deviation. This shows that respondents concur on high execution of veracity items at the pharmaceutical manufacturing companies; this bolstered by high t-value compared to T-tabulated for Veracity items. The means of the items also indicates that there is an agreement among the managers about the importance of Veracity on enhancing the quality of Decision-Making especially by using veracity to improve data accuracy and quality at the Jordanian Pharmaceutical Manufacturing Companies. The average mean is 4.11 with standard deviation of 0.713, demonstrates that the respondents exceedingly mindful and concern approximately about Veracity, where t-value is 20.435 > T-tabulated = 1.960.

Table 16: Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Veracity

No.		M.	S.D.	t	Sig.	Rank	Impl.
1	The company embraces big data veracity to increase satisfaction.	4.13	.854	17.250	0.001	3	High
2	The company employs big data veracity to avoid data manipulation.	4.08	.866	16.289	0.001	4	High
3	The company uses big data veracity to maximize the quality of data.	4.15	.797	18.767	0.001	2	High
4	The company utilizes big data veracity to improve data accuracy.	4.16	.838	18.028	0.001	1	High
5	The company uses big data veracity to secure data sources.	4.08	.910	15.420	0.001	5	High
	Veracity	**4.11**	**0.713**	**20.435**	**0.001**		**High**

T-tabulated=1.960

- **Value**

Table (17) shows that the means for Value items ranges from 4.05 to 4.21 and ranges from 0.837 to 0.902 for the standard deviation. This shows that respondents concur on high execution of value items at the pharmaceutical manufacturing companies; this bolstered by high t-value compared to T-tabulated for Value items. The means of the items also indicates that there is an agreement among the managers about the importance of Value on enhancing the quality of Decision-Making especially by using value to support decision-making process at the Jordanian Pharmaceutical Manufacturing Companies. The average mean is 4.13 with standard deviation of 0.730, demonstrates that the respondents exceedingly mindful and concern approximately about Value, where t-value is 20.225 > T-tabulated = 1.960.

Table 17: Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Value

No.		M.	S.D.	t	Sig.	Rank	Impl.
1	The company uses big data value to provide insight.	4.05	.902	15.128	0.001	5	High
2	The company utilizes big data value to support the decision-making process.	4.12	.848	17.176	0.001	3	High
3	The company embraces big data value to increase decision performance.	4.09	.889	15.954	0.001	4	High
4	The company employs big data value to increase decision effectiveness.	4.21	.837	18.878	0.001	1	High
5	The company uses big data value to improve decision quality.	4.20	.861	18.178	0.001	2	High
	Value	**4.13**	**0.730**	**20.225**	**0.001**		**High**

T-tabulated=1.960

4.2.2 Dependent Variables Analysis (Decision-Making Quality)

Table (18) shows that the means of the Decision-Making Quality Sub-Variables (Effectiveness & Efficiency) are 4.09 and 4.08 with standard deviation 0.78 and 0.81 respectively, which indicate that there is an agreement among Jordanian Pharmaceutical Manufacturing Companies on highly implementing the concepts of effectiveness and efficiency on making decisions which indicates the quality of the decisions that are made. The average mean demonstrates that the respondents exceedingly mindful and concern approximately about Decision-Making Quality, where t-value is 18.682 > T-tabulated = 1.960.

Table 18: Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Decision-Making Quality

No.		M.	S.D.	t	Sig.	Rank	Impl.
1	Decision-Making Effectiveness	4.09	.784	18.184	0.001	1	High
2	Decision-Making Efficiency	4.08	.812	17.418	0.001	2	High
	Decision-Making Quality	**4.09**	**0.761**	**18.682**	**0.001**		**High**

T-tabulated=1.960

• **Decision-Making Effectiveness**

Table (19) shows that the means for Decision-Making Effectiveness items ranges from 4.00 to 4.17 and ranges from 0.829 to 0.967 for the standard deviation. This shows that respondents concur on high execution of decision-making effectiveness items at the pharmaceutical manufacturing companies; this bolstered by high t-value compared to T-tabulated for Decision-Making Effectiveness items. The means of the items also indicates that there is an agreement among the managers about the importance of the effectiveness of the decision on improving target performance and satisfaction at the Jordanian Pharmaceutical Manufacturing Companies. The average mean is 4.09 with standard deviation of 0.784, demonstrates that the respondents exceedingly mindful and concern approximately about Decision-Making Effectiveness, where t-value is 18.184 > T-tabulated = 1.960.

Table 19: Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Decision-Making Effectiveness

No.		M.	S.D.	t	Sig.	Rank	Impl.
1	The company utilizes decisions based on big data.	4.00	.967	13.485	0.001	5	High
2	The company develops decisions to reach the desired outcome.	4.11	.910	15.837	0.001	3	High
3	The company uses decisions to achieve the planned strategy.	4.09	.883	16.074	0.001	4	High
4	The company aims to improve maximum satisfaction.	4.17	.829	18.418	0.001	1	High
5	The company employs decisions to improve target performance.	4.11	.877	14.434	0.001	2	High
	Decision-Making Effectiveness	**4.09**	**.784**	**18.184**	**0.001**		**High**

T-tabulated=1.960

• **Decision-Making Efficiency**

Table (20) shows that the means for Decision-Making Efficiency items ranges from 4.05 to 4.15 and ranges from 0.837 to 0.969 for the standard deviation. This shows that respondents concur on high execution of decision-making efficiency items at the

pharmaceutical manufacturing companies; this bolstered by high t-value compared to T-tabulated for Decision-Making Efficiency items. The means of the items also indicates that there is an agreement among the managers about the importance of the efficiency of the decision to reduce the financial cost at the Jordanian Pharmaceutical Manufacturing Companies. The average mean is 4.08 with standard deviation of 0.812, demonstrates that the respondents exceedingly mindful and concern approximately about Decision-Making Efficiency, where t-value is 17.418 > T-tabulated = 1.960.

Table 20: Mean, Standard Deviation, t-value, Ranking, and Implementation Level of Decision-Making Efficiency

No.		M.	S.D.	t	Sig.	Rank	Impl.
1	The company reduces operational costs.	4.10	.959	14.961	0.001	2	High
2	The company lowers response time.	4.05	.937	14.644	0.001	4	High
3	The company minimizes operational effort.	4.05	.847	14.413	0.001	5	High
4	The company reduces delivery time.	4.08	.969	14.556	0.001	3	High
5	The company lowers transportation cost	4.15	.927	16.128	0.001	1	High
	Decision-Making Efficiency	**4.08**	**.812**	**17.418**	**0.001**		**High**

T-tabulated=1.960

4.3 Relationship Between Study Variables

Bivariate Pearson Principal tool used to examine the relationships between variables and sub-variables. Table (21) shows that the relationships among Big Data sub-variables are solid, where r values range from 0.733 and 0.863. Moreover, the relationships between Decision-Making Quality dimensions are also solid according to r values which equal 0.820. Finally, the relationships between Big Data components and Decision-Making quality components are strong, where r ranges from 0.687 to 0.956.

The relationship between Big Data (Independent Variable) and Decision-Making Quality (Dependent Variable) is very strong, where r value equal to 0.891 based on results shown in Table (4.10).

Table 21: Bivariate Pearson's Correlation (r) Between Study Variables

No.		1	2	3	4	5	6	7	8
1	Volume								
2	Velocity	.789**							
3	Variety	.733**	.763**						
4	Veracity	.737**	.802**	.777**					
5	Value	.790**	.780**	.784**	.863**				
6	Big Data	.894**	.908**	.887**	.919**	.928**			
7	Decision-Making Effectiveness	.709**	.687**	.758**	.795**	.838**	.833**		
8	Decision-Making Efficiency	.718**	.740**	.734**	.818**	.815**	.842**	.820**	
9	Decision-Making Quality	.748**	.748**	.782**	.846**	.867**	.891**	.952**	.956**

**. Correlation is significant at the 0.01 level (2-tailed).

4.4 Testing Study Hypothesis

After affirming validity, reliability and correlation between variables, and before utilizing multiple regressions test to examine the impact of Big Data on Decision-Making Quality, the subordinate claiming need to be examined to ensure the correctness to use the multiple regressions test; the test needed to be examined are normality, linearity and multi-collinearity (Sekaran, 2003; Sekaran and Bougie 2013).

- **Normal Distribution Histogram**

The result of figure (2) appears that the information is ordinarily conveyed, since the residuals don't influence the normal distribution, this confirms normality (Sokal and Rohlf, 1969; Sekaran 2016; Hair, et. al. 2014).
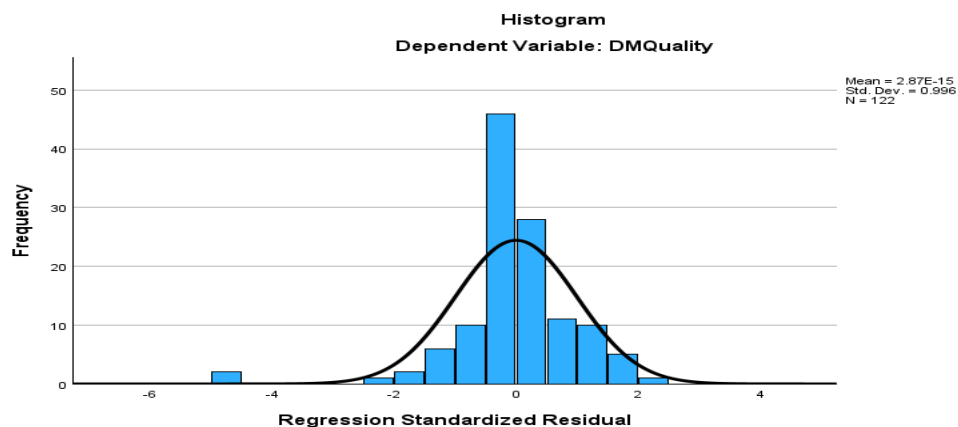
Figure 2:Normality Distribution

- **Linearity Test**

The result in figure (3) shows that the connections between the study variables are direct, in this manner linearity is expected. (Michael et. al.1997).
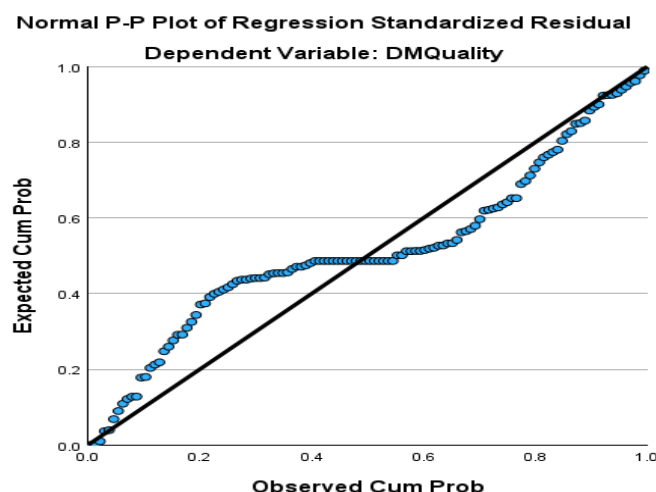
Figure 3: Linearity Plot

- **Multi-Collinearity Test**

Multi-Collinearity was examined by the tolerance and variance inflation factory (VIF) tests for the think about autonomous factors, taking under consideration that tolerance esteem must be more than 0.1 and the VIF esteem must be less than 10. Table (22) appears that multi-collinearity is expected.

Table 22:Multi-Collinearity Statistics Test

Indecent Sub-Variables	Tolerance	VIF
Volume	0.289	3.460
Velocity	0.264	3.783
Variety	0.317	3.151
Veracity	0.202	4.954
Value	0.192	5.216

- **Research Hypotheses**

H0: Big Data (Volume, Velocity, Variety, Veracity and Value) does not impact Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \geq 0.05$).

For examining the main Hypothesis and the sub-Hypothesis, multi regressions analysis is tested to observe the impact of Big Data sub-variables (Volume, Velocity, Variety, Veracity and Value) on Decision-Making Quality at Jordanian Pharmaceutical Manufacturing Companies. Table (23) shows that when regressing the five big data sub-variables together on the total of Decision-Making Quality R2 equals 0.802, which demonstrates that the independent variable Big Data can explain 80.2% of variance on dependent variable (Decision-Making Quality), where (R2=0.802, F=132.870, Sig=0.001). Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted, which declares that Big Data (Volume, Velocity, Variety, Veracity and Value) impact decision-making quality in the Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

Table 23: ANOVA Test: Multiple Regressions of Big Data Sub-variables on Decision-Making Quality.

Model	r	R^2	Adjusted R^2	F	Sig.
1.	0.895[a]	0.802	0.796	132.870	0.001[b]

a. Predictors: (Constant), Volume, Velocity, Variety, Veracity, Value, b. Dependent Variable: Decision-Making Quality

Table 24: ANOVA Test: Multiple Regressions of the Five Big Data Sub-Variables on Decision-Making Quality.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.028	0.163		-0.173	0.863
	Volume	0.074	0.064	0.074	1.147	0.253
	Velocity	-4.485	0.065	0.000	-0.001	0.999
	Variety	0.169	0.063	0.165	2.672	0.008
	Veracity	0.323	0.083	0.302	3.911	0.001
	Value	0.436	0.083	0.418	5.263	0.001

a. Dependent Variable: Decision-Making Quality, T-tabulated=1.960

Sub-Hypotheses

H0.1: Big Data Volume does not impact Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

Table (23) shows no statistically significant impact of Volume on Decision-Making Quality, where (β=0.074; t=1.147; sig=0.253, p>0.05). Therefore, the null hypothesis is accepted which declares that Volume does not impact decision-making quality in the Jordanian Pharmaceutical Manufacturing Companies, at level of $\alpha \leq 0.05$.

H0.2: Big Data Velocity does not impact Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

The results shown in Table (23) shows a negative statistically significant impact of Velocity on Decision-Making Quality, where (β=0.000; t= -0.001; sig=0.999, p>0.05). Therefore, the null hypothesis is accepted which declares that Velocity does not impact decision-making quality in the Jordanian Pharmaceutical Manufacturing Companies, at level of $\alpha \leq 0.05$.

H0.3: Big Data Variety does not impact Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

The results shown in Table (23) shows a statistically significant impact of Variety on Decision-Making Quality, where (β=0.165; t=2.672; sig=0.008, p<0.05). Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted which declares that Variety impacts decision-making quality in the Jordanian Pharmaceutical Manufacturing Companies, at level of $\alpha \leq 0.05$.

H0.4: Big Data Veracity does not impact Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

The results shown in Table (23) shows a statistically significant impact of Veracity on Decision-Making Quality, where (β=0.302; t=3.911; sig=0.001, p<0.05). Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted which declares that Veracity impacts decision-making quality in the Jordanian Pharmaceutical Manufacturing Companies, at level of $\alpha \leq 0.05$.

H0.5: Big Data Value does not impact Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies, at ($\alpha \leq 0.05$).

The results shown in Table (23) shows a statistically significant impact of Value on Decision-Making Quality, where (β=0.418; t=5.263; sig=0.001, p<0.05). Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted which declares that Value impacts decision-making quality in the Jordanian Pharmaceutical Manufacturing Companies, at level of α ≤ 0.05.

4.5 Summary

In summary, outcome demonstrates that the members agree on high implementation of Big Data Sub-Variables (Volume, Velocity, Variety, Veracity, and Value), where Value has highest implementation, followed by Veracity, followed by Variety, then Volume and finally Velocity.

Second, outcome demonstrates that the members agree on high implementation of Decision-Making Quality Sub-Variables (Decision-Making Effectiveness & Decision-Making Efficiency), where Effectiveness has highest mean, followed by Efficiency.

Third, Bivariate Pearson Correlation Principal test demonstrates that the relationships among Big Data components are strong, the relationship between Decision-Making Quality components are solid, and the relationships between Big Data components and Decision-Making Quality components are solid. Finally, it shows that the relationship between total Big Data and total Decision-Making Quality is hard solid.

Ultimately, Multiple Regressions test demonstrates that Big Data Sub-Variables (Variety, Veracity and Value) impacts Decision-Making Quality at the Jordanian Pharmaceutical Manufacturing Companies, where Value has the foremost impact on Decision-Making Quality, followed by Veracity, and finally Variety. Big Data Management Sub-Variable (Volume) based on the Multiple Regressions Analysis has no effect and Big Data Sub-Variable (Velocity) has a negative impact on the Decision-Making Quality at the Jordanian Pharmaceutical Manufacturing Companies.

Chapter Five

Results' Discussion, Conclusion & Recommendations

5.1 Results' Discussion

The outcome of this study reveals the high implementation of Big Data sub-variables in Jordanian Pharmaceutical Manufacturing Companies. The Value of Big Data have the foremost execution rate among the sub-variables, then Veracity, after that Variety, followed by Volume and finally Velocity. The high rate for implementing Big Data sub-variables from pharmaceuticals organizations comes from the massive data that is generated by the companied using innovative technology and become a difficult mission for this company to manage the data to make a decision so Big Data became gradually the solution to store data easier, beside the strong knowledge and wariness the managers have on the importance of implementing the Big Data. Second, the discoveries demonstrate that the high execution of Decision-Making Quality dimensions in Jordanian Pharmaceutical Manufacturing Companies. The Decision-Making Effectiveness is the highest implemented dimension, followed by Decision- Making Efficiency. The high rate for implementing Decision-Making Quality sub-variables from pharmaceuticals organizations comes from the importance to ensure that any decisions decided by the firms' managers are SMART decisions, achieve the desired outcome and with lowest resources.

Bivariate Pearson shows that Big Data has a strong relationship with Decision-Making Quality and Multiple regression analysis shows that big data (Variety. Veracity and Value) impact decision-making quality. But big data (Volume and Velocity) has no impact on decision-making quality based on the same Multiple regression test (ANOVA

Test). Results show that Value of the big data has the foremost impact on decision-making quality, followed by Veracity and finally Variety:

1. The significant impact of Big Data on Decision-Making Quality is bolstered by previous studies such as Alkatheeri, et al. (2020), Ayokanmbi, (2021) and Fanelli, et al. (2023).

2. The significant impact of Big Data Sub-Variable (Variety) on Decision-Making Quality is bolstered by previous studies such as Kowalczyk, (2017).

3. The significant impact of Big Data Sub-Variables (Variety and Value) on Decision-Making Quality is bolstered by previous studies such as Nisar, et al. (2021). The results are matching with the benefit of Big Data Varity and Big Data Value for developing the various sources for collecting valuable data and the commitment to data collection procedures to determine the truthiness of data collected.

4. The significant impact of Big Data Sub-Variable (Value) on Decision-Making Quality is bolstered by previous studies such as Saggi and Jain (2018) and Shamim, et al. (2019)

5. The significant impact of Big Data Sub-Variable (Veracity) on Decision-Making Quality is bolstered by previous studies such as Nguyen (2018). The results are matching with the benefit of Big Data Veracity to develop the credibility and truthiness of the data and also to transfer the data into valuable information that employees can trust and share.

6. The significant impact of Big Data Sub-Variable (Variety, Value and Veracity) on Decision-Making Quality is bolstered by previous studies such as Havakhor (2016) and Ashraf (2017).

On the other hand, Big Data Sub-Variables (Volume and Velocity) have no impact on Decision-Making Quality and it is bolstered by previous studies such as Janssen, el al. (2017), Alshikhi, & Abdullah, (2018), Rodrigues et al. (2019) and Ghasemaghaei (2021). These four studies mentioned potential reasons for this outcome:

- The sum of information impacts the conceivable level of control. The more data is utilized the less consideration can be paid to guaranteeing the rightness of the data.

- The data found in organizations are of poor quality and the huge amount of the data with high sheer to collect it has no impact on the decisions because it has been estimated that up to 5% of the data gathered are not just poor quality it is useless.

- Big Data relates to how firms need efficiently handle enormous size of complex information due to the infamous complexity of the information that can be gathered and created from different sources, ordinarily persuaded by expanding data size collected at high sheer come about in a useless information and poor or destitute data analysis.

- The findings also show that data volume does not impact data veracity and data velocity with data veracity has inverse relationship so the truthiness of the data gathered can be suspected and do not depend on them to make decisions.

5.2 Conclusion

This study is oriented to responded the study primary question: What is the impact of Big Data (Volume, Velocity, Variety, Veracity and Value) on Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies?

Data has been collated using questionnaire tool, which examined for its validity and reliability. Then to measure and examine the main hypothesis and the sub-hypotheses the correlation and multiple regression is utilized. The outcomes of this study demonstrate

the high execution of Big Data sub-variables in the Jordanian Pharmaceutical Manufacturing Companies. The Value of Big Data have the foremost implementation degree among the sub-variables, then Veracity, after that Variety, followed by Volume and finally Velocity. Moreover, the discoveries indicate the foremost implementation of Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing Companies, where the Decision-Making Effectiveness is the highest implemented dimension, followed by Decision- Making Efficiency.

Finally, outcomes show that there is a significant impact of Big Data on Decision-Making Quality in the Jordanian Pharmaceutical Manufacturing industries. Moreover, Value of the Data has the highest impact on Decision-Making Quality, then Veracity, followed by Variety. While, Volume and Velocity of the data does not show an impact on Decision-Making Quality due to multiple potential reasons mentioned above.

5.3 Recommendations

5.3.1 Recommendations for Jordanian Pharmaceutical Manufacturing Companies.

- The study recommends that Pharmaceutical Manufacturing Companies in Jordan have to coordinate the Big Data strategies for making vital and arranged decisions to achieve their goals effectively and efficiently.

- The study recommends that Pharmaceuticals Manufacturing Companies in Jordan need to actualize Big Data dimensions together since they influence each other.

- The study recommends that Pharmaceuticals Manufacturing organizations in Jordan demand to have strategies, tools, techniques and KPIs to check quality of the Data collected and the truthiness of the sources.

- This study recommends that Pharmaceuticals Manufacturing Companies in Jordan setting up a partitioned office with gifted and professional staff that oversee, control, analyze and manage the big data they create.

- This study recommends that Pharmaceuticals Manufacturing Companies in Jordan should center more on executing and empowering creativity of preparing employees by continuous memorize to learn new skills and methods to control and manage big data.

- This study recommends that Pharmaceuticals Manufacturing Companies in Jordan should focus in improvement and enhancement of Big Data Sub-Variables (Value, Veracity and Variety) to enhance the quality of the decision-making.

5.3.2 Recommendations for Academics and Future Research

- The study is pushed out based on the directors whose jobs located at the Pharmaceutical Manufacturing Companies in Jordan, the study recommends to take into consideration other level of workers in future thesis.

- This study is pushed out based on the Pharmaceutical Manufacturing Companies located in Jordan. To be able to generalize the current consider outcomes, it is prescribed to consider such study on same industry in other nations, particular the Middle East Countries because they have comparable social and social way of life.

- This study is pushed out on one industry which is Pharmaceutical Manufacturing Industries; in this manner, it is counseled to apply prompted to apply same factors on other manufacturing businesses.

- This study is pushed out inside constrained time; therefore, it is counseled to prompted to rehash this consider after a reasonable period to test manufacture improvement and accomplish new results.

- Expanding the examination to other industries and nations speaks to upcoming study potentiality, which can be accomplished by advanced measuring with bigger samples inside same industry, and counting other businesses to help minimize the problem of generalizing summarization on other nations and industries.

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Appendices

Appendix 1: Panel of Referees Committee:

No.	Professor Name	University / Place of Work
1.	Prof. Ali Adaileh	Middle East University
2.	Prof. Ahmad Ali Saleh	Middle East University
3.	Prof. Azzam Aboumoghli	Middle East University
4.	Prof. Ahmad Ghandour	Middle East University
5.	Assistant Prof. Sameer Jabali	Middle East University
6.	Assistant Prof. Omar Rashdan	Middle East University
7.	Assistant Prof. Wejdan Shrouk	Middle East University
8.	Assistant Prof. Mohmmad Maitaa	Al- Balqa' Applied University
9.	Miss. Sally Murad	Manufacturing Company
10.	Miss. Sarah Shiekh	Manufacturing Company
11.	Mr. Yassin Khamiseh	Manufacturing Company

Appendix 2: Respondents Letter and Questionnaire:

Dear Participant,

The researcher is currently promoting a scientific study with the purpose to identify the: **"The Impact of Big Data on Decision Making Quality: A Field Study on the Jordanian Pharmaceutical Manufacturing Companies"**.

The aim of this study is to gain the degree of master of e-business course, your help in answering the study survey marked the benefit to the study. The implementation only for academic purposes.

I would like to thank you very much for your kind help.

Researcher: Yazeed Reyad Haddadin

Supervisor: Prof. Dr. Abdel-Aziz Ahmad Sharabati

First Section: Demographic Variables

Gender

- ☐ Male
- ☐ Female

Age

- ☐ Below 30 Years old
- ☐ 30 – 34 Years old
- ☐ 35 – 39 Years old
- ☐ 40 – 44 Years old
- ☐ Above 45 Years old

Years of Experience

- ☐ Less Than 5 Years
- ☐ 5 – 9 Years
- ☐ 10 – 14 Years
- ☐ 15 – 19 Years
- ☐ More Than 20 Years

Educational Qualification

- ☐ High Diploma
- ☐ Bachelor's Degree
- ☐ Master's Degree
- ☐ Ph.D. Degree

Job Level

- ☐ Supervisor Level
- ☐ Managerial Level
- ☐ Director Level

Second Section: Thesis Questionnaire

This section is about Big Data and its five components: (Volume, Velocity, Variety, Veracity, and Value).

Please tick (√) in your opinion answer knowing that this questionnaire is based on a 5-point Likert scale.

The 5-point Likert scale consists of the below points: 1 = Strongly Disagree and 5 = Strongly Agree.

No.	Big Data	1	2	3	4	5
	Volume					
1.	The company uses big data volume to develop job opportunities.					
2.	The company utilizes big data volume to improve data quality.					
3.	The company employs big data volume to optimize decisions.					
4.	The company embraces big data volume to increase decision effectiveness.					
5.	The company uses big data volume to generate useful information.					
	Velocity					
6.	The company uses big data velocity to accomplish tasks quickly.					
7.	The company employs big data velocity to gather data quickly.					
8.	The company utilizes big data velocity to update data quickly.					
9.	The company develops big data velocity to increase decision effectiveness.					
10.	The company develops big data velocity to increase decision efficiency.					
	Variety					
11.	The company embraces big data variety to improve the decision-making process.					
12.	The company utilizes big data variety to improve decision effectiveness.					
13.	The company uses big data variety to meet market needs.					
14.	The company employs big data variety to gather various data.					
15.	The company uses big data variety to extract useful insights.					
	Veracity					
16.	The company embraces big data veracity to increase satisfaction.					
17.	The company employs big data veracity to avoid data manipulation.					
18.	The company uses big data veracity to maximize the quality of data.					

No.		1	2	3	4	5
19.	The company utilizes big data veracity to improve data accuracy.					
20.	The company uses big data veracity to secure data sources.					
	Value					
21.	The company uses big data value to provide insight.					
22.	The company utilizes big data value to support the decision-making process.					
23.	The company embraces big data value to increase decision performance.					
24.	The company employs big data value to increase decision effectiveness.					
25.	The company uses big data value to improve decision quality.					

Third Section: Thesis Questionnaire

This section is about Decision-Making Quality and its two components: (Decision-Making Effectiveness and Decision-Making Efficiency).

Please tick (√) in your opinion answer knowing that this questionnaire is based on a 5-point Likert scale.

The 5-point Likert scale consists of the below points: 1 = Strongly Disagree and 5 = Strongly Agree.

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No.	**Decision-Making Quality**	1	2	3	4	5
	Decision-Making Effectiveness					
1.	The company utilizes decisions based on big data.					
2.	The company develops decisions to reach the desired outcome.					
3.	The company uses decisions to achieve the planned strategy.					
4.	The company aims to improve maximum satisfaction.					
5.	The company employs decisions to improve target performance.					
	Decision-Making Efficacy					
6.	The company reduces operational costs.					
7.	The company lowers response time.					
8.	The company minimizes operational effort.					
9.	The company reduces delivery time.					
10.	The company lowers transportation cost					

Appendix 3: Task Facilitation Letter:

MEU جامعة الشرق الأوسط
MIDDLE EAST UNIVERSITY
Amman - Jordan

مكتب رئيس الجامعة
Office of the President

الرقم: در/خ/571
التاريخ: 2023/12/02

لمن يهمه الأمر

تحية طيبة وبعد،

فتهديكم جامعة الشرق الأوسط أطيب وأصدق الأمنيات، ولغايات توفير وربط أسس التعاون مع خدمة المجتمع المحلي؛ نرجو التكرم بالموافقة على تقديم التسهيلات الممكنة لطالب الماجستير يزيد رياض الحدادين، ورقمه الجامعي (402210061)، المسجل في برنامج ماجستير الاعمال الالكترونية / كلية الأعمال في جامعة الشرق الأوسط، والذي يتولى القيام بإعداد دراسة بحثية أكاديمية في رسالته المعنونه بـ " تأثير إدارة البيانات الضخمة على جودة اتخاذ القرار – دراسة ميدانية على شركات تصنيع الأدوية الأردنية "، علماً بأن المعلومات سيتم استخدامها لأغراض البحث العلمي وبصورة سرية.

وتفضلوا بقبول فائق الاحترام والتقدير...

رئيسة الجامعة

أ.د. سلام خالد المحادين

Tel. (+9626) 4790222 Fax: (+9626) 4129613 P.O.Box. 383 Amman 11831 Jordan e-mail: dir-presdepart@meu.edu.jo www.meu.edu.jo