LUISS

Master's Degree in Management   MANAGERIAL DECISION MAKING

BUSINESS INTELLIGENCE ADOPTION AND ITS IMPACT ON JORDANIAN COMMERCIAL BANKS PERFORMANCE

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ACADEMIC YEAR 2021/2022

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1. Introduction

In today's highly competitive market climate, business managers across the globe require timely and accurate information to make successful decisions. By delivering the right information to the right people in real-time, business intelligence systems can assist business managers in making faster and more effective decisions.

The relevance of historical data analyses have increased in recent years to examine past inaccuracies more closely. Jordanian banks are also beginning torecognize BI's secret potential, as it can better exploit such data for more improvisation in business processes and decision-making, allowing business managers to be more effective in creating value for stakeholders. In addition, the ever-increasing competition in the industry has prompted the implementation of decision-making enablers such as BI, which has resulted ingreater changes in organizations' overall efficiency (Chen, Y. 2017). This study aims to quantify the impacts gained as a result of BI implementation in Jordanian banks.

Business intelligence is a set of processes that collect data from different sources, clean and merge data, as well as present the findings in a way that can help decision-makers in businesses make better decisions (Karim, 2011),(Niwash et al, 2022).

According to Bronzo et al. (2013), business intelligence has a positive effect on organizational performance when aligned with process orientation initiatives. Further investigation into the effectiveness of business intelligence adoption in Jordanian commercial banks was necessary to achieve the goal of this study.

According to Taouab, O., & Issor, Z. (2019), organizations which maintain performance levels that keep up with high demands can effectively satisfy their stakeholders' requests.

Business intelligence is one of the most frequently searched phrases, and it continues to pique the interest of both the industrial and academic worlds. Gathering, cleaning, and integrating data from multiple sources can improve corporate decision-making. BI software has traditionally been used to manage company strategies and efforts at the strategic and tactical levels (Ahlijah, Y. A. 2022). BI provides suppliers, partners, and workers with simple access to information as well as the capacity to evaluate and share it with others (Arefin et al., 2015).

Improving a bank's performance is something that most organizations strive to achieve and this research will measure organizational performance using two dimensions that include: job process and innovation climate.

1.1. Problem Statement

Business intelligence systems provide an accurate estimate of the business's value and help distinguish it from competitors that use comparable systems. As a result, businesses are becoming more receptive to the idea of leveraging (BI) tools to gain a competitive edge. Additionally, Jordanian enterprises, particularly banks, have a vast amount of data that should be used for a variety of purposes in various departments (Maiti, M., et al. 2022).

According to Owusu (2017), financial institutions face numerous challenges, including fraud suppression and identification, risk management, client management, and loss prevention. To provide the proper support, managers must know what to do at the appropriate time. However, Jordanian bank managers do not use business intelligence systems in a manner that requires their constant participation in decision-making.

Numerous businesses leverage business intelligence concepts to achieve a competitive advantage. Business intelligence, on the other hand,

is growing more relevant for a variety of reasons. To begin with, data is ubiquitous, and data storage continues to become more affordable. While data tools are commonly easier to use because they simplify the analysis, there are methods for showing and presenting vast amounts of data that boost computational capability (Langloisa & Chauvela, 2017).

Banks are currently confronted with several issues, including process automation, growing customer demand, aggressive competition, and innovative enhancements. They must also keep an eye on opportunities and adapt their business methods to new national and international rules at this continuous pace. The board of directors makes choices and decisions, and those choices must be financially feasible and based on appropriate facts (Nithya & Kiruthika, 2020).

A financial database is a secure data repository used to improve the efficiency of any organization's systems. Banks have a lot of data that needs the help of (BI) technology. Business intelligence helps organizations improve the efficiency of their business (Niu, Y. et al., 2021). It helps managers and decision makers to make reliable, timely, and appropriate decisions in the workplace, which leads to increased productivity and profitability (Olaru, 2014), but managers need to gain practical experience to deal with such evolving technology.

The financial sector is considered a highly significant player, considering its contribution to the economic, social, and political conditions. Banks are regarded as the financial economy's backbone; they invest and spend enormous sums of money on technology to replace traditional services.

Jordanian banks must always provide their operating systems with a suitable environment to access the required information accurately, so this study sought to determine business intelligence adoption and its impact

(technology and functional scope, maturity, and speed of big data) on Jordanian Commercial Bank's performance (job process and innovation climate) listed on the Amman Stock Exchange company.

Business intelligence aims to improve Banks performance and decision making. However, despite the benefits of the BIS, banks may not implement and apply all of the features and functions that are needed to improve banks performance.

Previous studies addressed the business intelligence in many sectors. Most studies recognize the importance of business intelligence in all sectors, as a recent studies a serious gap i.e the shortages studies of business intelligence adoption and its impact on banks performance Jordan. However, there is a lack of a comprehensive model for adopting BI by Jordanian banks.

1.2. Study Questions

The main study question in this study is "What is the impact of business intelligence adoption (technology and functional scope, maturity, and the velocity of big data) on Jordanian commercial banks' performance (job process and innovation climate) listed on the Amman stock exchange company?"

The main study question can be broken down to the following sub-questions

1. What is the impact of technology and functional scope on Jordanian commercial banks' performance (job process and innovation climate)?
2. What is the impact of maturity on Jordanian commercial banks' performance (job process and innovation climate)?
3. What is the impact of the velocity of big data on Jordanian commercial

banks performance (job process and innovation climate)?

1.3. Study Purposes and Objectives

The main purpose and objective of this study is to "investigate the impact of business intelligence adoption (technology and functional scope, maturity, and the velocity of big data) on Jordanian commercial banks' performance (job process and innovation climate) listed on the Amman stock exchange company."

The main purpose and objective can be broken down to the following sub-objective

1. To analyze the impact of technology and functional scope adoption on Jordanian commercial banks' performance (job process and innovation climate).

2. To analyze the impact of maturity adoption on Jordanian commercial banks' performance (job process and innovation climate).

3. To analyze the impact of the velocity of big data adoption on Jordanian commercial banks' performance (job process and innovation climate).

4. To provide decision-makers in Jordanian Banks with recommendations and suggestions that could enhance their (job process and innovation climate) performance.

1.4. Significance of the study

The theoretical and practical significance of the study:

The significance of this study lies in demonstrating the impact of Business Intelligence adoption on organizational performance in Jordanian Banks listed in the Amman stock exchange company. The adoption of Business Intelligence is measured in the terms of the following independent variables, (technology and functional scope, maturity, and the velocity of big data) and determine dependent variables of Jordanian

commercial banks' performance, (job process and innovation climate). The importance of this study is to make Jordanian Commercial banks aware of the best way to enhance performance and decision making through Business Intelligence adoption.

Previous studies have examined Business Intelligence from various perspectives and based on different variables.

This study, however, differentiates itself from other studies by examining BI from the independent variables mentioned above (technology and functional scope, maturity, the velocity of big data, and overall organizational performance) specifically in Jordanian Commercial banks since there is a larger quantity of data than any other industry regarding customers and clients.

1.5.   Conceptual Framework

Figure (1.1): Study Model.
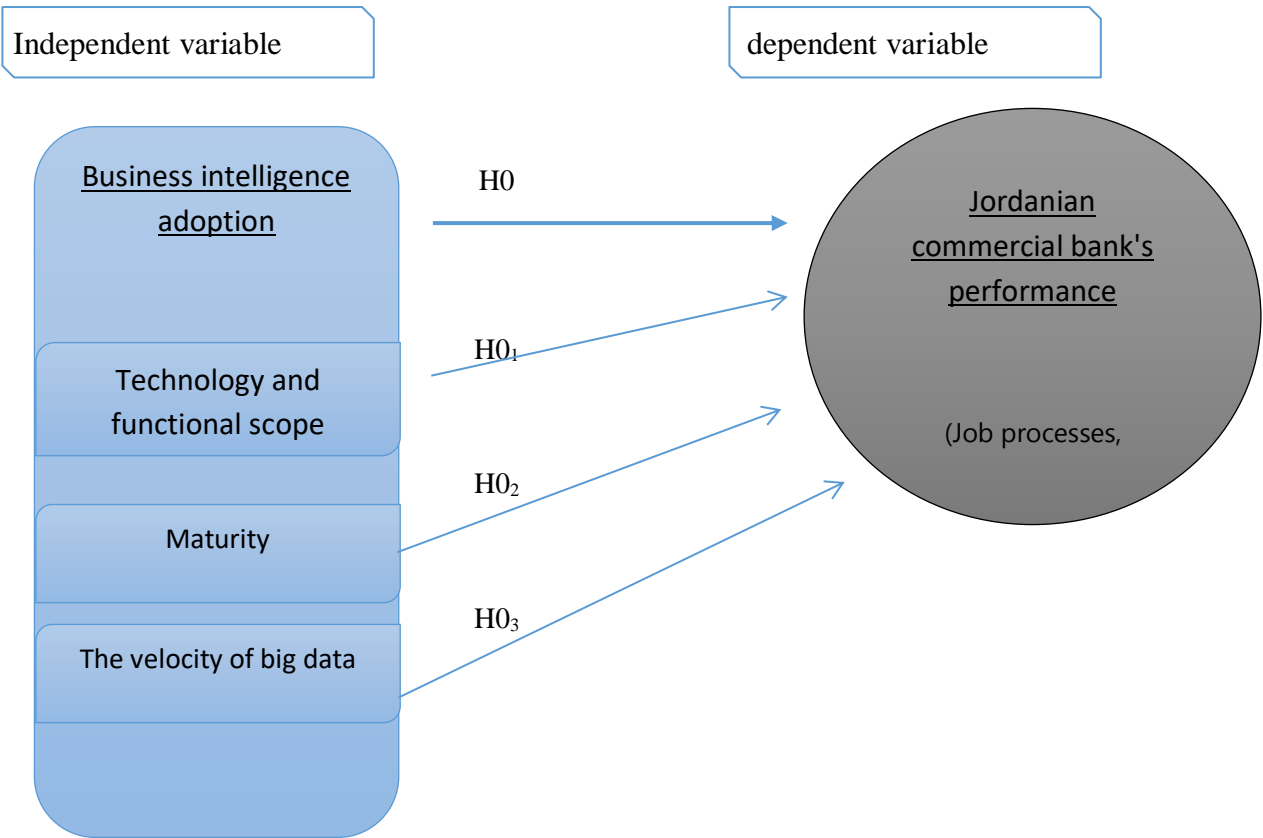
Figure (1.1): The proposed model for the impact of business
intelligence adoption on Jordanian Banks performance, adopted
from (Anshari, et al. 2019; Nithya and Kiruthika, 2020; Wieder,
B., and Ossimitz, M. L. 2015; Haas, A. 2020).

1.6. Study Hypotheses

Main Hypothesis:

H0: There is no significant impact of Business Intelligence adoption (technology and functional scope, maturity, and the velocity of big data) on Jordanian commercial banks' performance (job process and innovation climate) at level ($\alpha \leq 0.05$).

*Sub-hypotheses were derived as follows***:**

Sub-Hypothesis 1:

H01: There is no significant impact of technology and functional scope on Jordanian commercial banks' performance (job process and innovation climate) at a level ($\alpha < 0.05$).

Sub-Hypothesis 2:

H02: There is no significant impact of maturity on Jordanian commercial banks' performance (job process and innovation climate) at level($\alpha \leq 0.05$).

Sub-Hypothesis 3:

H03: There is no significant impact of the velocity of big data on Jordanian commercial banks' performance job process and innovation climate) at level ($\alpha < 0.05$).

1.7.   Procedural Definition

Business Intelligence adoption*:* Business intelligence (BI) is a collection of concepts, procedures, and techniques for enhancing business decision-making. It is a collection of data analysis and reporting tools that enable managers to make more informed decisions by utilizing relevant and timely data. BI is a collaborative technique for studying and analyzing structured data about a subject (usually stored in a "data warehouse").

Technology and functional scope: The technical spectrum of tools and techniques of business intelligence enables the workers in the organization to extract, collect, and analyze data and generate a meaningful representation of information to support the decision-making process and construct valuable knowledge. The level of technology and functional scope in an organization depends on various variables such as complexity size and sensitivity.

Maturity: The stage of growth of the employed businessintelligence tools and techniques in a specific organization. Maturity is usually classified into different classes depending on the nature of inputs and outputs of the system; for example, data, information, knowledge, wisdom, and it is all determined by the needs and characteristics of the specific business.

The velocity of big data: The velocity of data creation, storage, analysis,and visualization. It took a long time for computers and servers to process the data andupdate the databases. However, data is generated in real-time in the big data age.Machines and computers can transmit data as soon as it is generated due to the availability ofbusiness intelligence tools.

Jordanian Commercial Banks Performance (Organizational Performance): Organizational performance is the extent to which the organization has met its objectives as a social system based on an organizational structure, individuals, and employment. It is a collection of

matrices that highlight the level of achievement of the goals of the organization through job process and innovation climate. In addition, achieving goals by using the fewest possible resources is also considered organizational performance.

A job process is any strategy used by employees to generate value for the organization during work. An innovation climate is essential to the creative motivation of organizational members, and creativity motivation is a component of members' creativity.

1.8 Limitations of the Study

Scope Limits: The present study is limited to the specific dimensions adopted to measure business intelligence adoption and organizational performance.

Place Limits: The present study was applied to Jordanian commercial banks listed on the Amman Stock Exchange company in Amman.

Human Limits: The present study targeted participants who occupy three different positions, including branch managers, operations managers, and department supervisors in Jordanian commercial banks in the capital, Amman.

Time limits: The present study was conducted during the academic year 2021/2022.

1.9 Delimitations of the Study

The present study investigated the impact of business intelligence (technology and functional scope, maturity, the velocity of big data) on the performance of Jordanian commercial banks in the capital, Amman. So

generalizing to other sectors and/or countries is questionable. Moreover, the reliability of the results depended mainly on participants' perception of three job positions including branch managers, operations managers, and department supervisors. In conclusion, results are limited to data collected by the study questionnaire to cover the two main variables; Business intelligence and the performance of Jordanian commercial banks.

CHAPTER II

REVIEW OF RELATED LITERATURE AND PREVIOUS STUDIES

2. Literature Review

2.1. Business Intelligence

2.2. Organizational performance

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2.4. Previous Studies

2. Literature Review

Business Intelligence is the use of data in terms of information and business analytics within the context of essential business practices that need particular decisions and actions to result in enhanced performance. BI techniques can increase data utilization by displaying it in standard forms, coordinating and storing it in a data warehouse, allowing for the extraction of valuable and obscure data.

2.1. Business Intelligence

Although the BI term is not new, it is addressed in a variety of ways by scholars, resulting in a variety of meanings in the literature (Vugec, et al. 2020). Business intelligence systems, according to Negash and Gray (2008), (gande & Lara (2021), integrate operational data with analysis tools to provide decision-makers with dynamic and competitive knowledge. The aim is to increase the timeliness and accuracyof decision-making inputs. Business intelligence is used to consider the firm's strengths, as well as, developments level, and possible directions in the economies, technology, and regulatory climate in which the firm competes, aswell as competitor activities and their consequences.

Caserio and Coelho (2019) also describe Business Intelligence as a combination of tools and processes that aide in better decision-making. Business Intelligence is the process used to gather information necessary for survival and assessing actions taken by competitors, suppliers, consumers, technology, industries, goods and services, and overall business climate.

All of the activities, processes and supporting technologies for collecting, reviewing, and visualizing data to support both operational and strategic decision-making are referred to as business intelligence (Mariani, et al., 2018).

Furthermore, the term is characterized as a cooperative mechanism or system by which a firm can search and absorb information from a volatile environment to determine a possible chance while minimizing the risks associatedwith uncertainty (Cheng, et al., 2020). The study of BI's work has establishedvarious activities, including data collection, analysis, and sharing function (Wamba et al., 2017).

Business intelligence solutions for banks should enable decision-makers across all business segments from management to departments and leverage the information potential of a diverse set of internal and external data resources. The most essential areas of banking intelligence are Analytical Customer Relationship Management; Bank Performance Management; Enterprise Risk Management; Asset and Liability Management; and Compliance. In today's competitive environment, considering and analyzing overall client connections is critical for effective bank operations (Villar, et al., 2021).

Most business intelligence software solutions are focused on market segmentation, building a detailed image of clients and their interactions with banks, and providing a clear picture of market potential and the bank's capacity to capitalize on this potential (Seetharam, Y. 2022): Customer segmentation: a customer segment is a collection of clients that share specified characteristics; Customer profitability: profitability analysis is the examination of clients based on the predicted influence on the bank's profit, and hence the total return on equity (ROE); Cross-selling and up-selling: these sorts of analyses allow you to examine clients' capacity to utilize many goods and services at the same time (loans, deposits, cards, e-banking, and so on). Channel effectiveness: allows for the identification and analysis of various channels for communication with clients and product delivery through these channels; Campaign management: the main goal is to analyze and compare the effects of marketing campaigns on the increase in client

numbers, increase in the number and level of sold products, earnings, and so on.

Bank asset and liability management (ALM) is the process of managing a bank's liabilities and receivables to achieve profit and risk balance, establish a relationship between liabilities and receivables, and regulate the impact of risk on the bank's operations and financial performance. ALM business intelligence systems should enable the generation of a comprehensive set of internal reports, beginning with balance sheets, liquidity analysis, and cash flow and progressing through maturity and interest rate structure.

In addition to this, income structure studies and long-term syndicated loan agreement evaluations are included. Risk management is the methodical management of all risk processing phases (identification, analysis, measurement, control, and reporting) that pose a threat to the achievement of the bank's goals and individual business activities so that the achieved risk level does not jeopardize the bank's safe and stable operation. Credit risks, market risks, interest rate risks, foreign exchange risks, liquidity risks, operational risks, reputational concerns, and so on are some of the hazards that banks face. Credit risk is defined as the probability that the client will not return the bank loan within the conditions agreed upon in the contract. This risk is more broadly defined as the possibility that the bank's credit portfolio would lose value.

The goal of banking risk analysis solutions is to make it possible to analyze credit risk based on how loan losses affect fluctuations in the bank's earnings. Credit risk analysis, credit risk assessment, and credit risk mitigation assessment are among them. The solution should allow for the establishment of risk-mitigation procedures, such as the identification of market sectors, portfolio segments, transactions, and clients. It also cautions about the need to change the limit, activates risk-mitigation tools, and/or

shift the strategic direction in a market sector, a customer, a business process, or a product.

Some of the typical forms of analyses that BI systems for credit risk management assistance should provide are as follows (Soui, et al. 2019): Collections Analysis, Credit Risk Assessment, Credit Risk Mitigation Assessment, Customer Credit Risk Profile, Debt Restructure Analysis, Involved Party Exposure, Non-Performing Loan Analysis, Outstanding Analysis Portfolio, and Credit Exposure.

Business Intelligence gives access to data that has been integrated and cleansed so that it may be examined, manipulated, transformed, and merged to discover correlations, trends, and patterns that can bring new insights and assistance in decision making (Watson, 2009).

The move from a bureaucratic organization to one that is attentive to vertical, horizontal, and external problems and possibilities is one evidence of change in the competitive domain.

There are five steps in the business intelligence process:

(1) Data collecting, business intelligence systems may extract data from different data sources with diverse business units such as marketing, manufacturing, human resources, and finance. To be studied, extracted data must be cleaned, processed, and merged.

(2) Data analysis: At this step, data is transformed into information or knowledge using a range of analytical techniques such as reporting, visualization, and data mining. The results of the analytical process can assist management in better understanding the issue and making better decisions.

(3) Situation Knowledge, awareness of the situation can offer a greater grasp of the present condition of data-driven judgments.

(4) Risk assessments and other situation awareness's may assist managers in forecasting the future, identifying dangers and opportunities, and responding appropriately. Today's business operates in a very complicated environment. Business choices are increasingly vulnerable to external and internal threats. It is possible to infer that risk assessment is a key role in the business intelligence system.

(5) Decision Making Support, the major purpose of business intelligence is to assist managers in making sound decisions based on current business data. According to Inmon (2002) (as referenced by Niu et al., 2009).

A business intelligence system is made up of four layers of components and a metadata management module.

The components interact to assist fundamental business intelligence operations such as collecting data from the company's operating system, storing the collected data in the data warehouse, and retrieving the stored data for various business analysis applications.

(1) Operational system level, as the data source of business intelligence systems, business operating systems, in general, employ the system online transaction processing (OLTP) to support day-to-day business operations. In general, OLTP systems are separated into three categories: customer order entry systems, financial systems, and human resource systems.

(2) Data acquisition level, which is a pre-process component consisting of three stages: extract, convert, and load (ETL). A business has multiple OLTP systems that create a considerable volume of data. The data is taken from the OLTP system using the ETL procedure and then converted using the transformation rules. If the data has been converted, it will be stored in a data warehouse. Because the data quality of the other components is dependent on the ETL process, ETL is a fundamental component of

business intelligence systems. The main considerations in planning and implementing ETL are data quality, system flexibility, and process speed.

(3) Data storage level, the data processed by ETL components is stored in a data warehouse, which is typically implemented using relational database management systems (RDMS); is intended to aid in the transaction process.

This is in contrast to a data warehouse, which concentrates on the subject and stores it in an integrated manner as time passes. The most common data warehouse schemas are the star and snowflake schemas. Whatever scheme is utilized, the kind of table in a data warehouse is fact tables and dimension tables.

(4) Analytic level, many analytical applications have been developed based on the data warehouse. In terms of analytical functions, a business intelligence system provides two main types: reporting and online analytical processing (OLAP). The reporting function provides several sorts of company reports to managers, such as sales reports, product reports, and human resources reports. Running queries into the data warehouse generates reports.

Business intelligence plays a key role in transforming managerial and organization decision-making. What was once an instinct driven art is becoming a data driven approach. This shift is largely based on developing methods, systems, and tools that make collecting, storing, and analyzing large amounts of data possible. The biggest challenge businesses face is the ability to qualify added value by adopting business and intelligence systems (Ahlijah, 2021)

Considering the several factors outlined in the business intelligence definition This research aims to examine the expanding impact of Business Intelligence adoption across these dimensions (technology and functional scope, maturity, and the velocity of big data) and its effect on organizational

performance (job processes and innovation) at Jordanian banks listed on the Amman stock exchange company.

2.1.1. Technology and functional scope

The functional scope dimension is the technical spectrum of business intelligence tools and techniques that varies from basic reporting and graphing to advanced and scalable functionality such as predictive analytics, search, data mining, performance management, information integration, and more. As technology advances, these features must be available on a variety of platforms, including mobile and cloud-based deployments (Skyrius, 2015).

However, the sophistication level of advanced business intelligence software often necessitates a user's mastery of a complex task model, further complicating the problem at hand.

A large and sophisticated set of BI tools might be confusing to users who, for most of the time, would require just a fraction of this toolset. A tiered approach has been proposed earlier by the author (Skyrius, 2008), (Skyrius, R. 2015) to balance functional richness as a precaution. The terms "business intelligence" and "business analytics" seem artificial and immature to the author. Principal pieces of data, search tools, simple calculation tools, advanced search and information integration tools, forecasting, regression, simulation, data mining, reporting, and presentation tools are examples of the huge number of business intelligence technologies that can help the organization enhance performance (Chegini et al., 2013).

According to the Gartner Group, organizations utilize BIS primarily for corporate administration, customer relationship optimization, monitoring of company operations, reporting, planning, and decision-making assistance at all levels of management. The most amazing results have already been obtained while executing promotional programs,

forecasting sales and consumer behavior, developing loyalty schemes, and analyzing anomalies and fraud (Karmaska, A. 2019) and (Dedi, et al. 2017).

Business intelligence systems provide an integrated collection of tools, technologies, and software solutions that are used to collect heterogeneous data from disparate sources, integrate, and analyze it, and make it widely available. BI tasks entail the technological structure of BI systems.

"Technology" has developed into a potent, socially constructed attribute that aids mangers in making sense of their surroundings. The abstract notion of "technology" affects reasoning and decision-making. Individuals' perceptions of their environment and their optimism about technology may influence the effectiveness of technology. The positive correlation between technology and success is frequently undervalued. Mangers may believe that their optimism regarding the success of technology in the future is rational. Indeed, there are plausible reasons to be optimistic about the impact of technology on lives in the future (Clark, et al. 2016).

Business intelligence systems should be more scalable and built on a flexible technological basis to enable system growth whenever it is required. Furthermore, data quality and integrity issues must be long-term so that cross-functional and cross-departmental data use can succeed.

2.1.2. Maturity

Maturity is the stage of business intelligence growth in companies. The maturity scale usually includes phases ranging from the onset of a problem to one step above the current situation. Initial stages in BI refer to the first attempts to implement IT-enabled procedures to aid in forming and decision-making. Such attempts normally result in separate, unrelated intelligence-gathering operations (Skyrius, 2015).

Maturity is defined as "the state of being full, perfect, or ready". To achieve the required level of maturity, an evolutionary transformation route from a beginning to a goal stage must be followed. Maturity models may be used to assess both the strengths and weaknesses of businesses as a whole.

Different models have been proposed to explain the levels of maturity in business intelligence such as Deng (Deng, 2007) and Walker (Walker, 2009). The following is a brief description of Deng's model, where the process of businessintelligence development was classified into four levels:

1- The data level is where companies capture, clean, and simplify raw business databefore integrating it through source systems. This level aims to build and establish a data warehouse that can be used for analysis.

2- The information level employs integrated data of sufficient quality and establishes concrete contexts in which to present it. After that, businesses should implement market bench marking metrics that are simple to use and understand.

3- The knowledge level is when we can discover rules and models that can be appliedin business after obtaining the necessary information and making sense of it based on previous experience. In other words, new knowledge is generated bycombining relevant data.

4- The wisdom level is the highest level of maturity every company aspires to reach.

Organizations use available information to improve business processes, and business efficiency rises as a result of prompt, clever, and successful businessdecisions.

Gartner introduced a five-stage maturity model that should provide IT, managers, with a better knowledge of an organization's current state of BI maturity. The first stage is when people are ignorant of the entire potential of business information. The degree of wisdom is the fourth BI maturity level. It is the maximum maturity level that every company strives to

achieve. The first stage is where businesses are already aware of the benefits of BI and have deployed multiple projects.

The third stage focuses on managers cooperating more on the usage of business intelligence approaches. The fourth stage is strategic when the organization is implementing BI initiatives based on shared strategic goals. The fifth stage is all-encompassing, where the BI systems are integrated into the business processes and give necessary and trustworthy information to users.

Gartner's maturity model has five levels: Unaware, Tactical, Focused, Pervasive, Strategic, and Top. The fifth level of maturity, which is the pinnacle degree of business intelligence, is widespread (Eyasu, 2020). The goal of maturity models in information systems research is to explain the route of organizational maturation. Some researchers have questioned the very concept of stages of growth, while others have criticized the lack of theoretical foundations.

While most maturity model research has been conceptual in nature (Poeppelbuss, et al. 2011), relatively few maturity models (Damsgaard and Scheepers 1999; Raber et al. 2012) have acknowledged and sought to address these issues. Finally, the fundamental premise that there is a single linear path to maturation with no potential of equifinality has been severely criticized (King and Kraemer 1984b; Lasrado et al. 2015; Solli-Smither and Gottschalk 2010).

2.1.3. The Velocity of big data

Massive data and business analytics techniques have recently been created and applied to examine massive amounts of data generated by various business enterprises. As a result, every organization needs speedier visibility into ever-increasing amounts of transactional data. Real-time data analysis allows firms to observe the past and predict the future. Big

data analytics may boost companies' organizational outputs and industries in a variety of ways. These include enhanced health care delivery, educational standards, national security, and the ability to engage in good government. Furthermore, mobile network location data may be utilized for traffic management purposes, such as preventing traffic bottlenecks in major cities and better planning the public transportation system (Ajah, Nweke, 2019).

Business Intelligence has been gaining traction for approximately the last decade. The velocity of the big data dimension appears to be a viable option to investigate. This dimension will include BI systems ranging from real-time systems that produce results as soon as possible to right-time systems that use needs-defined latency (Skyrius et al., 2018).

Big Data was originally defined as "huge volumes of widely diversified data that are created, gathered, and processed at high velocity" (Walls & Barnard, 2020). The term "variety" alludes to the many forms of data that may be modified utilizing BD technology (Faroukhi, El Alaoui, Gahi, & Amine, 2020). Unstructured data from social networks, blogs, text messages, videos, and audio files are the primary source of this exponentially increasing data (Braganza, Brooks, Nepelski, Ali, & Moro, 2017). The pace at which data is created and transmitted is referred to as its velocity. Insights are near to decision-making in real-time.

Big Data is becoming a source of innovation and competitive advantage by utilizing all seven V's (volume, variety, velocity, veracity, value, valence, and variability) (Erevelles, Fukawa, & Swayne, 2016).

The complexity of data coming from social media and other sources is the business problem with big data analysis installation. Another organizational difficulty noted by the Bain and Company study is overcoming internal resistance to BDA as a new method of doing business (Bain and Company, 2013). According to studies, larger organizations that

have invested in outdated technology may find it difficult to adapt to new technology (McElheran, 2012).

Big data refers to a massive volume of data that cannot be analyzed using conventional data-base tools, management, and processing. Data processing in real time, specifically banks data collection and analysis, is referred to as velocity. Big data increases its speed, surpassing that of traditional computing techniques (Anshari, et al. 2019). Indicating that the banking industry has untapped value creation potential.

2.2. Organizational Performance

Performance refers to the degree of achievement and production achieved by hiring a person to perform a mission or service. When we realize that the success or loss of a company is dependent on its human resource, this subject takes on new importance. Performance has been interpreted differently in different ways, and each of the field's professionals and practitioners has interacted with a different aspect of performance. Job output is a collection of activities relating to operational priorities or the priorities of organizational departments, through which each has been given a role to complete (Ferris, Lian, Brown, Pang, & Keeping 2010)., the performance, outcomes, or consequences of each individual's activities should be specified (Shahzad, Sarmad, Abbas, & Amanullah Khan, 2011). For any fundamental organizational and industrial psychology feature, the focus has always been on improving job efficiency, which is focused on two broad categories of employee behaviors: duty-oriented performance and inferred performance (Kahya, 2007). Borman and Motowidlo (1993) differentiated between mission and contextual efficiency. The mission performance is the part of the performance that is described informal work description pages. Task efficiency has been described as the ability of individuals hired for a job to conduct tasks formally as part of a specific task, and it is known as the key kernel of any company. It is more akin to a

teacher's instruction in a classroom. In other words, job performance entails behavioral behaviors that are specifically involved in the manufacture of goods and services, or it integrates them.

Performance is the accomplishment of goals set by managers, the service provision,or the approval on goods paid for by consumers, all of which contribute to the company's sustainability, creation, growth, and benefit. Performance is a technique that is linked to each operation in an organization and depends in its execution on the company, market, and climate (Samsonova, 2012).

According to Ling & Hung (2010), organizational performance is a combination of the performance of all other departments within the company, with complex schedules in place to accomplish the ultimate target at various levels. An organization also can accomplish objectives by effective and efficient use of resources. In other words, an organization can achieve its financial targets and business criteria. Ling & Hung (2010) state that organizational performance is the result of two factors such as job processes, and innovation climate. In addition, organizational performance can be considered as a metric to measure the success and failure factors of an organization Ling & Hung (2010).

The term of performance, as described in French, English, and Romanian dictionaries refers to the idea of the outcome, achieved aim, and quality, rather than the economic characteristics of efficiency and effectiveness. The Romanian Explanatory Dictionary defines performance as "a result (especially good) acquired by someone in an athletic contest; a noteworthy achievement in an area of activity; the best result obtained by a technological system, a machine, a gadget, etc." "The definition demonstrates that the term performance was initially borrowed from the mechanical and sports sectors, only to be used to define the extremely good outcomes obtained in other fields. This indicates that performance is only gained by a small number of entities, those that produce the best outcomes.

Performance cannot be linked to any result attained, but only to a specific one. What exactly does "special" mean? In the first place, net superior to what was gained in a previous time, in the second place, superior to results acquired by "others," and in the third place, different by the established objectives, in a favorable acceptance. Due to the subjective nature of the idea of performance, there is now a range of meanings assigned to it. There are several publications and research in the literature that define the notion of performance as it relates to environmental influences. According to Didier Noye (2002), performance is defined as "fulfilling the goals that were assigned to you in the convergence of corporate orientations." In his perspective, performance is the consequence of a comparison between the outcome and the target, rather than a simple discovery of an outcome. Didier Noye, unlike other authors, believes that this term is truly a comparison between the outcome and the aim. The author's definition is hazy, as both outcomes and aims vary greatly from one sphere of action to the next. According to author Michel Lebas (1995), performance is future-oriented, aimed to represent the specificities of each organization/individual, and is based on a causal model linking components and products. He defines a "successful" firm as one that will accomplish the management coalition's goals, rather than one that has already achieved them. As a result, performance is as much a function of capabilities as it is of the future. Michel Lebas, unlike previous authors, distinguished between "a performance," "performance," and "being performant." "A performance" is often subject to a measurable outcome that is higher than that provided for or emerging from past results. As a result, "a performance" always has a good meaning. "Performance" refers to prior results and maybe both positive and poor. According to Whooley (1996), performance is not an objective fact waiting to be evaluated and graded anywhere, but rather a socially produced reality that exists in people's imaginations, if it exists at all. According to the author, performance might include components, products, consequences, and impact, as well as the economy, efficiency, effectiveness, cost-effectiveness,

or equity. Both Lebas (1995) and Whooley (1996) regard performance as subjective and interpretative, not least since it is tied to cost lines, emphasizing the concept's ambiguity. According to Rolstadas (1998), organizational system performance is a complicated connection including seven performance criteria that must be met: effectiveness, efficiency, quality, productivity, work quality, innovation, and profitability. The achievement of the criteria given above, which may be viewed as performance objectives, is directly tied to performance. According to Rolstadas, a specific definition of performance cannot be developed since it is based on the seven performance criteria, which are not precisely defined. The concept of performance has prompted Folan (2007) to emphasize three goals or aims of governance of performance in the research of performance in business: first, performance should be examined by each entity within the boundaries of the environment in which they select to operate. For example, a company's success should be evaluated in the markets in which it operates, not in areas that are unrelated to its activities. Second, performance is always connected to one or more objectives established by the organization whose performance is being evaluated. As a result, a company's success is measured by objectives and targets developed and agreed upon inside rather than those utilized by external agencies. - Third, performance is simplified to the most important and distinguishable qualities. Folan's theory states that performance is impacted by the surroundings, the goals to be reached, and the important and recognized qualities. Folan employs several definitions for the idea of performance, recognizing that it must be assessed and quantified from a variety of perspectives. According to Neely (2002), performance should involve assessing the efficiency and efficacy of actions. This quantification can be stated quantitatively as well as qualitatively. According to neely and other writers' definitions, performance is directly connected to efficiency and effectiveness. According to Kane (1996), performance is "something that a person leaves behind and that persists outside of the specified purpose." Kane defines performance as either at the

level of each individual inside the company or the level of the organization as a whole. It is seen as a comprehension of the produced findings. The author underlines the term's specificity and the difficulties of providing a generic definition. As a result, we may talk about the definition's correctness at a specific level and its ambiguity at a broad level.

At all, in the banking sector, performance is defined as "efficiency," or the skillful process of creating income over a specified period. Other studies link bank performance to service, quality, innovation, technology, or employee dedication. As another measure of a bank's performance, the reliability of a financial institution might be described in terms of solvency. However, flaws in these procedures have been identified, such as investors not knowing if they will get their money back in the event of a slump (Blandina et al., 2021).

2.3. The Relations between Business Intelligence and organizational performance

Enhancing the performance of companies and managers within organizations, as well as their proper interaction with the environment, has become increasingly relevant in today's organizations. As a result, various organizations, particularly those in Third World countries, should provide a foundation so that their workers and managers can apply all of their abilities, experiences, and capacities to achieve the target goals. (Chegini, et al., 2013).

It has recently grown in popularity as a result of the inclusion of concepts such as big data, analytics, and artificial intelligence as integral parts of digital transformation (Audzeyeva and Hudson, 2016). For organizations with the ultimate aim of improving performance, using BI to support decision-making is very helpful (Ramakrishnan et al., 2012). As it makes it easier for businesses to store, retrieve, and evaluate vast volumes of data about their activities, allowing them to make better decisions.

Business intelligence was discovered to provide the essential functions that assist anorganization in improving performance and the ability to respond to change. Business intelligence systems have so far mostly been used to manage strategicand tactical business strategies and programs. Businesses have been using business intelligence to monitor, evaluate, report on, and enhance performance(Watson and Wixom, 2007).

The abundance of data accessible in today's enterprises has resulted in the development of sophisticated analytics functions (which we will refer to as Business Analytics (BA). These methods include tactics like data mining that hunt for patterns that aren't visible with traditional BI tools. Despite the current trend toward the terms Business Intelligence and Analytics, conventional BI systems often give aggregated data, whereas statistical approaches used in BA typically use raw data. Furthermore, it has been suggested that organizational demands for analytic data differ from those for more transactional data. As a result, there are disparities between these two analytic techniques, implying that a BIS that extracts and processes transactional data may not necessarily support BA procedures.

The main activities of corporate performance management (CPM) include planning, measurement, and analysis. While, as previously noted, the business intelligence system may or may not support business analytics owing to the various types of information and technologies employed, we would expect the BIS to significantly support planning and measurement. However, not all BIS have the capabilities required by decision-makers. Exploring the link between the success of BIS and the effectiveness of corporate-level management methods would thus offer an indication of the significance of these systems for CPM.

Finally, the developing practice of BA might be regarded as a management practice that relies on the BI system but also influences other management practices such as planning and measurement. However, because BA often depends on raw data for statistical modeling, we would

anticipate BA and the BI system to affect planning and measurement in distinct ways (Richards et al., 2017).

Business intelligence aids organizations in improving their business efficiency. It assists managers and decision-makers in making reliable, timely, and appropriate decisions in the workplace, resulting in increased productivity andprofitability (Olaru, 2014). Turban et al. (2008) revealed that business intelligence increases the efficiency of business organizations by exhibiting easy access to the information as wellas the opportunity to evaluate and discuss it with others.

In recent years, the notion of business intelligence has arisen, and general connections with other management concepts have been recognized. BI is not a new phrase, and numerous perspectives should have been addressed and researched. The product applications that are used in various businesses to communicate data are all finished, and the BI improves the business's performance (Constantinescu, 2014).

BI is incredibly useful in day-to-day business operations in firms (Charles &Kumar, 2014). The CPM should have a broad relationship with the BI, which is currently being resolved. Organizations all across the world are seeking to improve their performance in whichever way they can. The decision on the events is sorted and made with the purpose of outward and interior diffused, and as a result, the relevance of the exercises is enlarged and the business dynamic is expanded at all conceivable levels (Acar&Zehir, 2018).

Business Intelligence (BI) is a fast-developing innovative system brought about by the global business environment. The dynamic is shifting, and it is characterized by massive volumes of data emerging from social networks and mobile communications, in addition to traditional databases. BI is concerned with transforming raw data into usable, meaningful, and actionable (knowledge) information. Additional information adds to an organization's success by allowing for better decisions and, as a result, impacts performance (Buhasho et al., 2021).

2.4. Previous Studies

❖ A study by (Olszak et al., 2021) entitled: **Business Intelligence & Big Data for Innovative and Sustainable Development of Organizations.**

The primary goal of this special issue (SI) is to give businesses a theoretical, conceptual, and applied grounded discussion of Business Intelligence and Big Data (BI & BD) to assist in creative and sustainable development, as well as effective decision-making. This SI of Information Systems Management is made up of eight papers, six of which are included in this issue. The final two pieces will be published in volume 39, issue 1. All of the authors did an excellent job of designing and delivering distinct papers on the topic. All articles are included because, at the end of the review process, they all become high-quality papers. Jennifer Weingarten and Stefan Spinler analyze online merchants' essential difficulties in their debut work, "Predicting Customers' Online Purchases: a Case Study in Fashion." The authors create a predictive model for anticipatory shipping that is simple to apply and may be used to forecast purchases. The third article, "What are the Critical Success Aspects for Agile Analytics Initiatives?" investigates factors that are important in managing agile analytics projects.

❖ A study by (Nithya and Kiruthika 2021))entitled: **Impact of Business Intelligence Adoption on the performance of banks: a conceptual framework**

To add value to the existing views on business intelligence adoption, this study attempted to develop a conceptual framework for measuring the effect of Business Intelligence Adoption on the performance of banking systems. The study has also included Customer Relationship Management as a moderating variable. The literature was evaluated on all variables, and a research gap was identified, paving the way for the creation of a model that can be used to quantify the effect of business intelligence adoption on bank performance in the context of customer relationship management in the future. This study will serve as a first step toward developing a model to evaluate and measure the effect of Business Intelligence Adoption on the performance of banking systems in the future.

❖ A study by (Buhasho et al., 2021) entitled **Moderating Effect of Organizational Capability on the Relationship Between Business Intelligence Capability and Performance Among Public Listed Firms in Kenya**

The purpose of this research is to ascertain the impact of organizational capabilities on the link between Business Intelligence capacity and company performance. To achieve the research goal, the study used multidisciplinary theories, particularly Information Systems Capability theory and Organizational Learning theory. Furthermore, the study was carried out utilizing a mixed methods research technique and a cross-sectional strategy. To analyze quantitative data and evaluate the proposed research model, the study employed structural equation modeling (Partial Least Squares approach- SEM-PLS). To analyze qualitative data, thematic analysis using Atlas. ti version 8 software was used. At the data analysis stage, the findings of the quantitative and qualitative strands of the study were triangulated using the convergence model. According to the findings,

organizational competence has a positive and substantial moderating effect. The findings provide new light on current Business Intelligence literature and open up new avenues for future study, with consequences for management, policymakers, and academics.

❖ A study by (Keshtegar et al., 2021) entitled: **The impact of business intelligence on enablers of EFQM excellence model with mediating role of knowledge sharing.**

The current study aims to investigate the influence of business intelligence on the enablers of the excellence model through the use of knowledge sharing as a moderator. The research technique is a descriptive survey, and it is used to collect data depending on the purpose. This study's statistical population includes workers of Marvdasht Banks in Iran's Fars region, with 127 respondents chosen using group sampling. Smart-PLS used structural equation modeling to evaluate research data acquired using standard questionnaires (enablers of excellence model questionnaire, Popovic questionnaire for business intelligence, and Wang questionnaire for knowledge exchange). Business intelligence has a favorable and considerable direct and indirect influence on the enablers of the excellence model, according to the findings. The direct effect of the business information on the model of enablers of excellence is 0.482. The indirect effect of business intelligence on the enablers of excellence model, with Knowledge sharing serving as a mediating function, is equivalent to 0.780. Furthermore, the indirect effect of information sharing on the model of facilitators of excellence is equivalent to 0.410. Business intelligence has a 0.726 indirect influence on knowledge sharing. Based on the research community, bank managers should pay special attention to the variables of business intelligence and knowledge sharing to increase organizational excellence and take action toward business intelligence by integrating data, increasing analytical capacity, increasing information quality, access quality of information, and analytical decision-making. These procedures have an

impact not only on information exchange in the company but also on organizational excellence.

❖ A study by (Hamdan & Rahman, 2021) entitled **Effect Of Business Intelligence System On Organizational Agility: Evidence From Syria**

The purpose of this research is to determine the impact of a business intelligence (BI) system on organizational agility. To meet the study's aims, a questionnaire with twenty-three (23) items was employed to collect primary data from seventy-five (75) respondents. The SPSS program is used to analyze the data acquired by the questionnaire in the research. The findings show a strong influence that is directly related to the business intelligence system, sensor agility, and application agility. The findings also show that there is a considerable influence with a strong direct association between the business intelligence system and decision-making and organizational agility.

❖ A study by (Buhasho et al., 2020) entitled **Business Intelligence Capability, Complementary Resources, and Performance among Public Listed Firms in Kenya.**

The primary goal of this study was to determine the impact of complementary resources on the link between Business Intelligence competence and business performance. To attain the research goal, the study employed multidisciplinary theories, notably information systems capacity theory and organizational learning. The study was conducted utilizing a cross-sectional approach using a mixed methods research technique. Data was gathered from 64 Kenyan publicly traded enterprises. According to the findings, complementary resources have a favorable and significant influence on the link between Business Intelligence capabilities and performance. The study contributed to theory by developing a framework for assessing business intelligence, which included aspects that greatly increased performance. The findings also add to the current literature and

point the way forward for future study, with implications for academics, legislators, and management.

❖ A study by (Zafary, 2020) entitled: **Implementation of business intelligence considering the role of information systems integration and enterprise resource planning**

The goal of this research is to examine the function of information systems integration and enterprise resource planning in the application of business intelligence. It is practical research, according to the objectives, and the work method is based on descriptive, survey, and exploratory research. Experts make up the study population for the qualitative portion of this investigation (information technology and communications managers from Tehran Stock Exchange companies and professors). A non-random and targeted strategy was used to conduct 25 interviews until theoretical saturation of the questionnaire was attained. The quantitative study population comprises all employees from 167 enterprises that use business intelligence in their operations. Two questionnaires were utilized to collect the necessary data for analyzing and measuring the factors under consideration. The comments of specialists corroborate the validity. Finally, seven issues are highlighted as useful elements in business intelligence success: structural variables, behavioral factors, environmental factors, processes, output, consequence, and effect, and their subcomponents. The processes have the greatest influence on the findings in terms of outcome, significance, and the model coefficient of the primary components. As a result, to boost business intelligence success, firms need to pay greater attention to their working procedures. Overall, the findings of the effective determinants on successful business intelligence implementation mirror the best practices of organizations that have successfully adopted BI systems and give insights for BI stakeholders that may raise the odds of successful implementation. This study demonstrates the importance of integrated information systems and corporate resource planning in the successful

application of business intelligence. The outcomes of this study open the door for other researchers to investigate a cost-cutting strategy. It also implies that it is time to research acceptable options by focusing on the critical aspects for effective business intelligence implementation and conducting a comparative study of methods to improve business intelligence preparation. In addition to enterprise resource planning and information system integration, this study discovered other characteristics that may be utilized to choose and rank additional elements of business intelligence deployment. In addition, a model for future study that explores the integration of business intelligence and other information systems in the organization is presented.

❖ A study by (Vugec, et al. 2020) entitled: **Business intelligence and organizational performance: The role of alignment with business process management.**

This research aims to learn more about how BI maturity translates into a company's performance. The researchers used a questionnaire to gather data from more than 50 employees in Croatian and Slovenian companies. Then they develop a BI–BPM alignment measurement instrument using prescribed scale creation and validation process besides 185 responses were analyzed depending on the structural equation modeling technique. Our findings show that coordination of BI and BPM initiatives completely mediates the impact of BI on performance and that using common terminology and methodologies can create BI business value, as well as good experts and managers, communication to coordinate the two initiatives. This study was created in response to a demand for a deeper understanding of how BI affects organizational performance. To give BI a business benefit, it was confirmed that BI and BPM initiatives should be linked.

❖ A study by (Tunowski, 2020) entitled **Sustainability of Commercial Banks Supported by Business Intelligence System**

The purpose of this paper was to determine if Business Intelligence (BI) technologies offer commercial banks sustainability by impacting their financial position. A hypothesis was developed as part of the search for a solution to the research topic, assuming that the usage of the Business Intelligence management system improves the financial situation of commercial banks. A novel comparative method was used to assess this impact, which assumed comparing financial condition indicators in three aspects: before and after the implementation of the Business Intelligence system (comparison over time), with average indicators of a group of banks (comparison to the industry), and concerning changes in the overall economic situation. A synthetic indicator of the impact of employing Business Intelligence (ABI) was produced as a result of the approach utilized. This study focused on six of the thirteen top commercial banks listed on the Warsaw Stock Exchange in 2020, all of which had used the Business Intelligence system since 2001. The assets of the institutions under examination account for 60% of the assets of commercial banks in Poland. As a consequence of the study, a beneficial impact of implementing the BI system on specified areas of commercial banks' financial situation was observed. This influence is most noticeable in the areas of productivity, asset and liability quality, profitability, and debt. The study's generalized findings enable the identification of cause and effect links between the deployment of the BI system in commercial banks and the improvement of financial condition indicators as well as sustainable banking.

❖ A study by (Al-Merri, 2020) entitled: **The Impact of Business Intelligence on Strategic Performance in Commercial Banks Operating in the State of Kuwait.**

The purpose of this study was to determine the influence of business intelligence on strategic performance in commercial banks operating in the State of Kuwait. The researcher employed a descriptive-analytical technique to introduce both business intelligence and strategic

performance. Employees in the top and middle management of commercial banks operating in the State of Kuwait made up the study population. A stratified random sample of 363 people was utilized. A total of 270 questionnaires were collected, accounting for 74.3 percent of the total sample. The study concluded that a business intelligence system ensures data processing by using data storage techniques and data extraction to obtain consistent and qualified information, thereby providing end-users and executives with the necessary knowledge to achieve strategic goals and objectives in the future. The researcher suggests that Kuwaiti banks keep up with developments in the field of business intelligence to be better utilized in enhancing strategic performance, as well as to conduct future studies that follow the analytical approach to deepen its utilization in the Kuwaiti commercial banking sector.

❖ A study by (Bett et al., 2019) entitled **Business Intelligence Techniques and Organizational Performance of Selected Commercial Banks in South Rift Counties in Kenya.**

The study used a descriptive research approach to investigate the effects of BI analytical tools on organizational performance in the banking industry. The research was conducted in chosen commercial banks in the counties of Bomet, Kericho, and Narok. The study's target population was 820 people, and 246 of them were chosen at random to fill out questionnaires, which served as the major source of data. The study determined that banks must employ data mining techniques to pull information from databases; data visualization allowed for easier comparison of bank performance.

❖ A study by (Abusweilem & Abualoush 2019) entitled **The impact of the knowledge management process and business intelligence on organizational performance**.

The purpose of this study was to investigate the relationship between knowledge management in its operations, including knowledge generation, knowledge sharing, knowledge usage, and business intelligence, including OLAP and data mining, and organizational performance in the Housing Bank branches in Irbid, Jordan. A total of 126 questionnaires were delivered to the study's sample. To assess the study's assumptions, a multiple regression analysis was utilized. The study shows that there is a favorable association between knowledge management methods and organizational performance. Furthermore, the components of business intelligence have a favorable impact on organizational performance. The findings have far-reaching ramifications for Jordan's financial industry.

❖ A study by (Owusu, 2019) entitled **Examining the Moderating Effects of Time-Since-Adoption on the Nexus Between Business Intelligence Systems and Organizational Performance.**

Through the viewpoint of the balanced scorecard, this research explores the post-adoption implications of business intelligence (BI) technologies on the organizational performance of Ghanaian banks. It also investigates if time-since-adoption moderates the expected association between BI system adoption and organizational performance in banks. To investigate the link between the research components, survey data from 130 Ghanaian bank employees were analyzed. According to the findings, BI Systems had a substantial influence on Ghanaian banks' organizational performance by increasing staff development and growth, strengthening internal business processes, and improving customer management performance. Nonetheless, BI Systems had no direct impact on the bank's financial performance. Furthermore, the data reveal that there is no substantial difference in BI System impacts on bank organizational

performance between early and late adopters. Other consequences are considered as well.

❖ A study by (Zarei & zarei, 2018) entitled: **The effect of business intelligence on the financial performance of Iranian banks. Journal of applied economics studies in Iran.**

This study investigates the impact of Business Intelligence on the financial performance of Iranian banks from 2006 to 2015. The information is derived from an examination of the financial statements of Iranian banks. This study has demonstrated that the use of Business Intelligence systems may have both financial and nonfinancial implications on banking performance. Due to the intangibility of some of the advantages, this has presented managers and policymakers with the insight that when analyzing the effects of Business Intelligence systems, they should take a complete approach and examine both the financial and non-financial elements. Furthermore, bank management should encourage the use of Business Intelligence tools in all of their activities, which can result in financial advantages for the banks over time. Then, banks may put this technology to work to improve their financial performance. In Iran, however, just three banks employ Business Intelligence.

❖ A study by (Raymond, 2018) entitled **The Impact of Business Intelligence on Corporate Performance Management: A Study of Equity Bank**

The goal of this study was to look into the impact of business intelligence adoption on corporate performance management in the context of Equity Bank Kenya. In preliminary and exploratory investigations, descriptive survey research designs were employed to allow researchers to collect information, summarize, present, and analyze it for clarification. The study's target population consisted of 1750 Equity Bank Limited workers. This is made up of top, medium, and low-level managers, all of whom are regarded to be at the business level in their organization. Stratified sampling

was employed in this study to choose a total of 104 respondents from top-level management, medium-level management, and lower-level management employees. Questionnaires were the primary data gathering instruments for this investigation. The questionnaire data was cleaned, corrected, coded, and placed into the Statistical Package for Social Sciences (SPSS), which will also help in data analysis. Employees believe that business intelligence systems are valuable, according to the research on the effects of business intelligence adoption on planning effectiveness. Business intelligence promotes connections and analytics that may be used at all levels within and outside of the organization. According to the findings of the study, the application of business intelligence in product development has boosted order velocity and accuracy in the industry. The study concluded that the usage of a business intelligence system is beneficial during decision making, that it saves the company time and money, and that it improves communication across departments.

❖ A study by (Bach et al., 2018) entitled **Understanding impact of business intelligence to organizational performance using cluster analysis: does culture matter?**

The purpose of this article is to examine the relationship between the company's organizational performance and its level of business intelligence maturity. Furthermore, because practitioners are becoming more conscious of the importance of organizational culture in the effective operation of a business, the significance of organizational culture is being considered in this research. A survey was done to achieve the paper's goal. Data was acquired via surveys from a sample of 177 Croatian and Slovenian businesses and analyzed using cluster analysis. The study revealed two distinct groupings. The findings of the clusters' cross-tabulation study show statistically significant variations in terms of firm turnover and dominant organizational culture between them.

❖ A study by (Pool et al., 2018) entitled: **The effect of business intelligence adoption on agile supply chain performance.**

The goal of this research is to investigate how business intelligence (BI) usage influences agile supply chain performance. We hypothesize and examine the link between the technology-organization-environment (TOE) paradigm, BI adoption, and agile performance using data from the computer behavior literature. To examine the association between the research variables, a structural equation modeling (SEM) test using maximum likelihood estimation was used. The empirical results of the structural model reveal that the TOE framework affected business intelligence adoption positively. Furthermore, BI adoption was found to be a direct predictor of agile performance.

❖ A study by (Bosilj-Vuksic et al., 2017) entitled: **The role of alignment for the impact of business intelligence maturity on business process performance in Croatian and Slovenian companies**

Business intelligence (BI) enables businesses to examine business data to make better decisions. Currently, there is little study on the level of BI maturity in Croatian and Slovenian businesses. Furthermore, numerous BI maturity models have been established, however, the majority of them are not exhaustive. This article aims to throw some light on this issue by pursuing two objectives: (1) investigating the influence of BI maturity on business process performance and (2) exploring the criteria for the alignment of two concepts, BI and business process management (BPM), inside the organization. The paper includes the following: I research into BI and BI systems in general, (ii) adaptation of the BI maturity model (dubbed biMM) for this study, (iii) the findings of primary research done on a sample of Croatian and Slovenian businesses as part of the study funded by the Croatian Science Foundation: Process and Business Intelligence for Competitive Advantage, (iv) the level of BI maturity, as well as the role of

BI and business process alignment in the influence of BI maturity on business process performance in the researched firms.

❖ A study by (Chegini, et al. 2013) entitled: **Relationship Between Business Intelligence And Organizational Performance (Case Study: Food Industry Companies In Rasht Industrial City)**

This study aimed to examine how business intelligence impacts the performance of 32 food industry companies in Rasht industrial city selected by simple random sampling method, Data was collected using a specially designed questionnaire; 42 questions of business intelligence and 11 questions of performance by a researcher for managers. Experts and scholars have verified the questionnaire's content validity, with Cronbach's alpha coefficients of 0.937 and 0.871 for two variables of business intelligence and performance, respectively. The dimensions that have been used in this study are efficient flow of information, employee's capabilities of learning knowledge, continuous improvement, Investment in information technology, technology, and IT infrastructures, and organizational learning. SPSS software was used to evaluate the collected data, and the results showed a positive and important effect of business intelligence on performance with organizational learning gaining the highest score to emphasize the strongest relation followed by policies of quality improvement.

CHAPTER III: METHODLOGY

3. Introduction

3.1. Study design and methods

3.2. Population and sample of study

3.3. Data Collection Methods

3.4. Procedure for data collection

3.5. Statistical techniques in data analysis

3.6. Validity and reliability

3. Introduction

This chapter discusses and presents the study methodology used to verify the impact of business intelligence adoption on Jordanian commercial banks performance and sample of the study, data collection sources, study model, variables measurements, and data analysis techniques.

3.1. Study Design and methodology

The study employed quantitative methods and adopted a descriptive-analytical study approach. The descriptive approach was employed for describing the level of the two variables, business intelligence adaption as an independent variable with its three dimensions and Jordanian commercial banks performance as a dependent variable, while the analytical approach was employed to test hypotheses find answers for the research questions about the current state of the study's topic and investigate the impact of business intelligence adaption with its three dimensions (technology and functional scope, maturity, the velocity of big data) on the organizational performance at Jordanian commercial Banks listed in Amman stock exchange company.

The study targeted Jordanian commercial Banks in Amman -Jordan. Data were collected by a valid and reliable questionnaire distributed to participants holding three different job positions in commercial banks in Amman include, branch managers, operations managers, and department supervisors. Ultimately, paving the way toward coming up with accurate and timely recommendations to researchers and decision makers in this era. The method was done considering the purpose and objectives of the study. The normality, validity and reliability. Were tested, descriptive analysis was carried out, and the impact was tested by multiple regression analysis.

3.2. Population and sample of study

The current study focused on Jordanian commercial banks in Amman, Jordan. The study used a convenience sample. The analysis unit consists of individuals occupying three different job positions in Jordanian commercial banks in Amman, Jordan including branch managers, operations managers and department supervisors who were present at the time of distribution and were willing and ready to participate. Though sixty-four branches were contacted about participating in answering the questionnaire, 11 commercial banks consisting of approximately 2 to 6 branches in each region in Amman cooperated. The branches that did not cooperate was based on their rules and regulations in each branch. In total, 136 questionnaires were collected.

The Statistical Package for the Social Sciences (SPSS) was used in the current study to describe all the variables. The demographic profile of respondents aims to show the frequencies and proportions of respondents' demographic characteristics. This is related to the first part of the questionnaire, such as gender, age, qualifications, occupation and experience.

As shown in Table (3.1), 66% of the respondents are males, representing 90 participants, while 34% are females, representing 46 participants. This is an indication that most of the respondents are males within the context of the analytical unit examined in this study.

Table (3.1): frequencies and percentages of respondents according to gender.

		Frequency	Percent
Gender	Female	46	34%
	Male	90	66%
	Total	136	100%

Figure (3.1): percentages of respondents according to gender.

Results of table (3.2) show that the majority of the respondent's ages are between 30 and 39 years old with a percentage of 49% of respondents representing 67 participants. A 27% is within the ages between 40 to 49 years old representing 37 participants. An 18% is less than 30 years old and finally 6% is over 50 years old, representing 24 and 8 participants, respectively.

Table (3.2): frequencies and percentages of respondents according to age.

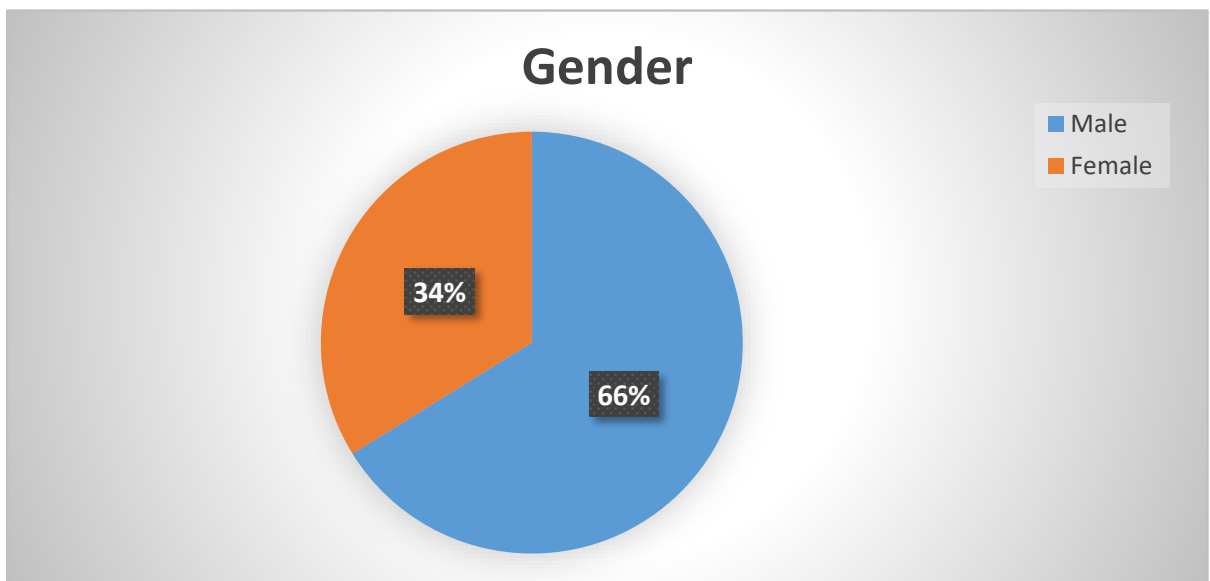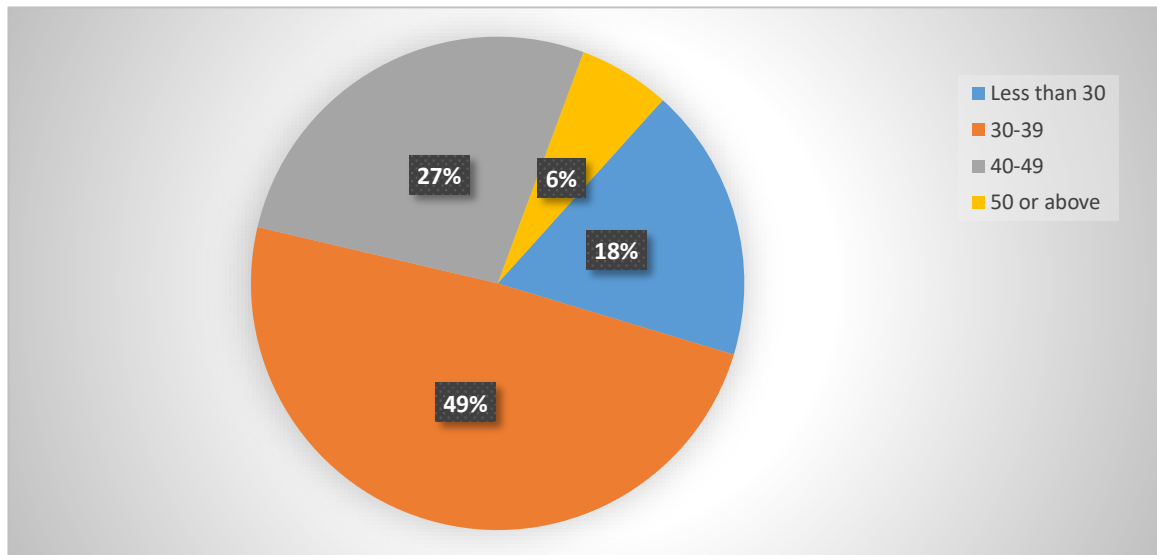|		Frequency	Percent
Age	Less than 30 years	24	18%
	From 30-39 years	67	49%
	From 40-49 years	37	27%
	50 or above years	8	6%
	Total	136	100%

Figure (3.2): percentages of respondents according to age.

Results of the table (3.3) show that the majority of the respondents hold Bachelor's degrees with a percentage of 81% representing 110 participants. While 16% of the participants have the Master's degree 22 individuals which reflect the employees are well-educated and interested in pursuing academic qualifications.

Notably, only four participants hold a diploma constituting a 3% of the sample.

Table (3.3): frequencies and percntages of respondents according to qualification.

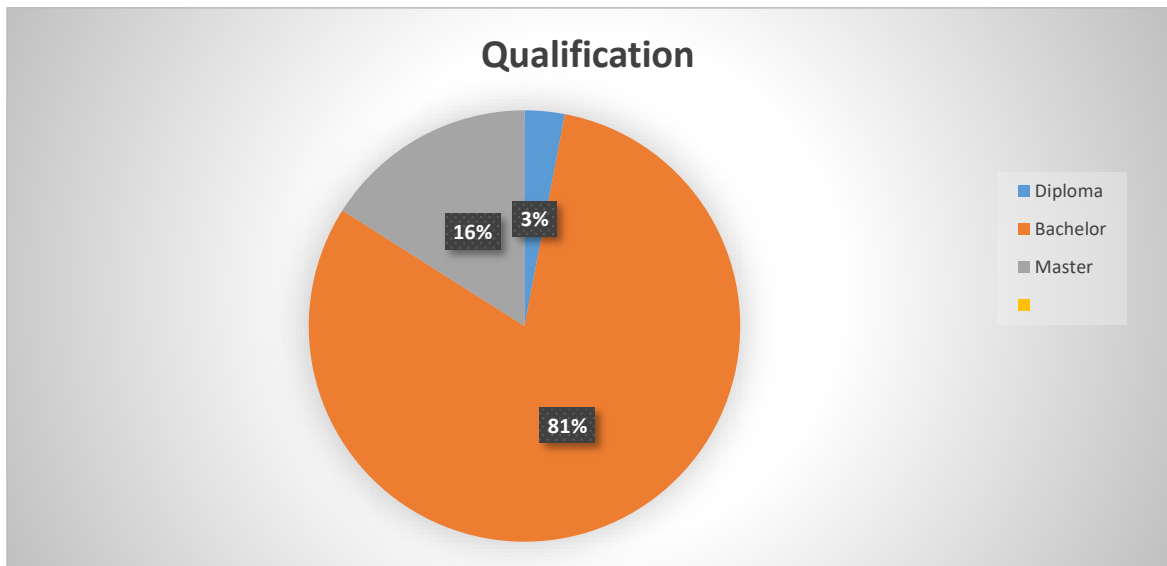|		Frequency	Percent
	Diploma	4	3%
	Bachelor	110	81%
Qualification	Master	22	16%
	Total	136	100%

Figure (3.3): percentages of respondents according to qualification.

Results of the table (3.4) show that the percentage of the participants hold different job position including branch managers, operation managers and department supervisors were 47%, 46% and 7% respectively. Of a sample of 136 participants, 64

participants are branch managers, 62 are operational managers and
10 are department's supervisors.

**Table (3.4): frequencies and percentages of respondents according to Position.**

		Frequency	Percent
position	Branch Manager	64	47%
	Operations Manager	62	46%
	Department supervisors	10	7%
	Total	136	100%
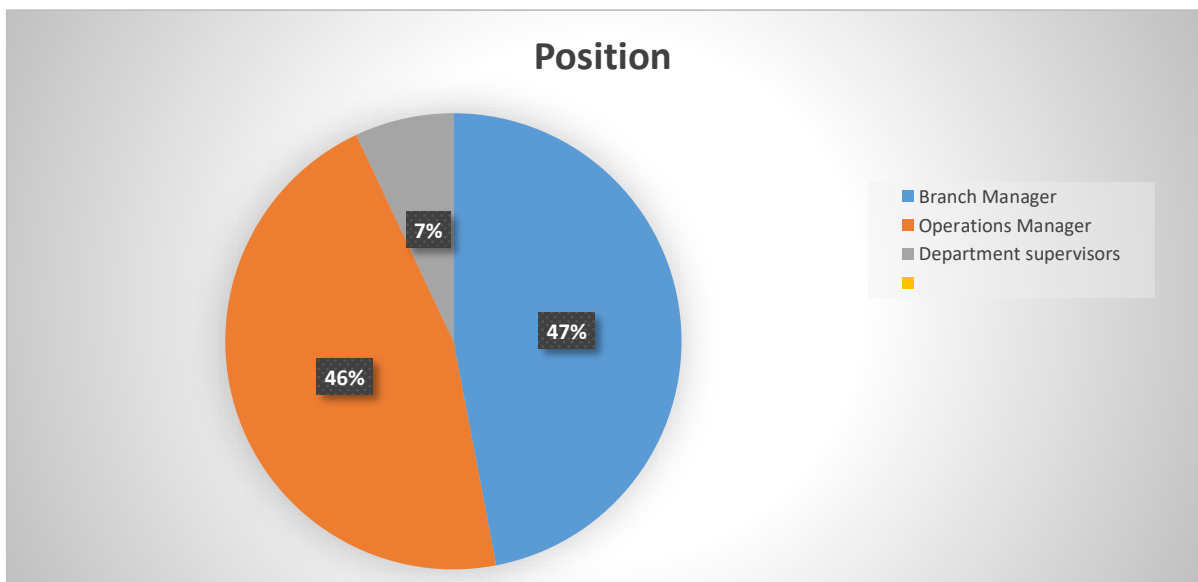
Figure (3.4): percentages of respondents according to position.

Results of the table (3.5) show that the respondents
experiences that are less than ten years and range from 11 to 15 years
peaked at the top with the same percentage 35% representing of total
94 participants, the next is 20% of respondents whose experience
range between 16 to 20 years representing 27 participants. And the

rest 11% of respondents who's representing 15 participants there experiences above 21 years.

Table (3.5): frequencies and percentages of respondents according to experience.

		Frequency	Percent
Experience	10 or less years	47	35%
	From 11-15 years	47	35%
	From 16-20 years	27	20%
	21 or more years	15	11%
	Total	136	100%

Figure (3.5): percentages of respondents according to experience.

3.3. Data Collection Methods

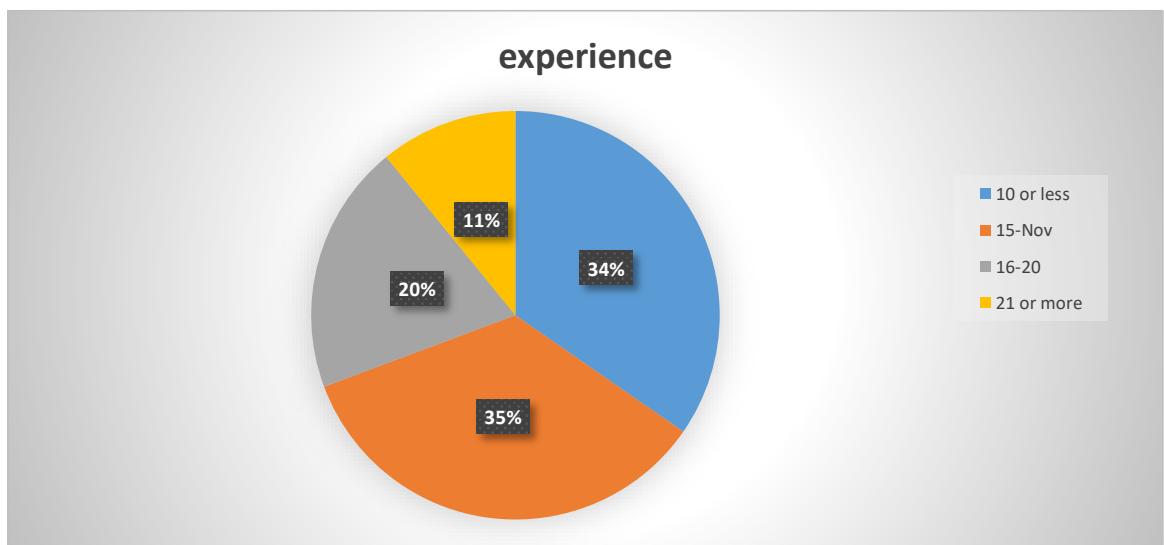The data collection in the present study was based on two-fold aspects. One is the theoretical aspect, which is based on previous scientific studies that are related to the study variables. Two, is the practical aspect, which is based on descriptive and analytical methods using practical ways to collect and analyze data to test hypotheses. Two types of data collection methods were used:

Secondary data: based on books, journals, published studies, researches, thesis, articles, government reports, etc., were utilized to compile the most recent worldwide data, comprehend the study's theoretical framework, and create the study's model and assumptions.

To conduct this study, **primary data** were collected from branch managers, operations managers, and department supervisors in Jordanian commercial banks via a questionnaire with closed questions. This questionnaire was designed and developed specifically for the purpose of collecting primary data about all study variables and the demographic characteristics of respondents.

The questionnaire was arranged from several sources then modified and approved by a group of professors related to Business Intelligence adoption and its impact of banks' performance as the two main variables of the study.

Participants were asked to think and answer objectively the questions asked.

According to the study model, the questionnaire was divided into three sections; 1, 2 and 3. Section 1 addressed demographic characteristics (gender, age, qualification, job position and experience), with items numbered from (1-5).

Section 2 addressed the independent variable: business intelligence adoption with its three dimensions (technology and functional scope, maturity, the velocity of big data). Under this section, items were used to test each dimension and were numbered from (6-22).

While section 3 addressed the dependent variable: Jordanian commercial banks performance, with items numbered from (23- 27). Table (3.6) shows the distribution of scale items. The necessary pre-test was conducted to provide a coherent research questionnaire and to detect and correct any deficiencies.

Table (3.6): Distribution of questionnaire's items to measure study variables.

Research variables	Variable type	Items	Number of items
Business intelligence		**(6-22)**	
Technology and functional scope	Independent	6-11	6
Maturity		12-15	4
The Velocity of big data		16-22	7
Jordanian commercial banks performance	Dependent	23-27	5
The total number			22

All items were measured by a 5-Point Likert type scale to rate the respondents' real perceptions regarding each item and give them

flexibility in the selection of their actual perceptions. Where the value ranged between 1 and 5 as shown in table (3.7) below.

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

Table (3.7): Likert scale

Strongly disagree	disagree	Neutral	agree	Strongly agree
1	**2**	**3**	**4**	**5**

3.4. Procedure for data collection

Electronic (google form) using a tablet device and also printed questionnaires were distributed to the Jordanian commercial banks personally.

A list of eleven commercial Jordanian banks in Jordan was retrieved from the website of the Banking Sector Guide-Central Bank of Jordan at the start of the survey. A letter from the University of Petra was used to facilitate the data collection task.

Some bank branches refused to cooperate due to their bank's policies and procedures, and sixty-four branches cooperated in answering the questionnaire.

The researcher made daily visits to many branches of commercial Jordanian banks in Amman and asked if they could fill out the questionnaire on the tablet or have a hard copy of it. 136 questionnaires were collected and used for the purpose and objectives of the study.

3.5. Statistical techniques in data analysis

To answer study questions and test study hypotheses, the present study employed the following descriptive statistical and analytical methods:

- Frequencies and percentages.

- Cronbach's Alpha.

- Mean and Standard deviation.

- Multi-collinearity and Correlation analysis

- Multiple regression analysis.

3.6. Validity and reliability

Validity text

To confirm the validity, the following approaches were used:

The face validity. The study tool was presented to a group of academic arbitrators with experience who are working at Jordanian universities to ensure that the questionnaire is valid. In particular. in terms of the appropriateness of the item for the content and the adequacy of the study tool in terms of the number of items, their comprehensiveness, the diversity of their content and the evaluation of the language drafting, or other notes they see deemed necessary. Arbitrators' observations and suggestions were taken into consideration, and modifications have been made in light of their recommendations. The name of arbitrators and the letter for the validation of the study instrument are shown in the appendices of the study.

The content validity: has been confirmed by the usage of multiple sources to gather information such as studies, books, journals, theses, dissertations, and the internet.

Reliability Test (Cronbach's Alpha):

This study used Cronbach's Alpha in order to test the reliability. Cronbach's alpha is a number that runs from 0 to 1 and is generally considered acceptable if higher than 0.7. The high alpha value indicates that the test items are highly correlated (Shrestha, 2021).

Table 3.8 presents the results of Cronbach's Alpha test for each business intelligence adoption dimensions (technology and functional scope, maturity, the velocity of big data) as well as Jordanian commercial banks' performance. The results illustrate that the values of Cronbach's Alpha coefficients are higher than 70%, indicating that the measurements for these variables are considered reliable.

Table (3.8): Reliability Test: Cronbach's Alpha

Variable	Reliability Statistics	
	Cronbach's Alpha	N of Items
Business intelligence		
Technology and functional scope	.795	6
Maturity	.902	4
Velocity of big data	.905	7
Jordanian commercial banks performance	.850	5

CHAPTER IV

RESEARCH RESULTS, DISSCUSSION AND INTERPRETAION

4.Introduction

4.1. Descriptive statistical analysis

4.2. Relationships between variables

4.3. Results Pertaining to The Main and Sub-Hypotheses

4.4. Conclusion

4. Introduction

The main findings of the data descriptive analysis of respondents' perceptions using mean, standard deviation, importance, and ranking are presented in this chapter. In addition, the results of a correlation analysis will be presented in order to test the relationship between business intelligence adoption dimensions (technology and functional scope, maturity, the velocity of big data) with each other, and the relationship between business intelligence adoption and Jordanian commercial banks performance. Finally, it includes hypothesis testing, which tests the impact of business intelligence adoption on Jordanian commercial banks performance.

4.1 Descriptive Statistical Analysis:

The mean, standard deviations, ranking and importance of each variable is presented in this section according to the respondents' answers to various items that describe the study variables. The importance is calculated based on the following equation: 5-1/3= 1.33. Consequently, the low importance is the range between 1-2.33, the medium is the range between 2.34-3.66, and the high importance is the range between 3.67-5.

4.1.1. Independent Variable: Business Intelligence Adoption

To test the impact of technology and functional scope in Jordanian commercial banks the respondents were asked to answer six questions related to that variable, then the mean, standard deviation, importance and ranking were calculated for each item based on the respondents' answers as shown in table (4.1).

Table (4.1): Mean, Standard Deviation, Importance and Ranking for Technology and functional scope

Technology and functional scope	Mean	Std. Deviation	Ranking	Importance
IT infrastructure supports the bank Business Intelligence strategy	4.125	0.838	3	High
Using Business Intelligence technology increases productivity	4.199	0.739	2	High
Using Business Intelligence technology improves the quality of decision	3.993	0.830	4	High
Using Business Intelligence technology enables to accomplish tasks more quickly	4.294	0.721	1	High
Our bank has the ability to adapt to the complex environment 'is one that is dynamic or unexpected	3.949	0.855	6	High
Information provided in the Bank is characterized by being comprehensive 'covering completely or broadly'.	3.963	0.838	5	High
Technology and functional scope	4.087	0.566	High	

The results in table 4.1 reflects the agreement among commercial banks employees on high implementation of technology and functional scope in their working environment. This can be inferenced from the obtained mean values that range between 3.949 to 4.294, and standard deviation between 0.721 to 0.855.

In addition, the overall average mean value for the six items is 4.087 with a standard deviation of 0.566 which is a high value that also confirms the agreement among employees in the Jordanian commercial banks on high implementation of technology and functional scope variable. Moreover, the statement that describes how business intelligence technology enables quickly tasks accomplishment was ranked the first with high importance according to the respondent's answers which indicate that the dimension has a high implementation agreement from the viewpoint of the respondents. Another result that supports the same findings is the agreement among employees on how using business intelligence technology increases productivity (mean= 4.199) and how IT infrastructure supports the bank's business intelligence strategy (mean= 4.125). Even the lowest obtained mean value (3.949) by the statement 'our bank has the ability to adapt to the complex environment is one that is dynamic or unexpected' is considered high in terms of level and confirms the high level of agreement among respondents on the implementation of technology and functional scope variable in Jordanian commercial banks

To test the impact of maturity in Jordanian commercial banks the respondents were asked to answer four questions, then the mean, standard deviation, importance and ranking were calculated for each item based on the respondents' answers as shown in table (4.2).

Table (4.2): Mean, Standard Deviation, Importance and Ranking of Maturity

Maturity	Mean	Std. Deviation	Ranking	Importance
Our Bank depends on modern technology means in providing of services.	3.949	1.098	1	High
Our Bank converts the data and information into scientific ways to facilitate knowledge access.	3.846	0.950	3	High
Our Bank encourages setting up seminars among employees to encourage their intellectual ability in the areas of banking knowledge.	3.882	1.040	2	High
Our Bank uses information technology in the field of thinking and innovation to find cognition or solutions.	3.801	0.957	4	High
Maturity	3.869	0.890	High	

The results in table 4.2 reflects the agreement among employees in the Jordanian commercial banks on high implementation of maturity in their working environment. This can be inferenced from the obtained mean values that range between 3.801 to 3.949, and standard deviation between 0.950 to 1.098.

In addition, the overall average mean value for the four items is 3.869 with a standard deviation of 0.890 which is a high value that confirms the agreement among employees on the high implementation of the maturity variable. In addition,

the statement 'Our Bank depends on modern technology means in providing of services' was ranked first with the highest mean value 3.949, followed by the statement 'Our Bank encourages setting up seminars among employees to encourage their intellectual ability in the areas of banking knowledge' with the second highest mean value 3.882, which indicate that the dimension has a high implementation agreement from the viewpoint of the respondents. Besides, even the lowest obtained mean value (3.801) by the statement 'Our Bank uses information technology in the field of thinking and innovation to find cognition or solutions' is considered high in terms of level and confirms the high level of agreement among respondents on the implementation of maturity variable in Jordanian commercial banks.

To test the impact of the velocity of big data in Jordanian commercial banks the respondents were asked to answer seven questions, then the mean, standard deviation, importance and ranking were calculated for each item based on the respondents' answers as shown in table (4.3).

Table (4.3): Mean, Standard Deviation, Importance and Ranking of the Velocity of big data.

The Velocity of big data	Mean	Std. Deviation	Ranking	Importance
Big Data Velocity increases work effectiveness.	4.051	0.880	2	High
The use of big data helps in obtaining correct information.	4.044	0.868	3	High
Big Data Velocity increases work efficiency.	3.853	0.947	7	High
Velocity of Big Data is an opportunity to the organization.	3.963	0.922	5	High

Big Data Volume is used to provide objectivity for decisions making.	3.868	0.815	6	High
Big Data Velocity is used to provide speed in accomplishing tasks.	4.029	0.877	4	High
Big Data Velocity improves Business Intelligence process.	4.096	0.833	1	High
The Velocity of big data	3.986	0.701	High	

Table 4.3 illustrates that the values of mean for the velocity of big data items is between 3.853 and 4.096 with the standard deviation between 0.815 and 0.947. Besides, the overall average of the velocity of big data seven items is 3.986 with a standard deviation of 0.701. The above findings indicate that there is an agreement among employees in the commercial banks in Jordan on the high implementation of the velocity of big data items.

In addition, the statement 'Big Data Velocity improves Business Intelligence process' was ranked first with the highest mean value (4.096), followed by the statement 'Big Data Velocity increases work effectiveness' (mean=4.051) which confirms the same findings. On the other hand, the statement 'Big Data Velocity increases work efficiency' obtained the lowest mean value (3.853), which is considered high in terms of level and confirms the high level of agreement among respondents on the implementation of big data velocity variable in Jordanian commercial banks.

4.1.2. Dependent Variable: Jordanian Commercial Banks Performance

Table (4.4): Mean, Standard Deviation, Importance and Ranking of Jordanian commercial banks performance.

Jordanian commercial banks performance	Mean	Std. Deviation	Ranking	Importance
Our bank uses BI Systems in its critical operations.	3.824	1.025	4	High
Our bank is very flexible; it can quickly change procedures to meet new conditions and solve problems as they arise.	3.897	0.897	2	High
Using Business Intelligence systems improve competitive advantages in the bank.	3.890	0.908	3	High
The information obtained from Business Intelligence is accurate.	3.728	0.890	5	High
The Bank has the internal capabilities to deal with the Business Intelligence methods.	4.140	0.888	1	High
Jordanian commercial banks performance	3.896	0.730	High	

The results of the descriptive analysis of the dependent variable, Jordanian commercial banks performance, in table (4.4) indicate that the respondents agree on the high importance of the Jordanian commercial banks' performance variable. For instance, the mean values range between (3.728 to 4.140) and the standard deviation ranges between (0.888 and 1.025) which confirms the high importance of the variable according to the respondent's answers. Moreover, the respondents

highly agreed that the bank has the internal capabilities to deal with the business intelligence methods in the commercial banks in Jordan and that the bank is very flexible as it can quickly change procedures to meet new conditions and solve problems as they arise.

Another finding to confirm the results is the mean average for all banks' performance items which is (3.896) and a standard deviation is (0.730). In addition, the lowest value of the mean (3.728) is considered high in terms of level and confirms the high level of agreement among respondents on the implementation of Jordanian commercial banks performance items.

4.2. Relationships between Variables

One of the basic tenets of linear regression analysis is that the study variables must have an interpreted relationship that is within acceptable limitations. As a consequence, Pearson's correlation matrix was used to test the relationship between business intelligence adoption dimensions (technology and functional scope, maturity, velocity of big data) with each other, and the relationship between business intelligence adoption and Jordanian commercial banks' performance.

Table (4.5): Correlation analysis

		Technology and functional scope	Maturity	Velocity of big data	Jordanian commercial banks performance
Technology and functional scope	Pearson Correlation	1	.538**	.563**	.641**
	Sig. (2-tailed)		.000	.000	.000
	N	136	136	136	136

Maturity	Pearson Correlation	.538**	1	.660**	.716**
	Sig. (2-tailed)	.000		.000	.000
	N	136	136	136	136
The Velocity of big data	Pearson Correlation	.563**	.660**	1	.684**
	Sig. (2-tailed)	.000	.000		.000
	N	136	136	136	136
Jordanian commercial banks performance	Pearson Correlation	.641**	.716**	.684**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	136	136	136	136
**. Correlation is significant at the 0.05 level (2-tailed).					

The results of correlation analysis in table 4.5 indicate that there are medium to a strong level of relationships within the dimensions of business intelligence adoption that the Pearson correlation coefficients range between 0.538 (technology and functional scope with maturity) and 0.660 (velocity of big data with maturity). In addition, the correlation coefficients between the dimensions of business intelligence adoption with the Jordanian commercial banks' performance ranged between 0.641 (technology and functional scope with performance) and 0.716 (maturity with performance) which is also at a medium to a strong level of relation.

4.2.1. Multicollinearity

This study employed both the Variable Inflation Factor (VIF) and the tolerance test for each dimension of business intelligence adoption represented by (technology and functional scope, maturity, and the velocity of big data) to test the assumption of multicollinearity. The variable inflation factor (VIF) is proportional

to the degree of tolerance and must not exceed 5, whereas the tolerance test value must be more than 0.2 (Grekousis, 2020).

Table (4.6): Multi-Collinearity test.

Coefficients[a]		Collinearity Statistics	
Model		Tolerance	VIF
1	(Constant)		
	Technology and functional scope	.634	1.578
	Maturity	.524	1.909
	The Velocity of big data	.503	1.987
a. Dependent Variable: Jordanian commercial banks performance			

The results of the multicollinearity test are presented in Table 4.6, with the data indicating that the VIF for each variable is less than 5. Furthermore, the tolerance findings are greater than 0.2. This suggests that there is no multicollinearity in the present study's variables.

4.3. Results Pertaining to the Main Hypothesis and Sub-Hypotheses

4.3.1. Results pertaining to the main hypothesis H_0

H01: There is no statistically significant impact at a significant level $(\alpha \leq 0.05)$ of business intelligence adoption represent by (technology and functional scope, maturity, and the velocity of big data) on Jordanian commercial banks' performance.

Table (4.7): Results of Multiple Regressions Analysis to test main hypothesis H_0

Model Summary					
	R Square	Adj. R Square	Std. Error of the Estimate		
	.642	.634	.4417		
	Sum of Squares	df	Mean Square	F	Sig.
Regression	46.170	3	15.390	78.899	.000
Residual	25.748	132	.195		
Total	71.917	135			
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.067	.288		.232	.817
Technology and functional scope	.362	.084	.280	4.286	.000
Maturity	.317	.059	.387	5.378	.000
The Velocity of big data	.282	.076	.270	3.684	.000

Table (4.7) presents the results of the multiple regressions analysis to test the main hypothesis (H_0) that aims to analyze the impact of business intelligence adoption represent by (technology and functional scope, maturity, and the velocity of big data) on Jordanian commercial banks' performance. The value of R-squared

(R2) illustrates the fitness of the model for multiple regressions. Since R2 is 64.2 % then the dimensions of business intelligence adoption can explain 64.2 % of the variance on Jordanian commercial banks performance, since (R2 =64.2 %, F=78.899, Sig.=0.000).

Accordingly, the null hypothesis is rejected and concluded that there is a significant impact of business intelligence adoption represented by (technology and functional scope, maturity, and the velocity of big data) on Jordanian commercial banks' performance at a 5% level of significance.

4.3.2. Results pertaining to the sub-null hypothesis $H0_1$

$H0_1$: There is no statistically significant impact at a significant level ($\alpha \leq$ 0.05) of technology and functional scope on Jordanian commercial banks' performance. This hypothesis was tested by using multiple regression tests to answer the sub-question about the research problem.

The results in table (4.7) shows that the beta coefficient for the technology and functional scope variable is 0.362, with t calculated value (4.286) that is higher than the critical t-value (1.96), and the significant level is less than 5% (0.000). This indicates that there is high importance of technology and functional scope and its effect on the performance of Jordanian commercial banks. Therefore, the first sub-null hypothesis should be rejected and conclude that there is a significant positive impact of technology and functional scope on the Jordanian commercial banks' performance at a significant level ($\alpha \leq 0.05$).

4.3.3. Results pertaining to the sub-null hypothesis $H0_2$

$H0_2$: There is no statistically significant impact at a significant level ($\alpha \leq$ 0.05) of maturity on Jordanian commercial banks' performance. This hypothesis was tested by using multiple regression tests to answer the sub-question about the research problem.

The results in table (4.7) shows that the beta coefficient for the maturity variable is 0.317, with t calculated value (5.378) that higher than the critical t-value (1.96), and the significant level is less than 5% (0.000). This indicates that there is

high importance of maturity and its effect on the performance of Jordanian commercial banks. Therefore, the second sub-null hypothesis should be rejected and conclude that there is a significant positive impact of maturity on the Jordanian commercial banks' performance at a significant level ($\alpha \leq 0.05$).

4.3.4. Results pertaining to the sub-null hypothesis $H0_3$

$H0_3$: There is no statistically significant impact at a significant level ($\alpha \leq 0.05$) of the velocity of big data on Jordanian commercial banks' performance. This hypothesis was tested by using multiple regression tests to answer the sub-question about the research problem.

The results in table (4.7) shows that the beta coefficient for the velocity of big data variable is 0.282, with t calculated value (3.684) that higher than the critical t-value (1.96), and the significant level is less than 5% (0.000). This indicates that there is high importance on the velocity of big data and its effect on the performance of Jordanian commercial banks. Therefore, the third sub-null hypothesis should be rejected and conclude that there is a significant positive impact of the velocity of big data on the Jordanian commercial banks' performance at a significant level ($\alpha \leq 0.05$).

4.4. Conclusion

This study follows a quantitative descriptive design. The data was collected from 136 managers working at 11 Commercial banks in Amman branches, by questionnaire. After confirming the normality, validity, and reliability of the tool, the statistical analysis means, standard deviations, and t-values were used to describe the responses, then the correlation between variables was carried out, and finally, multiple regressions were used to test the hypothesis.

The result shows that there is an agreement among the bank's managers the respondents on high implementation of each business intelligence sub-variables, and the total mean of business intelligence is high, which indicated that there is a significant implementation of business intelligence tools, methods, procedures, and techniques among mangers in banks sector in Jordan.

This indicates that the managers working at Jordan banks realize the importance of the business intelligence sub-variables on Jordanian commercial bank performance. Moreover, the respondents highly agreed that the bank has the internal capabilities to deal with the business intelligence methods in the commercial banks in Jordan and that the bank is flexible as it can quickly change procedures to meet new conditions and solve problems as they arise. In addition, the overall result indicated that there is a positive significant impact of business intelligence adaption on Jordanian commercial bank performance.

Results show that business intelligence adaption effect Jordanian commercial bank performance and each sub-variables of business intelligence has a significant effect on Jordanian commercial Banks' performance. Furthermore, the study indicated that technology and functional scope has the highest impact on Jordanian commercial Banks' performance, followed by the velocity of big data and finally maturity.

The main findings for descriptive analysis show that respondents agree on the high importance of business intelligence adoption represent by (technology and functional scope, maturity, and the velocity of big data) as well as the performance of the Jordanian commercial banks. In addition, the correlation coefficients between the dimensions of business intelligence adoption with the Jordanian commercial banks' performance ranged between 0.641 and 0.716 which is also at a medium to a strong level of relation.

Finally, the results of the multiple regressions analysis show that there is a significant positive impact of business intelligence adoption represented by (technology and functional scope, maturity, and the velocity of big data) on the performance of Jordanian commercial banks at a 5% level of significance.

CHAPTER V

Results discussion, conclusion and recommendations

5.1 Results discussion

5.2 Conclusion

5.3 Recommendations

5.1 Results discussion

The main results of study questions, tested hypotheses and contributions to solving the study problem are as follows:

This study shows that there is a high implementation of the business intelligence sub-variables in Jordanian commercial banks. Such results are due to the high implementation of advanced technology in Jordanian banks, and the performance level of the Jordanian commercial banks is high due to the effect of the adoption of business intelligence. There is significant impact of business intelligence with its three dimensions both separately and together (technology and functional scope, maturity, and the velocity of big data) on Jordanian commercial banks' performance through job process and innovation climate in Amman, Jordan.

As a result, the present study found statistical evidence that business intelligence adoption has a positive and significant impact on the performance of Jordanian commercial banks, which in turn reflects on the banks' missions and aims.

These results are in line with results from other researchers, such as a study by Abusweilem & Abualoush (2019), which found significant positive significance in the impact of the knowledge management process and business intelligence on organizational performance. Their study looked at the relationship between knowledge management and business practices in bank branches in Jordan.

To add value to the existing views on business intelligence adoption, a study by Nithya and Kiruthika (2021) attempted to develop conceptual framework for measuring the effect of business intelligence adoption on the performance of banking systems. The study will serve as a first step toward developing a model to evaluate and measure the effectiveness of business intelligence adoption on the performance of banking systems in the future.

Another group of researchers and scholars who have studied business intelligence in different geographical locations is Bett et al. (2019). Their study was conducted in commercial banks in the counties of Bomet, Kericho, and Narok. The study determined that banks must employ data mining techniques to pull information from databases. It also found that data visualization allowed for easier bank performance between different banks. Hamdan & Rahman (2021) study the Effect of Business Intelligence Systems on Organizational Agility using evidence from Syria. They came up with findings revealing a significant impact on decision-making and organizational agility that is directly tied to the business intelligence system, sensor agility, and application agility.

Al-Merri (2020) studied how business intelligence affected strategic performance in Kuwaiti commercial banks. According to his study, he finds that Kuwaiti banks should stay up to date with innovations in the field of business intelligence so that they can better use it to improve strategic performance.

Recently, according to Olszak et al., the Internet, social media, distributed databases, and mobile devices have all contributed to the expansion of data (2021). Much of this unstructured data can be a huge corporate benefit when handled appropriately. As a result of a lack of appropriate tools or a misunderstanding of its significance, a number of businesses utilize vital data only infrequently. This special issue (SI) seeks to provide businesses with a theoretic\al, conceptual, and applied foundation in BI and BD to facilitate innovative and sustainable development, as well as sound decision-making. According to Keshtegar et al., business intelligence has a positive direct and indirect effect on excellence model enablers. According to a study, bank managers should prioritize business intelligence and knowledge exchange to achieve organizational excellence.

The main hypothesis related to this study: there is a significant impact of Business Intelligence adoption on Jordanian banks' performance at level ($\alpha <$ 0.05).

This result is consistent with Vugec, et al. (2020) study result show that coordination of BI and BPM initiatives completely mediates the impact of BI on performance and that using common terminology and methodologies can create BI business value, as well as good experts and managers, communication to coordinate the two initiatives. This study were create in response to a demand for a deeper understanding of how BI affects organizational performance, It confirmed that BI and BPM initiatives should be aligned in order to give BI a business value. furthermore, Tunowski, R. (2020) this research describes a novel comparison method for analyzing banks' financial status after BI implementation, research has not discovered a simple universal way for analyzing BI's impact on an organization's health. Studies on the impact of BI on firms in Poland have mostly involved case studies, and there have been few publications on long-term impact studies. Managers can immediately determine the financial impact of implementing a Business Intelligence system with its help. The results corroborate the research hypothesis and show that employing BI improves banks' financial position. Using the BI system improved financial condition indicators in all areas tested.

Concerning the sub-hypotheses related to this study, this study came up with the following result.

First, there is a significant impact of technology and functional scope on Jordanian banks' performance (job process and innovation climate) at a level ($\alpha < 0.05$). The managers and employees of Jordanian commercial banks agreed that using Business Intelligence technology enables them to accomplish tasks more quickly and increases productivity as reported by Pool et al. (2018). Accepting technologies that promote the chain's information sharing has a beneficial impact on chain performance, and research shows that RFID can improve consumer demand forecasting and supply chain performance by enhancing information sharing. Since BI may share online, our study results match this research. Managers should first have a thorough method for accepting BI and adopt the sort of BI project based on their needs.

Second, there is a significant impact of maturity on Jordanian banks' performance (job process and innovation climate) at a level ($\alpha < 0.05$). Based on the Bosilj-Vuksic et al., (2017) study shows that it is reasonable to expect, business intelligence maturity will result in higher process performance improvement when they are implemented as coordinated and aligned initiatives.

Third, there is a significant impact of the velocity of big data on Jordanian banks' performance (job process and innovation climate) at a level ($\alpha < 0.05$). Research by Olszak et al. (2021) demonstrates that organizations can benefit from a theoretical, conceptual, and applied discussion of business intelligence and big data (BI & BD) in order to promote innovative and sustainable development and sound decision-making.

Finally, to achieve the last objective , number 4, "To provide decision-makers in Jordanian banks with recommendations and suggestions that could enhance their (job process and innovation climate) performance," in this study utilized all listed references in this study to shed light on the importance of adopting business intelligence and its dimensions that could lead to enhancing the Jordanian bank's performance through job process and innovation climate , especially in the large current flow of data daily. And this can be a reference for further studies in the future.

5.2 Conclusion

The purpose of the present study is to investigate the impact of business intelligence adoption on Jordanian commercial banks' performance.

The research from the various details that supported this study can conclude the importance of business intelligence adoption on Jordanian commercial bank performance and gain the advantage in making high quality, valuable and timely decisions in nowadays the era of technology and the large flow of data daily. This finding shows that the main study question, "What is the impact of business intelligence adoption (technology and functional scope, maturity, and the velocity

of big data) on Jordanian commercial banks' performance (job process and innovation climate) listed on the Amman stock exchange company?" is answered.

The high implementation of technology and functional scope in Jordanian commercial banks' will increases productivity and enables them to accomplish the task more quickly, this finding shows that the first sub-question, "What is the impact of technology and functional scope on Jordanian commercial banks' performance (job process and innovation climate)? From this study, questions are answered.

Regarding the second sub-question, "What is the impact of maturity on Jordanian commercial banks' performance (job process and innovation climate)? of this study, The stage of growth of business intelligence tools and techniques used in Jordanian commercial banks confirm the high level of the application of the maturity variable in Jordanian commercial banks, the bank relies on modern technology in providing its services, and transforms data and information into scientific methods to facilitate access to knowledge and this, in turn, increases the efficiency of the bank's performance.

The velocity of data creation, storage, analysis, and visualization improves the business intelligence process, increases work effectiveness in Jordanian commercial banks' and helps in obtaining correct information too, this finding shows the third and last sub-question. "What is the impact of the velocity of big data on Jordanian commercial banks' Performance (job process and innovation climate)?" from this study questions are answered.

From the literature reviews, the business intelligence system is crucial to organizations' success, continuity, and advancement. To convey, highlight, and describe the concept and dimensions of high performance more thoroughly and properly, various points of view were collected and noted. Business intelligence is a set of ideas, methods, and approaches for making better business decisions. It's a set of data analysis and reporting tools that help managers make better decisions by allowing them to use relevant and timely data. It helps provide better and faster banking services, which requires planning and organization to evaluate

needs and resources in IT. Identifying ways banks might improve their performance.

This study follows a quantitative descriptive design. The data was collected from 136 employees occupying three different positions working at 11 Commercial banks in Amman branches, by questionnaire. The result shows that there is an agreement among the bank managers and the respondents on the high implementation of each business intelligence sub-variables. The bank has the internal capabilities to deal with the business intelligence methods in the commercial banks in Jordan.

Results show that business intelligence adaption effect Jordanian commercial bank performance and each sub-variables of business intelligence has a significant effect on Jordanian commercial Banks' performance. Furthermore, the study indicated that technology and functional scope has the highest impact on Jordanian commercial Banks' performance, followed by the velocity of big data and finally maturity.

5.3 Recommendations

For managers in Jordanian commercial banks:

- The bank's top management has to provide professional quality orientation training to guarantee continuous improvement for the service provided and developing new services will increase the commercial banks' financial and non-financial performance.

- Bank managers are recommended to increase the use of business intelligence systems in all their banking operations, especially critical operations.

- Bank managers must take into consideration the importance of enhancing their ability to adapt to the complex environment of banks.

- Bank managers are recommended to increasing the adoption of business intelligence systems specifically to ensure that accurate information is always received to improve the quality of the decision-making process in the banking sector in Jordan.

Recommendations For scholars interested in business intelligence adaptation and its impact on the organizations' performance:

- To further validate the universality of the present study results by performing more studies in a larger sample, different sectors, and other geographical areas.

- To further study business intelligence using different dimensions in the same study settings or different study settings.

- The study implemented a quantitative method to collect data from the study sample; therefore, the study recommends using a qualitative method for future research.

- The study collected data from the managers in 2022; therefore, the study recommends future research to test the consistency of the study tool and results.

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APPENDICES

Appendix (1)

Letter from the University of Petra

Appendix (2)

Name of arbitrators:

NO.	Name	Academic Rank	University Name
1	Waleed Alawawdeh	Professor	Al albayt University
2	Riad Abazeed	Professor	Al albayt University
3	Bilal sakarneh	Professor	Isra University
4	Saed zighan	Associate Professor	University Of Petra
5	Nasim Matar	Assistant Professor	University Of Petra
6	Mohannad Issa	Assistant Professor	University Of Petra
7	Hazem Qattous	Assistant professor	Princess Sumaya University for Technology

Appendix (3)

Academic questionnaire

Demographic information

Please respond to the following questions by placing a check mark (√) that corresponds to your response.

1. What is your Gender?

◯ Male   ◯ Female

2. What is your Age?

◯ Less than 30   ◯ 30-39   ◯ 40-49   ◯ 50 or above

3. Qualification?

◯ Diploma   ◯ Bachelor   ◯ Master   ◯ PhD

4. Job Position?

◯ Branch manager's   ◯ operation manager's   ◯ department supervisors

5. Years of Experience?

◯ 10 or less   ◯ 11-15   ◯ 16-20   ◯ 21 or more

Independent variable

Please respond to the following questions by placing a check mark (√) that corresponds to your response.

No.	Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Technology and functional scope	يتيح النطاق التقني لأدوات وتقنيات ذكاء الأعمال للعاملين في المنظمة استخراج البيانات وجمعها وتحليلها وإنشاء تمثيل هادف للمعلومات لدعم عملية صنع القرار وبناء المعرفة القيمة . يعتمد مستوى التكنولوجيا والنطاق الوظيفي في المنظمة على . متغيرات مختلفة مثل التعقيد والحجم والحساسى					
6	IT infrastructure supports the bank Business Intelligence strategy.					
7	Using Business Intelligence technology increases productivity.					
8	Using Business Intelligence technology improves the quality of decision.					
9	Using Business Intelligence technology enables to accomplish tasks more quickly.					
10	Our bank has the ability to adapt to the complex environment 'is one that is dynamic or unexpected'.					

No	Statement					
11	Information provided in the Bank is characterized by being comprehensive 'covering completely or broadly'.					

	Maturity	مرحلة نمو أدوات وتقنيات ذكاء الأعمال المستخدمة في منظمة معينة . عادة ما يتم تصنيف النضج إلى فئات مختلفة اعتمادًا على طبيعة مدخلات ومخرجات النظام ؛ على سبيل المثال ، البيانات والمعلومات والمعرفة والحكمة ، وكل ذلك يتم تحديده من خلال احتياجات وخصائص عمل معين.

No	Statement					
12	Our Bank depends on modern technology means in providing of service.					
13	Our Bank converts the data and information into scientific ways to facilitate knowledge access					
14	Our Bank encourages setting up seminars among employees to encourage their intellectual ability in areas of banking the knowledge.					
15	Our Bank uses information technology in the field of thinking and innovation to find cognition or solutions.					

	The Velocity Of big data	سرعة إنشاء البيانات وتخزينها وتحليلها وتصورها . استغرقت أجهزة الكمبيوتر والخوادم وقتًا طويلاً لمعالجة البيانات وتحديث قواعد البيانات . ومع ذلك ، يتم إنشاء البيانات في الوقت الفعلي في عصر البيانات الضخمة . يمكن للآلات وأجهزة الكمبيوتر نقل البيانات بمجرد إنشائها بسبب توفر أدوات ذكاء الأعمال.

No	Statement					
16	Big Data Velocity increases work effectiveness.					

17	The use of big data helps in obtaining correct information.					
18	Big Data Velocity increases work efficiency.					
19	Velocity of Big Data is an opportunity to the organization.					
20	Big Data Volume is used to provide objectivity for decisions making..					
21	Big Data Velocity is used to provide speed in accomplishing tasks.					
22	Big Data Velocity improves Business Intelligence process.					

Dependent variable

	Jordanian commercial Banks	الأداء التنظيمي هو مدى تحقيق المنظمة لأهدافها وتقييم أدائها كنظام اجتماعي قائم على الهيكل التنظيمي والأفراد والتوظيف. بالإضافة إلى ذلك ، فإن تحقيق الأهداف باستخدام أقل الموارد الممكنة يعتبر تنظيميا . بشكل عام ، الأداء التنظيمي هو مجموعة من المصفوفات غير المالية التي تسلط الضوء على مستوى تحقيق أهداف المنظمة (عمليات التوظيف ، مناخ ,الابتكار).				
23	Our bank uses BI Systems in its critical operations.					

24	Our bank is very flexible; it can quickly change procedures to meet new conditions and solve problems as they arise.					
25	Using Business Intelligence systems improve competitive advantages in the bank.					
26	The information obtained from Business Intelligence is accurate.					
27	The Bank has the internal capabilities to deal with the Business Intelligence methods.					

Summary

Jordanian banks are beginning to recognize business intelligence's secret potential, as it can better exploit such data for more improvisation in business processes and decision-making. By delivering the right information to the right people in real-time, business intelligence systems can assist business managers in making faster and more effective decisions. This study aims to quantify the impacts gained as a result of BI implementation in Jordanian banks.

Businesses are becoming more receptive to the idea of leveraging (BI) tools to gain a competitive edge. Jordanian enterprises, particularly banks, have a vast amount of data that should be used for a variety of purposes in various departments. Bank managers do not use business intelligence systems in a manner that requires their constant participation in decision-making. Business intelligence helps organizations improve the efficiency of their business. It helps managers and decision makers to make reliable, timely, and appropriate decisions in the workplace, which leads to increased productivity and profitability. Despite the benefits of the BIS, banks may not implement and apply all of the features and functions that are needed to improve banks performance.

The main purpose and objective of this study is to "investigate the impact of business intelligence adoption (technology and functional scope, maturity, and the velocity of big data) on Jordanian commercial banks" listed on the Amman stock exchange company.

Business Intelligence (BI) is the process used to gather information necessary for survival and assessing actions taken by competitors, suppliers, consumers, technology, industries, goods and services, and overall business climate. Business intelligence solutions for banks should enable decision-makers across all business segments from management to departments and leverage the information potential of a diverse set of internal and external data resources. In today's competitive environment, considering and analyzing overall client connections is critical for effective bank operations. The

most essential areas of banking intelligence are Analytical Customer Relationship Management; Bank Performance Management; Enterprise Risk Management; Asset and Liability Management; and Compliance. Most business intelligence software solutions are focused on market segmentation, building a detailed image of clients and interactions with banks.

The functional scope dimension is the technical spectrum of business intelligence tools and techniques. It includes basic reporting and graphing to advanced and scalable functionality such as predictive analytics, search, data mining, performance management, information integration, and more. Organizations utilize BIS primarily for corporate administration, customer relationship optimization, monitoring of company operations, reporting, planning, and decision-making assistance at all levels of management. The positive correlation between technology and success is frequently undervalued. Business intelligence systems should be more scalable and built on a flexible technological basis.

Maturity is the state of being full, perfect, or ready. The maturity scale includes phases ranging from onset of a problem to one step above the current situation. Different models have been proposed to explain the levels of maturity in business intelligence such as Deng (Deng, 2007) and Walker (Walker, 2009). Maturity model has five levels: Unaware, Tactical, Focused, Pervasive, Strategic, and Top. The first stage is when people are ignorant of the entire potential of business information.

The fourth stage is strategic when the organization is implementing BI initiatives based on shared strategic goals. The fifth stage is all-encompassing, where the BI systems are integrated into the business processes and give necessary and trustworthy information to users.

Every organization needs speedier visibility into ever-increasing amounts of transactional data. Real-time data analysis allows firms to observe the past and predict the future. Big data analytics may boost companies' organizational outputs and industries in a variety of ways. These include enhanced health care delivery, educational standards, national security, and the ability to engage in good government.

Mobile network location data may be utilized for traffic management purposes, such as preventing traffic bottlenecks in major cities.

Big data refers to a massive volume of data that cannot be analyzed using conventional data-base tools, management, and processing. Unstructured data from social networks, blogs, text messages, videos, and audio files are the primary source of this exponentially increasing data. Data processing in real time, specifically banks data collection and analysis, is referred to as velocity. Insights are near to decision-making in real-time.

Performance refers to the degree of achievement and production achieved by hiring a person to perform a mission or service. Job output is a collection of activities relating to operational priorities or the priorities of organizational departments. Task efficiency has been described as the ability of individuals hired for a job to conduct tasks formally as part of a specific task, and it is known as the key kernel of any company. The term of performance, as described in French, English, and Romanian dictionaries refers to the idea of the outcome, achieved aim, and quality. Performance cannot be linked to any result attained, but only to a specific one.

Performance is defined as "fulfilling the goals that were assigned to you in the convergence of corporate orientations". Performance is not an objective fact waiting to be evaluated and graded anywhere, but rather a socially produced reality that exists in people's imaginations. In the banking sector, performance is defined as "efficiency," or the skillful process of creating income over a specified period. Other studies link bank performance to service, quality, innovation, technology, or employee dedication.

Business Intelligence was discovered to provide the essential functions that assist an organization in improving performance and the ability to respond to change. The abundance of data accessible in today's enterprises has resulted in the development of sophisticated analytics functions. Despite the current trend toward the terms Business Intelligence and Analytics, conventional BI systems often give aggregated data, whereas statistical approaches used in BA typically use raw data. The main activities of corporate performance management (CPM) include planning, measurement, and

analysis. We would expect the business intelligence system to significantly support planning and measurement.

Not all BISs have the capabilities required by decision-makers. Exploring the link between the success of BIS and the effectiveness of corporate-level management methods would offer an indication of the significance of these systems for CPM. Business Intelligence is a fast-developing innovative system brought about by the global business environment. BI is concerned with transforming raw data into usable, meaningful, and actionable (knowledge) information. The CPM should have a broad relationship with the BI, which is currently being resolved. Organizations all across the world are seeking to improve their performance in whichever way they can.

This study shows that there is a high implementation of the business intelligence sub-variables in Jordanian commercial banks. All variables of business intelligence adoption have high levels of implementation. Such results are due to the high implementation level of advanced technology in Jordan banks, and the performance level of the Jordanian commercial banks is high due to the effect of the use of banking business intelligence.

There is a significant impact of Business intelligence with its three dimensions both separately and together (technology and functional scope, maturity, velocity of big data) on Jordanian commercial banks' performance in Amman, Jordan.

As a result, the present study found statistical evidence that business intelligence adoption has a positive and significant impact on the performance of Jordanian commercial banks, which in turn reflects on the banks' missions and aims.

These results are in line with results from other researchers such as a study by Abusweilem & Abualoush (2019), which found a positive significance in the impact of the knowledge management process and business intelligence on organizational performance, their study has looked at the relationship between knowledge management and business practices in a bank branch in Jordan.

To add value to the existing views on business intelligence adoption, a study by Nithya and Kiruthika (2021) attempted to develop a conceptual framework for measuring the effect of Business Intelligence Adoption on the performance of banking systems, The study will serve as a first step toward developing a model to evaluate and measure the effectiveness of business intelligence adoption on the performance of banking systems in the future.

Another group of researchers and scholars, who have studied business intelligence in different geographical locations, is Bett et al., (2019) their study was conducted in commercial banks in the counties of Bomet, Kericho, and Narok. The study determined that banks must employ data mining techniques to pull information from databases. It also found that data visualization allowed for easier comparison of bank performance between different banks, Hamdan & Rahman (2021) study the Effect of Business Intelligence System on Organizational Agility using evidence From Syria. They came up with findings revealing a significant impact on decision-making and organizational agility that is directly tied to the business intelligence system, sensor agility, and application agility. The data also suggest that the BIS has a significant influence on decision-making and agility, with a strong direct connection.

Al-Merri, (2020) studied how business intelligence affected strategic performance in Kuwaiti commercial banks. According to his study, find that Kuwaiti banks should stay up with innovations in the field of business intelligence so that they can better use it to improve strategic performance.

Moreover, Zarei & Zarei, (2018) demonstrated the effect of business intelligence on the financial performance of Iranian banks, although only three banks in Iran use business intelligence. Bank management should encourage the use of business intelligence tools in all of their activities, which would result in long-term financial benefits for the banks. The technology could then be used by banks to improve their financial performance.

Recently, Olszak et al. (2021) showed that the Internet, social media, distributed databases, and numerous mobile devices have all contributed to the significant growth

of data. Much of this unstructured and organized data has tremendous business value and, when used appropriately, may become a valuable organizational asset. Many businesses make only sporadic use of the important data they have access to, either because they lack the appropriate tools or because they do not recognize its value. The main purpose of this special issue (SI) is to provide businesses with a theoretical, conceptual, and applied ground in Business Intelligence and Big Data (BI & BD) to aid in innovative and sustainable development, as well as effective decision-making.

Another study entitled The Impact of Business Intelligence on Enablers of EFQM Excellence Model with mediating role of knowledge sharing by Keshtegar et al. (2021) shows that business intelligence has a favorable and considerable direct and indirect influence on the enablers of the excellence model. Based on the research, bank managers should pay special attention to the variables of business intelligence and knowledge sharing to increase organizational excellence.

The study methodology used to verify the impact of business intelligence adoption on Jordanian commercial banks performance and sample of the study. Data were collected by a valid and reliable questionnaire distributed to participants holding three different job positions in commercial banks in Amman include, branch managers, operations managers, and department supervisors. The study employed quantitative methods and adopted a descriptive-analytical study approach. The current study focused on Jordanian commercial banks in Amman, Jordan. In total, 136 questionnaires were collected.

The demographic profile of respondents aims to show the frequencies and proportions of respondents' demographic characteristics. This is related to the first part of the questionnaire, such as gender, age, qualifications, occupation and experience.

The reliability of the results depended mainly on participants' perception of three job positions including branch managers, operations managers, and department supervisors. So generalizing to other sectors and/or countries is questionable. Results are limited to data collected by a study questionnaire to cover the two main variables; Business intelligence and the performance of Jordanian commercial banks.

Data were collected from Jordanian commercial banks via a questionnaire with closed questions. The questionnaire was arranged from several sources then modified and approved by a group of professors related to Business Intelligence adoption and its impact on banks' performance. According to the study model, the questionnaire was divided into three sections; 1, 2 and 3. Section 1 addressed demographic characteristics (gender, age, qualification, job position and experience). Section 2 addressed the independent variable: business intelligence adoption with its three dimensions (technology and functional scope, maturity, velocity of big data), and section 3 addressed the independent variable: Jordanian commercial bank's performance.

The researcher made daily visits to many branches of commercial Jordanian banks in Amman and asked if they could fill out the questionnaire on a tablet or have a hard copy of it. 136 questionnaires were collected and used for the purpose and objectives of the study. The study tool was presented to a group of academic arbitrators with experience who are working at Jordanian universities to ensure its validity. This study used Cronbach's alpha in order to test the reliability of business intelligence products and tools used by Jordanian commercial banks. The high alpha value indicates that the test items are highly correlated and that they are reliable and comprehensible. Arbitrators' observations and suggestions were taken into consideration, and modifications have been made in light of their recommendations.

The main outcomes of the descriptive analysis of respondents' perceptions utilizing mean, standard deviation, significance, and ranking. In addition, the findings of a correlation study will be provided to examine the relationship between business intelligence adoption characteristics (technology and functional scope, maturity, and the velocity of big data) and the performance of Jordanian commercial banks. It concludes with hypothesis testing, which examines the influence of business intelligence adoption on the performance of Jordanian commercial banks.

 A quantitative descriptive design is used in this research. The information was gathered through a questionnaire from 136 managers at 11 Amman-based commercial banks. After establishing the tool's normalcy, validity, and reliability, statistical analysis was

performed to summarize the answers using means, standard deviations, and t-values, followed by a correlation analysis and multiple regressions to test the hypothesis.

The findings demonstrate that bank managers agree on high implementation of each business intelligence sub-variable, and the overall mean of business intelligence is high, indicating that business intelligence tools, methods, procedures, and strategies are widely used among Jordanian bank managers.

This shows that Jordanian bank managers understand the value of business intelligence sub-variables in determining the success of Jordanian commercial banks. Furthermore, the respondents strongly agreed that the bank has internal capacity to cope with business intelligence methodologies used by Jordanian commercial banks, and that the bank is flexible in that it can swiftly adjust procedures to suit changing situations and handle problems as they emerge. Furthermore, the total result revealed that business intelligence adaptation has a favorable substantial influence on the performance of Jordanian commercial banks.

The findings reveal that business intelligence adaptation has an influence on Jordanian commercial bank performance, and that each sub-variable of business intelligence has a considerable impact on the performance of Jordanian commercial banks. Furthermore, the study found that technology and functional scope had the greatest influence on the performance of Jordanian commercial banks, followed by big data velocity, and lastly maturity.

The primary findings of the descriptive study demonstrate that respondents agree on the relevance of business intelligence adoption as measured by (technology and functional scope, maturity, and velocity of big data), as well as the performance of Jordanian commercial banks. Furthermore, the correlation coefficients between the parameters of business intelligence adoption and the performance of Jordanian commercial banks varied from 0.641 to 0.716, indicating a moderate to significant relationship.

Managers and employees of Jordanian commercial banks agreed that using Business Intelligence technology enables them to accomplish tasks more quickly and increases productivity. Accepting technologies that promote the chain's information sharing has a beneficial impact on chain performance. Managers should first have a thorough method for accepting BI and adopt the sort of BI project based on their needs.

Jordanian commercial banks gain the advantage in making high quality, valuable and timely decisions in nowadays the era of technology and the large flow of data daily. The bank relies on modern technology in providing its services, and transforms data and information into scientific methods to facilitate access to knowledge and this in turn increases the efficiency of the bank's performance. Business intelligence is a set of ideas, methods, and approaches for making better business decisions. It's a data analysis and reporting tools that help managers make better decisions by allowing them to use relevant and timely data. The velocity of data creation, storage, analysis, and visualization improves business intelligence process, increases work effectiveness and helps in obtaining correct information too.

In the end the research there is a several recommendation for managers in Jordanian commercial banks Jordan's top bank managers have been asked to increase the use of business intelligence systems in all their banking operations, especially critical ones. The bank's top management has to provide professional quality orientation training to guarantee continuous improvement for the service provided, and developing new services will increase the commercial bank's financial and non-financial performance, and recommendations For scholars interested in business intelligence adaptation and its impact on the organizations performance To further validate the universality of the present study results by performing more studies in a larger sample, different sectors, and other geographical areas. To further study business intelligence using different dimensions in the same study settings or different study settings. The study implemented a quantitative method to collect data from the study sample; therefore, it recommends using a qualitative method for future research.