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| RESEARCH ARTICLE

The Impact of Business Intelligence on Organizational Excellence in Jordanian Commercial Banks

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| ABSTRACT
This study aims to investigate the impact of business intelligence on organizational excellence in Jordanian commercial banks. In an increasingly competitive and dynamic business environment, commercial banks must adopt strategic tools that enhance their decision-making processes and overall performance. Business intelligence—through its core dimensions of data management systems, data analysis systems, management support systems, and report presentation—plays a pivotal role in improving operational efficiency and sustaining competitive advantage. The study adopted a quantitative approach using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the proposed model and hypotheses. Data were collected from a proportional stratified random sample comprising 280 managers from senior and middle management levels across 12 Jordanian commercial banks. The findings revealed that all dimensions of business intelligence have a statistically significant and positive effect on the dimensions of organizational excellence, namely leadership excellence, subordinate excellence, strategy excellence, and operations excellence. Based on these findings, the study recommends enhancing investment in business intelligence infrastructure, fostering a data-driven organizational culture, and providing training for managerial staff to optimize the strategic use of BI tools—ultimately supporting sustainable excellence and competitiveness in the banking sector.

| KEYWORDS
Business Intelligence, Organizational Excellence, Jordanian Commercial Banks

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1. Introduction

1.1 Background of the Study

In today's rapidly evolving banking environment, organizations are increasingly confronted with complex challenges arising from digital transformation, intensified competition, regulatory pressures, and growing customer expectations. These challenges have compelled commercial banks to move beyond traditional management practices and adopt advanced technological and analytical tools that enhance their ability to respond effectively to environmental changes. Within this context, organizational excellence has emerged as a critical strategic objective that enables banks to sustain competitiveness, improve performance quality, and strengthen long-term institutional resilience.

The term business intelligence today is closely associated with large software vendors providing technical solutions to end users, and the term business analytics will be used to further highlight these missing elements of the business intelligence equation, which are the most interesting; if mastered, it will lead the organization to a prosperous future (Laursen & Thorlund, 2017, 2).

Organizational excellence is linked to a business strategy that requires specific types of labor that are only available in very small numbers that will prove difficult to implement. Awareness of the challenges facing talent is one thing; knowing what can be

done about them is another. HR, as the main function specialized in dealing with people in organizations, must be uniquely positioned to make a difference in the success of their business (Holbeche, 2022, 23).

Jordan's commercial banks are one of the main pillars of the Kingdom's financial and economic system. These banks play a vital role in providing banking services and financing economic projects, which contribute to promoting economic growth and financial stability, andthese banks face multiple challenges that include adapting to rapid changes in technology and market requirements, as well as intense competition between local and international financial institutions to achieve organizational excellence.

Despite the growing recognition of Business Intelligence as a strategic asset, empirical research examining its direct impact on organizational excellence remains limited, particularly in developing economies and Arab banking environments. Jordanian commercial banks, in particular, operate in a highly competitive and technology-driven market that requires continuous innovation and data-driven decision-making to achieve sustainable excellence. Therefore, this study seeks to empirically examine the impact of Business Intelligence and its core dimensions on organizational excellence in Jordanian commercial banks, addressing an important research gap and offering insights of both theoretical and practical value.

1.2 The problem of the study and its questions

Jordan Commercial Banks are facing increasing challenges in a dynamic business environment, which calls for organizational excellence to ensure survival and competitiveness, business intelligence is a vital tool in this context, as business intelligence contributes to the collection and analysis of data to support strategic decision-making.

The Penguin study (2023) indicates that work must be done to develop flexible organizational structures so that banks can respond to successive changes in bringing about changes, which would enhance banks' position on applying business intelligence systems to achieve organizational ingenuity, all of which achieves organizational excellence, in addition to the need to pay attention to following up and developing the services provided to customers by banks to achieve more of the use of business intelligence systems to develop the performance of employees in a way that ensures banks growth, survival and organizational excellence, Based on the above, the study problem can be formulated with the following main question:

What is the impact of business intelligence on organizational excellence in Jordanian commercial banks?

Based on the main question above, the following sub-questions can be identified:

1. Is there an impact of business intelligence in its dimensions (data management systems, data analysis systems, management support systems, and presentation of reports) on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks?
2. Is there an impact of data management systems on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks?
3. Is there an impact of data analysis systems on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks?
4. Is there an impact of management support systems on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks?
5. Is there an impact of reporting on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks?

1.3 Study hypotheses

Based on the main question of the study and the sub-questions, the hypotheses of the study can be determined as follows:

The first main hypothesis Ho1: There is no statistically significant effect at a significant level ($\alpha \leq 0.05$) of business intelligence in its dimensions (data management systems, data analysis systems, management support systems, and presentation of reports) in organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks.

Sub-hypothesis Ho1-1: There is no statistically significant effect at a significant level ($\alpha \leq 0.05$) of data management systems on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks.

Second sub-hypothesis Ho1-2: There is no statistically significant effect at a significant level ($\alpha \leq 0.05$) of data analysis systems on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks.

The third sub-hypothesis Ho1-3: There is no statistically significant effect at a significant level ($\alpha \leq 0.05$) of management support systems on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks.

Fourth sub-hypothesis Ho1-4: There is no statistically significant effect at a significant level ($\alpha \leq 0.05$) for the presentation of reports on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks.

1.4 Objectives of the study

This study mainly aims to identify the impact of business intelligence in its dimensions (data management systems, data analysis systems, management support systems, presentation of reports) on organizational excellence in its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks, as well as achieving a set of the following objectives:

1. Identify the impact of business intelligence in its dimensions (data management systems, data analysis systems, management support systems, and presentation of reports) on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks?
2. Identify the impact of data management systems on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks?
3. Identify the impact of data analysis systems on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks.
4. Identify the impact of management support systems on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks.
5. Identify the impact of reporting on organizational excellence in terms of its combined dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence) in Jordanian commercial banks.
6. Provide a set of recommendations and proposals regarding enhancing business intelligence and its impact on organizational excellence in Jordanian commercial banks.

1.5 The importance of studying

The importance of the study stems from the following:

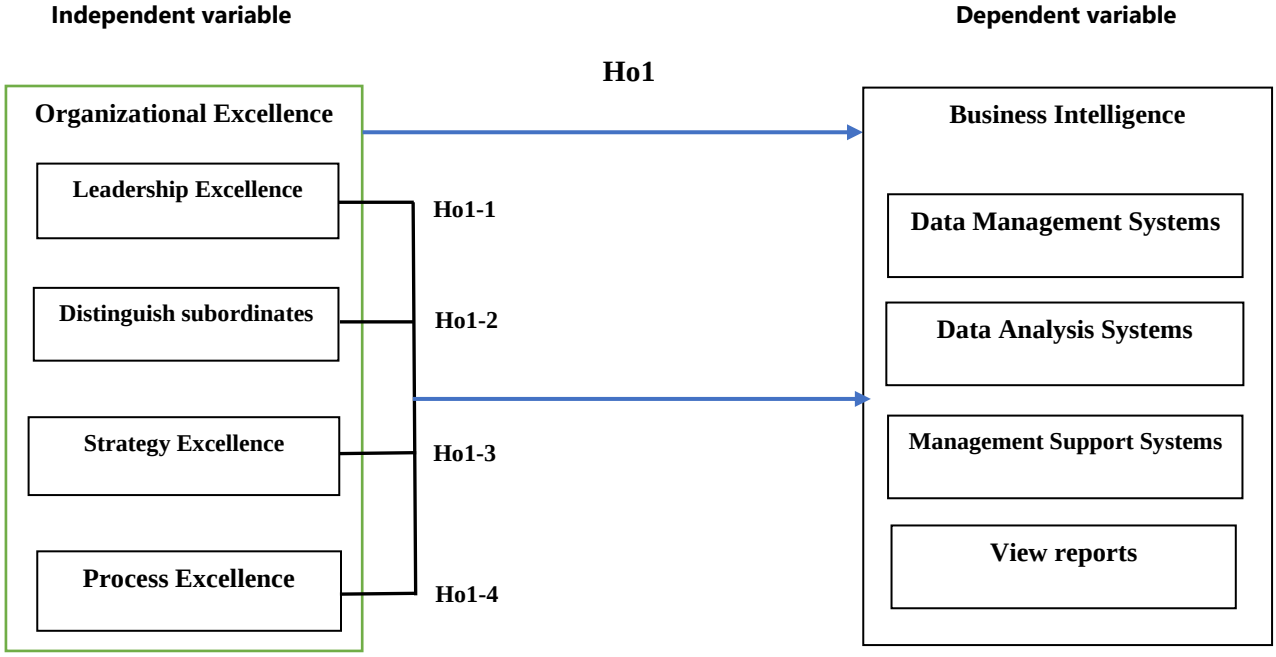
1. Scientific importance: The significance of this study lies in its attempt to provide an integrated understanding of how Business Intelligence contributes to achieving organizational excellence within the banking sector by examining both the combined and individual effects of its dimensions on excellence-related outcomes. In doing so, the study highlights the strategic role of data-driven capabilities in enhancing institutional performance, while responding to contemporary organizational and technological challenges faced by commercial banks and emphasizing the importance of aligning technological investments with strategic and managerial objectives. Moreover, by focusing on the Jordanian banking sector—a vital pillar of the national economy undergoing rapid digital and organizational transformation—the study offers context-specific insights that move beyond generic technological discussions and provide a grounded understanding of the effectiveness of Business Intelligence in real organizational settings.

2. Applied importance: The practical utility of this study lies in its ability to demonstrate how Business Intelligence can evolve from a supportive technological tool into a strategic driver of organizational excellence. The findings provide actionable insights for senior and middle management in Jordanian commercial banks regarding the effective use of data management systems, analytical tools, management support systems, and reporting mechanisms to enhance leadership quality, operational efficiency, strategic decision-making, and employee performance. Furthermore, the study offers practical guidance for policymakers, banking executives, and information systems managers in designing and implementing Business Intelligence strategies that align with institutional objectives and promote a data-driven organizational culture. By clarifying the effectiveness of Business Intelligence applications in achieving excellence-related outcomes, the study contributes to improving organizational responsiveness, strengthening competitive positioning, and supporting long-term sustainability within the banking sector.

1.6 Study model

Figure indicates the study model, including its variables and the dimensions of these variables.

Study Form



2. Literature Review

2.1 Business Intelligence

In 1958, IBM researcher Hans Linn first defined business intelligence as the ability to capture the interrelationships of presented facts in a way that directs action toward the desired goal (Ashour, 2024, 18).

In 1989, Howard Dresner, considered the godfather, defined it as a broad category of software and solutions for collecting, consolidating, analyzing, and accessing data in a way that allows enterprise end users to make the best business decisions (Al-Nasser, 2020, 97).

Soni et al. (2019) defined it as the application of tools and techniques for big data analysis that enable information-based decision-making in changing business environments.

Popovič (2019) defined it as high-quality information in well-designed data warehouses, combined with software tools that provide users with timely access, effective analysis, and good presentation of the right information, enabling managers to take the right actions or decisions.

Both Qishta and Abu Dan (2020) pointed out that business intelligence is all that will support the organization and provide information, which is one of the modern practices witnessed by business organizations, which is based on the process of collecting, processing, organizing and preparing data from its sources by providing a database and data warehouse for practices and applications that help identify and improve strategic options.

Business intelligence is a decision support system in a process of continuity in data collection, recording, and analysis, and the results are used in the decision-making process to improve performance (Sheikh, 2022, 229).

Penguin (2023) defined it as an automated system that deals with data, and it was linked to data analysis and then developed to include a set of data analysis programs with the aim of improving the decision-making process, which appeared its relationship to knowledge and achieving a competitive advantage for the organization, which is a logical development for the development of topics and research areas in general, unlike developments in the environment of organizations.

2.1.1 Dimensions of Business Intelligence

2.1.1.1 Data Management Systems

It is a computer system used to configure the database, maintain the database and set up strict access activities for beneficiaries and workers, and the role of the database management system at the level of data resource management is similar to the role and function of the operating system at the level of computer management (Yassin, 2009 ،22).

Data management systems involve the creation of a single master data record from multiple data sources within an organization, andthe primary goal of this system is to create a single source of reliable and valuable data used by different

departments and units throughout the organization, and master data management offers various benefits to the organization, including reducing information errors, eliminating redundancy, and generating accurate reports through the single main source created.Pansara, 2021)

Data management systems are a critical element in enabling business intelligence within organizations, as they allow data to be collected, stored, and organized from multiple sources, facilitating access to accurate and reliable information that supports the decision-making process, and it has been proven that information systems enable business intelligence by improving data governance and providing accurate information that contributes to strategic planning within organizations (Al-Ghamdi and Al-Aqili, 2022).

IoT and IT data management requires intelligent and autonomous robotic systems and networks in complex task distributions, so that mobile robots integrate distributed position control and awareness systems into quick decision-making and performing complex tasks in dynamic, unstructured environments using mapping and navigation tools in terms of virtualization modeling and geospatial data mining.Andronieet al., 2023)

He added Szukits and Móricz (2024) that Data Management Systems Contribute in improving data quality and analyzing it effectively, enabling organizations to gain deeper insights into their performance and customer behavior. He also pointed out that senior management's support for business analytics initiatives, along with improving data quality, promotes a culture of data-driven decision-making, which contributes to improving the performance of the organization.

2.1.1.2 Data Analysis Systems

It was defined as the process of examining, cleaning, transforming and modeling data for the purpose of discovering useful information based on which conclusions are stated, and decision-making process is supported, and data analysis often includes the use of statistical methods (Abdelhak and Abdelradi, 2023, 13).

Business analytics is the practice and art of using quantitative data in decision-making, and this term means different things for different organizations (Shmueli et al., 2023, 3).

He added both Mashayekh et al. (2023) that systems Data analytics is a vital component of business intelligence, transforming raw data into valuable insights that support strategic decision-making. Using statistical analysis and machine learning techniques, organizations can understand patterns and trends in their data, allowing them to improve processes and increase efficiency. Also, Key factors for the success of business intelligence systems include the ability to easily adapt data, improve the performance of organizations by providing more valuable insights, and support decision-making.

2.1.1.3 Management Support Systems

It is an integrated set of ready-to-use software, assertions, models and processing tools, which interact with data and information to deliver proposed solutions and can also integrate several models to form an integrated model and provide management and production programs, structured and unstructured, such as decisions related to new products (Abed Rabbo, 2013, 80).

These systems provide support to senior management to help them make decisions and solve problems and provide a range of alternatives that leave the decision-maker free to choose the best alternative from among them (Mohammed, 2015, 98).

Management support systems are an important tool to support the activities of the virtual organization, as these types of systems facilitate planning and organization (assigning tasks to collaborators), monitoring and controlling activities (carrying out and accounting assigned tasks) for the organization, management support systems can be purchased and used by different entities (including virtual organizations) in the form of services available in cloud computing under the SaaS (SaaS model) (Dziembek, 2020).

Lindahl (2024) added that management support systems support innovative ideas in terms of the strong side of continuous improvement work, which gradually expands the idea of what is needed to complete the change. At the same time, green thinness is seen as hindering circular transformation. The versatility of unified and innovative management support contributes to the existing literature on circular transformation in the production process.

2.1.1.4 View reports

The ability to present data in a visually appealing way has become part of the role of almost every business analyst and data scientist. When this focus area becomes a material role in the company, your primary responsibility includes creating business intelligence solutions for teams and customers based on specific business requirements and use cases. In other cases, it can be more graphic design oriented (Abdelhak and Abdelradi, 2023 ،8).

Jiménez-Partearroyo and Medina-López (2024) pointed out that interactive reporting tools facilitate the exchange of information between different departments within the organization, enhance collaboration and accelerate response to changes in the market, in addition to that the use of business intelligence systems improves the operational performance of organizations by providing accurate and timely information, allowing them to quickly adapt to new challenges and opportunities.

Artene et al. (2024) added that reporting tools are one of the cornerstones of business intelligence systems, as they allow organizations to present complex data in a simplified and organized way, support strategic decision-making, and these tools convert raw data into visual representations such as interactive tables, graphs and dashboards, making it easier to understand and analyze information.

2.1.2 Organizational Excellence

The concept of organizational excellence arose to express the need for a comprehensive approach that combines the elements and elements of building organizations on superior foundations, achieving their competitiveness in the face of external variables and conditions that surround them on the one hand, and ensuring full cohesion and consistency between their elements and components. Investing their pivotal capabilities, excelling and achieving benefits and benefits for the organization's stakeholders (Sioufi, 2019, 67).

Organizational excellence is defined as the ongoing efforts to develop internal standards and procedures that will engage and motivate employees to meet customer expectations while maintaining budgetary constraints (Wang et al., 2018). Nenadál et al. (2018) emphasized organizational excellence as expressing the unique organizational characteristics of organizations through their ability to coordinate their activities and work in a flexible and simplified manner, with the aim of improving performance and achieving the desired goals that These institutions were established.

Excellence is considered a state of administrative creativity and organizational excellence, which achieves exceptional levels of performance and implementation in the organization, resulting in results and achievements that exceed previous levels of achievement and performance, and are equivalent to satisfying the recipient of the product or service (Dawood, 2020, 23).

It is defined as those planned organizational efforts that aim to achieve the permanent competitive advantages of the organization, achieve advanced levels of institutional performance at all administrative levels by achieving the desired goals efficiently and effectively, and invest in critical opportunities preceded by effective strategic planning and commitment to achieving a common vision dominated by clarity of goals, adequacy of resources, and attention to outstanding performance (Khalil, 2021, 152).

Organizational excellence refers to the means and methods that ensure an organization's ability to achieve the goals it seeks to achieve through the resources available to it, seek to develop them, and integrate social and economic opportunities, as well as an enabling environment (Al-Adwan and Al-Shami, 2021, 79).

Chen & Lin (2021) defines organizational excellence as the enthusiasm, energy level, commitment, and amount of creativity an employee brings to the organization on a daily basis.

Organizational excellence was defined as the coordination and unification of efforts, actions and activities, and the availability of organizational principles such as specialization, division of labor, determination of authority and responsibility, supervision and direction, unity of leadership, with a specific goal and activities necessary to achieve the distinctive goals. This is accompanied by qualified and trained people to do the work (Mohammadi, 2022, 35).

The organizational excellence building model consists of four key components (culture, people, strategy, and structure) and each consists of key drivers of performance. The model also includes seven enabling capabilities that an organization needs to achieve and maintain excellence: leadership, communication, stakeholder engagement, learning and development, performance and monitoring, evaluation, and adaptation, and change. The Organizational Excellence Model is a comprehensive framework, all elements of which are interconnected and recognizes that to achieve excellence, all components and aspects of an organization must be strengthened (Asplund, 2023, 27).

Al-Jamal (2024) added that it is a process in which the available efforts are invested, so that the organization leads to outperform its competitors by enjoying a competitive advantage among competing companies, and providing the product or service to a degree that exceeds customer expectations, which leads to achieving customer happiness.

Al-Gohari (2024) added that it is a position that the organization obtains by outperforming its peers in providing outstanding services to customers and enjoying efficient and effective leadership.

2.1.2.1 Dimensions of Organizational Excellence

2.1.2.1.1 Leadership Excellence

Leadership requires a set of conditions and personal qualities related to the manager. A manager can progress from a managerial role to a leadership role; however, this transition requires adopting additional practices and abandoning certain ideas that hinder genuine leadership, creativity, and overall success..(Zabid, 2016، 21)

Known Aldalimy et al. (2019) As an attractive leadership, with an influential personality and a strong presence, it works to achieve its transfer and change the working conditions and the organization through its ability to influence, inspire, motivate and encourage excellence in performance.

Leadership in business organizations consists of influencing the behavior of followers towards a specific goal, it is linked to three basic elements, including the leader, followers, and specific common goals (Judeh, 2024, 178).

2.1.2.1.2 *Distinguish subordinates*

The importance of the human element is due to several reasons, including that the human being is the decision-maker, responsible for innovation and innovation, and is the educated mediator in the organization, there is no doubt that despite modern quantitative methods in the field of decision-making, the human element by all standards remains the dominant element in the decision-making process, and aims to evaluate and evaluate institutional performance (Ghazi, 2014).

Al-Hajri added (2024) that human resources are the main pillar of the success of all organizations, because of the role they play in contributing to the achievement of their goals, and for this reason organizations pay great attention to them, and that all organizations must follow the ways and means that work to pay attention to human resources and maintain them and provide them with the skills and knowledge that enable them to raise the level of the organization to achieve organizational excellence.

2.1.2.1.3 Strategy Excellence

Strategy excellence plays an active role in achieving excellence in institutional performance through its ability to transform the organization from a state of disintegration and deterioration to leadership and excellence, and outstanding performance depends on setting the direction and excellence of the strategy in building a strong and solid foundation for all its components to achieve the organization's goals and enable it to achieve organizational analysis (Joma, 2021).

The origin of the word goes back to the military expression, but it is now widely used in different contexts such as business strategy, marketing strategy, and others, where the word derives its roots from the Greek word strategies, whose concept has been associated with the plans used in battle management (Al-Sulaihat, 2022, 28).

2.1.2.1.4 Process Excellence

High-performing institutions establish and develop integrated processes and methodologies with clearly defined responsibilities to ensure the achievement of institutional objectives in line with the approved strategic plan. Their performance is monitored through a comprehensive system of performance indicators, stakeholder satisfaction measures, and strategic decisions that are based on assessment results.(Mohammed, 2019، 195)

Early management scientists focused on operational management, and considered that it includes planning, organization, guidance and control, and assume that a successful scientific manager is a manager who participates in these processes and practices them in a scientific way, and is interested in organization, control and guidance, and uses experts and specialists to help you implement these processes (Bernouti, 2022 ،270).

3. Method and procedure

3.1 Type and nature of study

This study is considered applied in nature, and explanatory in terms of purpose, as it will try to show the impact of business intelligence on organizational excellence in Jordanian commercial banks, but in terms of planning and controlling the study, it is not planned Non Contrived Research, because it is conducted in the environment of natural organizations, and it is also considered a cross-sectional study In terms of the time horizon because it is conducted simultaneously, and in general it is a quantitative study in terms of mechanism and procedures (Al-Najjar et al., 2020, 55-56 Saunders et al. 2016, 166;).

3.2 Strategy used in the study

The researcher will adopt a sampling strategy, where a proportional stratified random sample representative of the study population will be drawn (Al-Najjar et al., 2020, 61).

3.3 Study population

The study population consists of all positions in senior and middle management in the 12 Jordanian commercial banks, according to data from (Jordan Association of Banks, 2024), and the number of managers reached (620) managers, as shown in Table (1.4).

3.4 Study Sample

The researcher will adopt the method of a proportional stratified random sample to determine the sample from the study population, where a sample of jobs in the senior and middle management in each of the Jordanian commercial banks will be withdrawn, due to the different banks in terms of size (number of employees), which is reflected in a number of jobs in senior and middle management in each company to represent each bank in the study sample, and therefore the size of the representative sample of the community of (620) is (238) as a director from the senior and middle management (Al-Najjar et al., 2020, 109), and for the purpose of obtaining the required number of questionnaires, the sample size has been increased to be (280) managers from the senior and middle management, and Table (4-1) shows the distribution of the sample to the companies of the study population proportionally, as in the following table:

Number of managers in Jordanian commercial banks and sample

figure	Bank Name	Senior and middle management staff	Sample size
1	Arab Bank	87	39
2	Housing Bank for Trade and Finance	85	38
3	Jordan Ahli Bank	79	36
4	Cairo Amman Bank	77	35
5	Bank of Jordan	59	27
6	Union Savings & Investment Bank	56	25
7	Jordan Kuwait Bank	43	19
8	Capital Bank of Jordan	38	17
9	Jordan Commercial Bank	30	14
10	Arab Banking Corporation Bank	24	11
11	Arab Jordan Investment Bank	22	10
12	Jordan Investment and Finance Bank	20	9
		620	**280**

Source: Prepared by the researcher based on the Jordanian Banks Association.

Proportional stratified sample representing each company = (Number of senior and middle management managers in each bank ÷ the total number of managers in senior and middle management in all Jordanian commercial banks) x sample size (Al-Najjar et al., 2020, 118).

3.5 Analysis Unit

The analysis unit consisted of jobs at the senior and middle management levels of Jordanian commercial banks.

3.6 Data collection methods:

The researcher will rely on several methods to collect the necessary data, which are as follows:

- Secondary data:

Data related to the study are collected through a review of scientific books, previous studies, research articles, and relevant theses in both Arabic and foreign literature. The researcher adopts the American Psychological Association (APA) citation and referencing style(APA, 2020).

- Raw data:

The researcher will rely on collecting the necessary primary data for the study variables through a questionnaire that will be prepared specifically for the purposes of this study.

3.7 Study Tool

The study tool will be the questionnaire that the researcher will develop in accordance with the nature of the study and its variables, and the questionnaire will contain the following parts:

The first part: contains the demographic variables of the study sample members, including: gender, age group, educational qualification, and number of years of work experience, Job Title.

Part II: It will include paragraphs that measure the independent variable represented by business intelligence in its dimensions (data management systems, data analysis systems, management support systems, presentation of reports).

The third part: It will contain paragraphs that measure the dependent variable represented by organizational excellence in its dimensions (leadership excellence, subordinate excellence, strategy excellence, and operations excellence).

3.8 Statistical methods

A. Descriptive Statistics:

The Statistical Package for- Social Sciences (SPSS) program will be used to conduct various statistical analysis and tests, and for the purposes of achieving the purposes of the study, the following statistical methods have been used:

- **Percentages:** They will be used to measure the proportions and frequency distributions of the study sample.
- **Arithmetic mean:** It will be used to measure the average answers of respondents to questionnaire questions.

- **Standard deviation:** It will be used to measure the deviation in the respondents' answers from their arithmetic mean.
- **Materiality:** It will be determined when commenting on averages according to an approved formula, and according to the Likert five-point scale of answer alternatives for each paragraph, where it will be as in Table:

Levels of Materiality

Scale	Level of materiality
1 Less than 2.34	low
2.34 - Less than 3.67	medium
3.67- 5	High

B- Analytical Statistics:

After collecting the data obtained through the study tool (questionnaire), it was processed using the statistical programs for social sciences (SPSS), which contained the statistical methods mentioned below:

- Cronbach Alpha Coefficient: It is used to know the degree of stability of the study scales, by measuring the degree of consistency and internal consistency between the paragraphs of the resolution.
- Multicollinearity test: To find out the suitability of the study data for multiple regression analysis, and to verify that the data is free of the problem of almost complete linear correlation between two or more variables, where Pearson Correlation was used to find the extent of self-correlation between the dimensions of each variable of the study, and the variance inflation coefficient (VIF) and the permissible variance were tested to ensure that there is no high correlation and linear interference between the dimensions of the independent variable.
- Normal distribution test using torsion coefficient and mutation coefficient.
- Simple linear regression coefficient: to verify the effect of the independent variable on the dimensions of the variable Tabp.
- Standard multiple linear regression coefficient: to verify the effect of the dimensions of the independent variable on the dependent variable.

3.9 Data analysis

In order to work on achieving the objectives of the current research and knowing the effects of OE and its dimensions (LE, DS, SE, PE) on BI and its dimensions (DMS, DAS, MSS,VR). the partial least squares-structural equation modeling PLS-SEM approach was used, which is used for the purposes of testing causal hypotheses (Hair et al., 2022), knowing the latent links between variables and determining the sufficient predictive degree in order to judge the research hypotheses (Ringle et al., 2024). PLS-SEM is usually used to overcome the problems and limitations created by traditional methods such as CB-SEM (Hair et al., 2017) as it deals flexibly with the non-normal distribution and the extended values and improves the accuracy of prediction when relying on the results obtained through PLS-SEM.

Before testing the hypotheses, the reliability and validity of the measurement tool were confirmed through the measurement model stage, which gives results about convergent, discriminant validity and reliability, and then after accepting the results, the structural model is moved to, which is considered the second stage of the analysis stages

The measurement model.

Convergent validity, reliability, and discriminant validity were assessed for the survey items. Reliability was shown by Cronbach's alpha and composite reliability (CR) values exceeding 0.70. Every item's factor loading was higher than the permissible limit of 0.70. Convergent validity was confirmed by the average variance extracted (AVE), which was higher than 0.50 (Hair et al., 2019). The outcomes of these tests are shown in Table.

Table 1. Reliability and convergent validity

Construct	Item	Factor loading	AVE	CR	α
LE	LE1	0.771	0.564	0.914	0.928
	LE2	0.795			
	LE3	0.742			
	LE4	0.784			
	LE5	0.722			
DS	DS1	0.757	0.564	0.844	0.886
	DS2	0.801			
	DS3	0.815			
	DS4	0.0.721			
	DS5	0.739			
SE	SE1	0.841	0.656	0.734	0.850
	SE2	0.894			
	SE3	0.780			
	SE4	0.848			
	SE5	0.725			
PE	PE1	0.812	0.704	0.789	0.877
	PE2	0.881			
	PE3	0.823			
	PE4	0.705			
	PE5	0.715			
DMS	DMS1	0.802	0.633	0.746	0.855
	DMS2	0.804			
	DMS3	0.836			
	DMS4	0.825			
	DMS5	0.940			
DAS	DAS1	0.865	0.724	0.887	0.809
	DAS2	0.881			
	DAS3	0.733			
	DAS4	0.845			
	DAS5	0.752			
MSS	MSS1	0.903	0.679	0.864	0.736
	MSS2	0.908			
	MSS3	0.870			
	MSS4	0.882			
	MSS5	0.876			
VR	VR1	0.959	0.648	0.902	0.864
	VR2	0.860			
	VR3	0.951			
	VR4	0.890			
	VR5	0.910			

The results of the confirmatory factor analysis indicate strong evidence of both reliability and validity across all study constructs. All Cronbach's Alpha and Composite Reliability (CR) values exceeded the accepted threshold of 0.70, confirming high internal consistency within each dimension. Additionally, the Average Variance Extracted (AVE) values for all constructs were above 0.50, supporting convergent validity. Factor loadings were also consistently strong, with the majority of items loading above 0.70, indicating that the indicators appropriately represent their underlying constructs. These results affirm that the measurement model is statistically robust and suitable for proceeding with the structural model analysis to test the hypothesized relationships in the study.

As recommended by Heseler et al. (2015), the heterotrait-monotrait ratio (HTMT) was subsequently used to evaluate discriminant validity. The HTMT value must be less than 0.85 in order for discriminant validity to be recognized. All values satisfied this requirement, as seen in Table 2, so verifying the existence of discriminant validity (Hair et al., 2019).

Table 2. Discriminant validity: HTMT criterion

Constructs	1	2	3	4	5	6	7	8
LE								
DS	0.798							
SE	0.667	0.762						
PE	0.492	0.800	0.839					
DMS	0.545	0.799	0.828	0.686				
DAS	0.025	0.415	0.852	0.528	0.820			
MSS	0.358	0.689	0.725	0.208	0.527	0.628		
VR	0.254	0.527	0.666	0.445	0.120	0.052	0.476	

3.10 The structural model

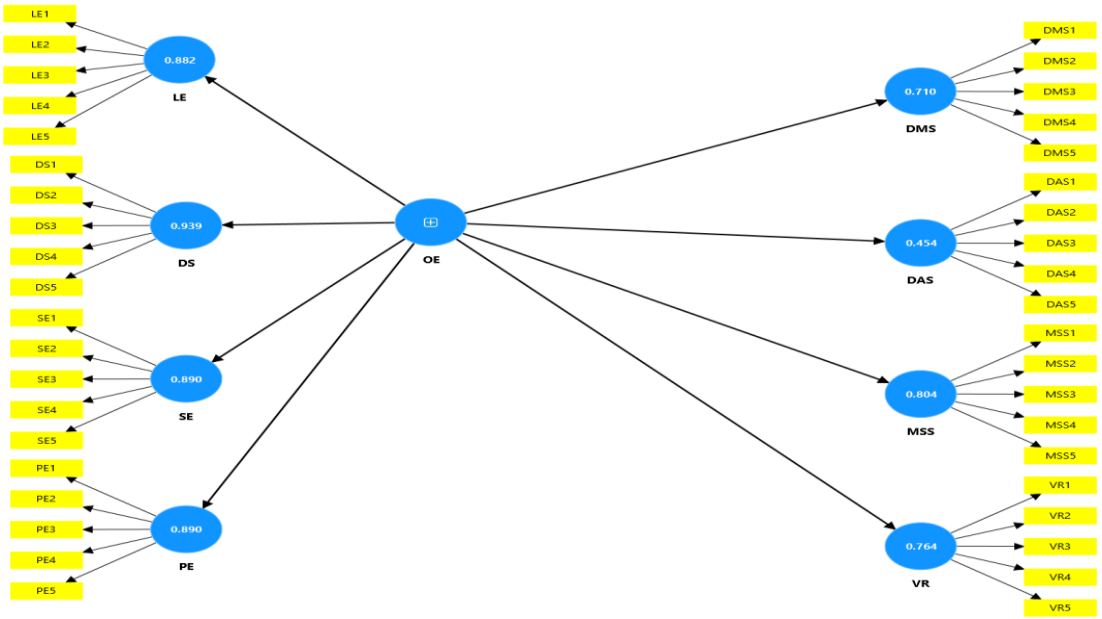
Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to assess the study hypotheses and verify the research model. Regression pathways (regression coefficients) were estimated using the bootstrapping approach, which created a random sample that was 5,000 times from the original sample. When compared to conventional approaches, this methodology offers a more effective estimation of regression coefficients.

With an R2 value of 0.710 for DMS, 0.454 for DAS, 0.804 for MSS and 0.764 for VR. The research results showing a fairly high variance.

It is clear from the results in Table 3 of the hypothesis testing that there is support for all of the direct hypotheses and the statistically significant effects were positive.

Table 3. Structural model results

Hypothesis	Paths	Std. Beta	Std. Error.	t-value	p-value
H1	OE → DMS	0.784	0.029	26.952	0.000
H2	OE → DAS	0.381	0.063	6.026	0.000
H3	OE → MSS	0.567	0.090	6.279	0.000
H4	OE → VR	0.420	0.062	6.739	0.000



The findings of the structural model demonstrate statistically significant and positive relationships between organizational excellence and all four dimensions of business intelligence. Specifically, the path coefficient from organizational excellence to

data management systems (DMS) was the strongest, indicating that excellence in organizational leadership, strategy, operations, and human capital has a profound influence on the development and effectiveness of data management infrastructure. Significant effects were also observed on data analysis systems (DAS), management support systems (MSS), and report visualization (VR), highlighting the role of an excellent organizational environment in enabling advanced analytics, informed managerial decision-making, and effective communication of insights. The high t-values and p-values below 0.05 for all relationships confirm the robustness of these effects, thus supporting all proposed hypotheses and affirming the relevance of organizational excellence as a key driver in maximizing the value of business intelligence systems within Jordanian commercial banks.

Demographic table

Characteristics	Category	No.	%
Gender	Males	94	55
	Females	77	45
Age	Less than 30 years	65	38
	30-40	62	36
	40-50	42	25
	50 years and above	2	1
Education	Diploma	10	6
	Bachelor	139	81
	master	7	4
	PhD	15	9
Current position	manager	30	18
	Department head	31	18
	Deputy department head	93	54
	Deputy manager	17	10
Years of experience	Less than 5 years	46	27
	5- less than 10	37	22
	10-less than 15	54	32
	Above 15 years	34	20
Total		**171**	**100**

The demographic profile of the study sample reflects a diverse and balanced representation of managerial roles in Jordanian commercial banks. In terms of gender distribution, the sample included 55% males and 45% females, indicating relatively balanced gender participation. Regarding age, the largest proportion of participants fell into the "less than 30 years" category (38%), followed closely by those aged 30–40 (36%), which suggests a youthful workforce that combines early-career dynamism with mid-level experience. Educationally, a significant majority of respondents held a bachelor's degree (81%), while a smaller percentage held postgraduate degrees (PhD 9%, Master's 4%), indicating a well-qualified managerial base. With respect to job position, more than half of the sample (54%) were deputy department heads, while 18% were managers and another 18% were department heads, showing a strong representation of mid- to upper-level management. In terms of experience, 32% of participants had between 10 and 15 years of experience, and 27% had less than five years, reflecting a workforce that is relatively experienced but also inclusive of newer professionals. These characteristics ensure that the data collected reflects a well-rounded understanding of business intelligence and organizational excellence across varied managerial perspectives.

The results of the study: The study found the following:

1. The study confirmed a statistically significant and strong impact of Business Intelligence (BI) in its combined dimensions (Data Management Systems, Data Analysis Systems, Management Support Systems, and Report Presentation) on organizational excellence in Jordanian commercial banks. This highlights BI as a strategic tool in supporting institutional performance and achieving competitive advantage.
2. All sub-dimensions of Business Intelligence showed statistically significant effects on organizational excellence, particularly in enhancing leadership excellence, subordinate excellence, strategic excellence, and operational excellence.
3. The results of the Partial Least Squares Structural Equation Modeling (PLS-SEM) revealed that a substantial percentage of the variance in organizational excellence can be explained by BI dimensions, indicating the robustness of the proposed model.
4. The study confirmed the reliability and validity of the measurement model through meeting the standards of internal consistency (Cronbach's Alpha and Composite Reliability), convergent validity (AVE), and discriminant validity (HTMT).
5. The study showed that BI plays a key role in improving decision-making efficiency, facilitating strategic interventions, and enhancing the quality of reporting and administrative outputs in banks, which in turn supports their performance and excellence in the banking sector.
6.

3.11 Recommendations:

The study recommended the following:

1. Jordanian commercial banks are advised to adopt clear policies for implementing Business Intelligence systems by investing in advanced digital infrastructure and training staff in data analysis tools and interpretation to support evidence-based decision-making.
2. There is a need to continuously enhance and update Data Management Systems to ensure the accuracy and reliability of organizational data, which directly contributes to improving decision-making and reporting quality.
3. The study recommends strengthening a culture of innovation and predictive analysis by leveraging Management Support Systems to guide internal and strategic processes toward sustainable excellence.
4. Investment in smart and interactive reporting tools is essential to improve information sharing across departments and enable quicker responses to market changes.
5. The scope of Business Intelligence use should be expanded to include human capital management and enterprise resource planning, allowing for better integration across bank functions and contributing to comprehensive organizational excellence.
6. Decision-makers are encouraged to rely on BI outputs as a basis for formulating strategies and policies that align with the organization's vision, enhance customer satisfaction, and improve competitiveness in the dynamic banking environment.

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