The Impact of Digital Transformation on Operational Efficiency in Jordanian Commercial Banks

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Received: 05/11/2024
Accepted: 26/01/2025
Published: 30/06/2025

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DOI:https://doi.org/10.59759/business.v4i2.747

Abstract

The study examines the impact of digital transformation-driving technologies, processes, and people on operational efficiency in Jordanian commercial banks. The research design used was a descriptive analysis. The sample included twelve Jordanian banks. A total of 240 electronic questionnaires were distributed among accountants, programmers, auditors, and chief auditors in different Jordanian banks. In the end, 223 responses were usable and were analyzed using SPSS software. These results indicate that digital transformation significantly influences operational efficiency, which shows that technology plays a crucial role in ensuring an increase in speed and reliability of data transfer so as to instill confidence among customers and investors. The study calls for increased investment in human capital and in the digital transformation drive as a way of keeping up with rapid technological advancements that would help improve their efficiency in operations within the financial institutions.

Keywords: "Digital Transformation (DT), Operational Efficiency, Competitive Advantage, Customer Service, Risk; Jordan"

أثر التحول الرقمي على الكفاءة التشغيلية في البنوك التجارية الأردنية

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ملخص

تبحث هذه الدراسة في أثر التقنيات والعمليات والموارد البشرية المحفزة للتحول الرقمي على الكفاءة التشغيلية في البنوك التجارية الأردنية. اعتمد البحث على التحليل الوصفي. شملت العينة اثني عشر بنكاً أردنياً. وُزّع ما مجموعه ٢٤٠ استبياناً إلكترونياً على المحاسبين والمبرمجين والمدققين وكبار المدققين في مختلف البنوك الأردنية. في النهاية، كانت ٢٢٣ استجابةً صالحةً للاستخدام، وتم تحليلها باستخدام برنامج SPSS. تشير هذه النتائج إلى أن التحول الرقمي يؤثر بشكل كبير على الكفاءة التشغيلية، مما يُظهر أن التكنولوجيا تلعب دوراً حاسماً في ضمان زيادة سرعة نقل البيانات وموثوقيتها، مما يعززُ ثقة العملاء والمستثمرين. تدعو الدراسة إلى زيادة الاستثمار في رأس المال البشري وفي جهود التحول الرقمي لمواكبة التطورات التكنولوجيّة المتسارعة، مما يُسهمُ في تحسين كفاءة العمليات داخل المؤسسات المالية.

الكلمات المفتاحيّة: التحول الرقمي، الكفاءة التشغيلية، الميزة التنافسيّة، خدمة العملاء، المخاطر، الأردن.

Introduction

Various sectors have been impacted by digital transformations, including the business sector, which has been particularly affected (Tian et al., 2023). The world has seen a radical transformation in the field of information transfer and provision because digital sources have become easily accessible, making any event occurring in any part of the world quickly known worldwide (Mubarak et al., 2019). Additionally, the digital image has constituted a major replacement for the physical and printed image. Since all sectors can now present their reports and results in an easy-to-understand and visually appealing digital format for beneficiaries, the idea of digital transformation has encouraged many organizations, businesses, banks, and others to embrace it. This helps to make information more accessible and appealing (Wujarso, 2023).

The most prominent features of digital transformation and its events that affect the activities of the economy as a whole and in accounting and auditing in

particular (Peng et al., 2023), is the holding of the forty-sixth session of the World Economic Forum in Switzerland in 2016 to discuss the Fourth Industrial Revolution, which is related to digital transformation and its development in the whole world (Al-Marji and Al-Rashidi, 2023), as the use of technology is no longer an option or a luxury, but rather a duty and part of the work strategy of organizations, and any organization must accelerate and adjust its strategies, towards digital transformation to be part of its plans and priorities, otherwise its fate is to exit the field of competition as a result (Abu Rahma and Rashwan, 2020). Digital transformation "does not only mean applying technology and automation within the organization", but rather it is a comprehensive strategic program that affects the organization internally and externally. From the internal aspect, it is related to its internal work method and style, and externally, it is related to how to provide products and services to the target audience and increase market share, all of which contributes to achieving the strategic goals of the organization in an easier and faster way and with less effort and cost (Marai, 2022).

Operations are the cornerstone of digital transformation and form the foundation and driving force for implementation. In other words, digital transformation is really about enhancing these processes with advanced technologies, which directly impact operational efficiency and, in a broader sense, overall productivity. Organizations can achieve a quantum leap in operational efficiency by deploying a robust enterprise asset management system. This maximizes the utilization of productive assets, thereby delivering strategic benefits and ensuring a positive impact on financial results.

For instance, it needs to offer solutions to manage corporate assets, improve operation efficiency, and asset availability that is ultimately going to drive profitability. As explained before, digital transformation has been considered one of the major drivers of improved operational efficiency and competitiveness in the fast-changing business world (Mubarak et al., 2019).

As mentioned before, recently, digital transformation has been one of the key drivers for organizations in pursuit of improved operational efficiencies and competitiveness within their fast-changing business environments. Undoubtedly,

the integration of digitized technologies with process reengineering and people can really change how an organization works. In this regard, with digital transformation strategies, adoption has increasingly been on the rise, but little comprehension exists in respect to the level at which these transformations directly impact operational efficiency.

Since digital transformation encompasses technologies, processes, and people, which are dimensional in nature, it requires further investigation for proper establishment with respect to the influence of each of these dimensions in enhancing operational efficiency. This therefore, brings out one important uncertainty for any organization that tries to maximize the business benefits while ensuring sustainability of improved performance from the digital investments. Jordan's banking sector faces unique challenges and opportunities, such as rapidly evolving regulatory frameworks and the need for advanced cybersecurity measures to support digital transformation (Teng et al., 2022).

The problem of the study can be summarized in answering the following questions:

Primary Question: What is the impact of digital transformation, with all its associated dimensions: (technologies, processes, and people) on operational efficiency in Jordanian commercial banks?

This primary question leads to the following additional questions:

1- Do digital transformation applications addressed in technologies have an impact on operational efficiency in Jordanian commercial banks?
2- Do digital transformation applications addressed in processes have an impact on operational efficiency in Jordanian commercial banks?
3- Do digital transformation applications addressed in people have an impact on operational efficiency in Jordanian commercial banks?

This study has, therefore, been conducted with the objective of discussing and analyzing, through the triple lens of technologies, processes, and people, the impact of digital transformation on operational efficiency. In this respect, the contribution of all three dimensions is discussed in detail to comprehensively understand how digital transformation initiatives drive improvements in operational performance.

The importance of the research also included supplying useful guidance to an organization on how best to make its digital transformational strategy, if at all. By identifying the role of technologies, processes, and people in improving operational efficiency, it will be prepared to present practical guidance to decision-makers on where to concentrate their energies. In addition, awareness of the statistical significance of the effect of each dimension may help organizations in the development of more effective digital strategies that confirm they achieve the maximum operation gains and competitive advantages in the digital era.

Study model

"Figure (1) indicates the study model, and includes the study variables and the dimensions of each variable".

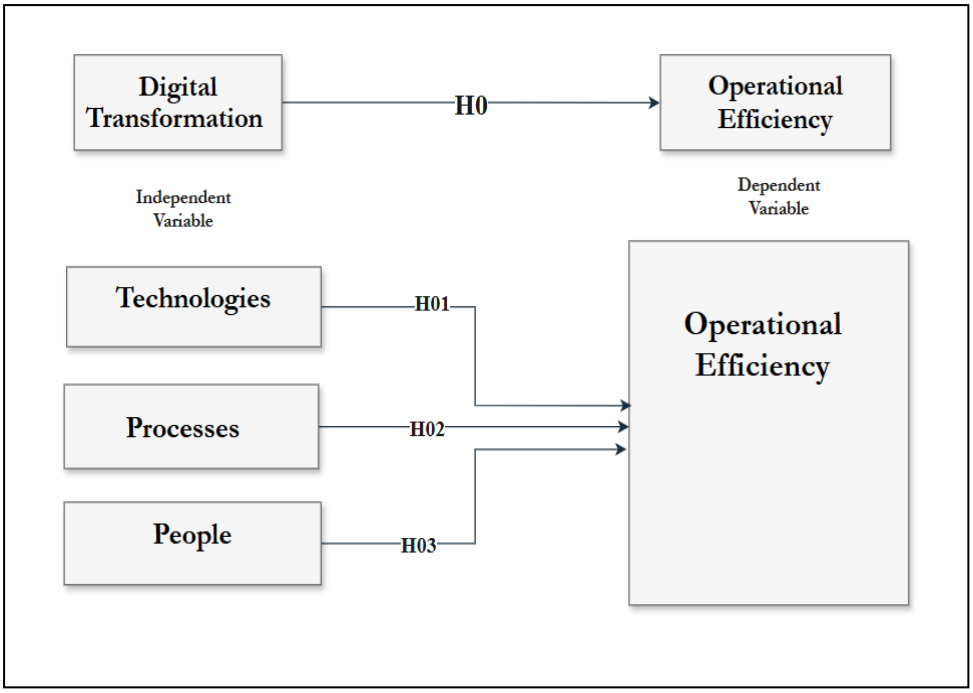

Figure 1: Study Model (Researcher work).

Research hypotheses

Main Hypothesis (H0): "Digital transformation does not significantly affect operational efficiency in Jordanian commercial banks at the significance level ($\alpha \leq 0.05$), encompassing the dimensions of technologies, processes, and people."

Sub-Hypotheses:

H01: "Technological innovations within digital transformation do not significantly influence operational efficiency in Jordanian commercial banks at the significance level ($\alpha \leq 0.05$)."

H02: "Process enhancements driven by digital transformation do not significantly impact operational efficiency in Jordanian commercial banks at the significance level ($\alpha \leq 0.05$)."

H03: "The human capital aspect of digital transformation does not significantly contribute to operational efficiency in Jordanian commercial banks at the significance level ($\alpha \leq 0.05$)."

"Theoretical framework and previous studies"

- "**Digital Transformation concept**"

The result of digital transformation is enhanced business operations through the improvement of customer service, smoothing of internal flow and processes, and new establishments of business models (Liere-Netheler et al., 2018). The adoption of digital technologies for the establishment of new business models, improvement in customer and employee experience, and converting processes into a digital system may contribute to operational efficiency and performance. Digital transformation increases the use of digital services for a wider population to promote financial inclusions (Zuhairi & Khamis, 2021).

Abu Samra (2019) states that digital transformation for him "is the move towards digital technologies for innovative creation of products, services and marketing channels to add value to products and open up job opportunities (Abu Samra, 2019)." On the other hand, he also described it as "a technological transition to higher levels; it opens up new models for institutions and learning, and requires innovative management leadership capable of implementing integrated systems based on data analytics" (Brooks and McCormack, 2021). As

Garzoni et al. (2020) note, it might be said that digital transformation is one of the structural changes in which big data and AI are integrated with the intention of enhancing decision making for better business efficiency.

Al-Nasir (2021) regarded it as the method of adapting to the rapid era of digitization to realize sustainable development. Ishaq (2022) defined it as the application and adaptation of electronic services in a contemporary techno-manner to meet users' needs. Qaryo (2022) regards it as changing analog information into a digital-based system that enhances the accessibility and management of intellectual content. Shannan (2023) relates this concept to the role of the use of modern technologies in promoting transparency in accounting and enhancing financial reporting.

The digital transformation's dimensions are illustrated in the following:

"Digital transformation in the auditing profession" specifically impacts the profession through the use of modern technologies that facilitate the auditor's work and present it in the best possible way and at the right time, even though it still causes many strong shocks and shocks in the methods and procedures of field work and the organizational structure of auditing and accounting firms (Bakay, 2022). As a result, it offers businesses enormous opportunities on many levels since it helps them achieve their strategic goals and chart their course, which allows them to make better use of their resources and improve control operations by depending on individuals to carry out a set of tasks required to achieve digital transformation, from adopting modern technology to setting strategies, which is a fundamental requirement "to meet the expectations of users" and customers (Qasaimeh et al., 2022). The most significant aspects of digital transformation are as follows:

- **First: Technology**

"A wide range of prerequisites, including data, computers and" mobile devices, cloud storage, "social media, big data, artificial intelligence, the Internet of" Things, software, cybersecurity, embedded devices, and applications, are necessary to begin the digital transformation process (Nazari, Musilek, 2023). One of the factors contributing to the success of digital transformation is the advancement of technology, such as the Internet of Things (IoT), cryptocurrencies, applications, smartphones, and artificial intelligence. These technologies allow businesses to better

satisfy customer needs than they could with conventional approaches (Butler, 2020). Therefore, technology encompasses any work that uses data, computers, and cloud storage to enhance or automate services and processes automatically. It also includes the rapidly expanding industrial sector and companies that use a variety of methods to meet the needs of both consumers and businesses (Ibrahim, 2023).

- **Second: Processes.**

According to Nazari and Musilek (2023), it is a collection of tasks required for digital transformation and is represented in strategies, business models, operating models, commercial activities, new services, operational processes, coordination mechanisms, products, organizational culture, and organizational structure. This means that in order to successfully achieve digital transformation, organizational leaders need to possess a wide range of skills and fully comprehend the advantages of digital technologies.

- **Third: People**

They are the core of digital transformation, its foundations, and the ideal outcome to achieve. Customers, executives, talents, workers, workforce, people, managers, suppliers, owners, competencies, stakeholders, and partners are among the overlapping mix of roles that a human may hold concurrently (Nazari & Musilek, 2023). Skills, knowledge, experience, leadership qualities, vision, and collaborative competences are all evaluated by organizations to determine their human capital. Effective communication in problem-solving is also evaluated. One of the most crucial foundations of the organization's digital transformation is thought to be the technical skills and digital capabilities of its human resources, including technical skills for interacting with digital transformation systems and technology. Software and technology developers are among the most important human resources in digital transformation because they help the firm achieve its objectives by creating technical and technological applications that align with its needs and vision (Spector & Ma, 2019).

- **<u>Operational Efficiency concept</u>**

The literature analysis identifies a number of ways that digital payments, the most significant service provided by financial institutions, can impact their

effectiveness. The authors examine both cost and operational efficiency because the former is crucial to the functioning of financial institutions. Traditionally, the phrase "operational efficiency" refers to how well a company can deliver its goods and services with the least amount of waste. It is frequently displayed as a ratio of inputs to outputs (Cannas, 2023). The ability of a business to maximize the use of its assets, employ resources effectively, and provide goods and services at a reasonable cost is known as operational efficiency according to Prasetyo & Darmayanti, (2015). In the context of management, a number of performance measurements, including lead time, production costs, and productivity, are typically used to gauge operational efficiency. “To improve operational efficiency and gain a competitive“ edge, “digital technologies like artificial intelligence (AI), cloud computing, and data analytics must be integrated“.

- **Related Studies**

The following studies presents an in-depth exploration of the impact of digital transformation on operational efficiency, providing insights from various sectors and nations from 2021 to 2024.

Adaileh & Alshawawreh (2021) developed, in turn, a framework for assessing the progress of the REACH 2025 digital transformation initiative of Jordan's government, which aims to position Jordan among the leading countries in the area of digital economy by the year 2025. Among the seven critical dimensions, the authors identified public sector innovation, enabling business environments, smart digital infrastructure, and ICT skills. The researchers gathered data from 196 participants, representing a diverse cross-section of the population, via a survey designed to evaluate perceptions of advancements made towards specific goals. Overall, the findings indicated a favorable outlook towards the REACH 2025 initiative, particularly in areas such as ICT skills and public sector innovation, although some areas were identified as requiring further enhancement. Results showed that continuous efforts were needed in measuring the impacts of digital transformation on productivity and investment in the Jordanian economy as a whole. The study recommended the usage of the proposed framework in

further empirical research and refinement of government policies by identifying implementation gaps (Adaileh & Alshawawreh, 2021).

Al-Araj et al. (2022) investigate how AI impacts service quality and customer satisfaction of the Jordanian banking industry. The current research focuses on AI for fraud detection analysis, system failure prediction, and loyalty evaluation of customers. This study finds significant evidence, after surveying a sample of 270 consumers, that Artificial Intelligence enhances Service Quality. An effective balance between Digital and Human contact is required; it remains crucial to respond effectively to the increasing demands of all customers' needs and preferences (Al-Araj et al., 2022).

The research conducted by Mavlutova et al., (2022) investigates the process by which the banking industry undergoes digital transformation because of the innovative application of technology and solutions for improving operational efficiency and expanding financial inclusion. The primary focus of the research is on digital payments. In order to conduct this study, we conducted a comprehensive literature review, conducted interviews with professionals in the field, and reviewed secondary data (Mavlutova et al., 2022).

Yu et al. (2022) investigated how digital transformation capability might facilitate superior operational performance. Based on a survey of 162 enterprises, it was observed that the capability is acting as an important mediator in the link between strategic orientation and operational efficiency. Enterprises with good digital transformation capabilities were thus at a better position in which an integration of business processes could be done with ease to attain a certain competitive advantage through the deployment of digital technologies. These findings gave full notice for the development of a robust digital transformation strategy that could drive maximum operational efficiency (Yu et al., 2022).

Rohmah & Komarudin (2023) conducted research into how digital transformation affects the current management of operational businesses in Indonesia. They employed a qualitative methodology through a literature review to evaluate how digital technologies, including the Internet of Things, artificial intelligence, advanced robotics, and blockchain, are transforming operational business behavior. The authors presented that their work on digital transformation

developed a revolution in operational management, which had transformed aspects of efficiency, productivity, and competitiveness. Companies that adopt these technologies could therefore plan and organize production processes more effectively and with speed, enabling them to give better responses in case of market changes. Precisely, knowledge in digital technologies could bridge the gap between customer expectations and traditional business models toward sustainable operational efficiency (Rohmah & Komarudin, 2023).

The impact of digital transformation on operational effectiveness and competitive advantage in Jordanian Islamic banks was the main emphasis of Raymond et al. (2023). In this respect, the methodology developed was that of a descriptive-analytical approach; the collection of primary data was facilitated by the use of a questionnaire by 68 respondents representing four Islamic banks throughout the country. In the light of "the hypotheses of the study, the application of Structural Equation Modeling" in testing such hypotheses revealed that there is a statistically significant and positive relationship between digital transformation and operational efficiency and competitive advantage at significance level $\alpha \leq 0.05$. Eventually, it turned out that stratification enabled these banks to innovate and compete in a more aggressive manner with other applications of digital transformation strategies beyond the scope of Islamic finance. The study also pointed out the need for mitigating risks that arise with the arrival of digital technologies and underlined the risks relating to the stability of the financial system. Other recommendations included the design of a holistic digital transformation approach, which must be innovative, with risk and competition too, without moving away from Islamic banking principles (Raymond et al., 2023).

Ji et al. (2023) have "assessed the impact of digital transformation" on the sustainability of firms in China with operational efficiency acting as a mediator. This paper has, for the first time, used an integrated analytical framework based on theories such as the resource-based view and dynamic capability theory to assess the association between digital transformation and sustainability. This leads to results showing that digital transformation can foster sustainability by encouraging operational efficiency and corporate innovation. It emphasized how ownership,

industry, and location are the critical determinants driving the relationship between digital transformation and sustainability performance (Ji et al., 2023).

Wang et al. (2023), on the other hand, concentrated their research effort in the manufacturing industry of China and analyzed how digital transformation has influenced enterprise performance. Based on the data collected from 156 listed manufacturing companies, this research used textual analysis to create a digital transformation index for assessing its effect on operational efficiency. The results indicated that digital transformation reduced production cost and, as such, enhanced the overall performance through improving efficiency in operations. The research team also noticed that for significant performance gains, medium to high levels of digital transformation were required, while low levels of transformation had minimal effects. This meant that different levels of digital adoption shone fresh light on the way business operations are affected (Wang et al., 2023).

An investigation of the intricate connections that exist between the operational efficiency of the banking industry, financial innovation, and digital transformation was carried out by Al-Ansi et al., (2024) in the course of their research efforts. When it comes to financial management, the most important aspects are the connections to big data analytics and blockchain technology. These connections contribute to ever-increasing levels of operational efficiency, which are assisting in overcoming specific challenges. Additional problems that were brought to light included the utilisation of outdated technologies and the issue of privacy (Al-Ansi et al., 2024).

Study method

"The descriptive analytical approach is" considered the basic approach followed by the current research to achieve the objectives it included "and answer the questions" it raised, as this approach is considered one of the best approaches used in applied and field studies that are compatible with their nature.

Population and Sample

The study sample consisted of chief accountants, audit managers, auditors working and programmers in Jordanian commercial banks. The researcher decided

to distribute (240) questionnaires to the study sample, with (20) questionnaires in each Jordanian commercial bank, as the number of Jordanian commercial banks is (12) banks. The distribution process was carried out electronically using Google documents and in cooperation with the main departments in the general departments of Jordanian commercial banks.

The researcher was able to retrieve (92.1%) of the questionnaires distributed electronically, amounting to (223) questionnaires, all of which were valid for applying statistical analysis. The following table shows the demographic characteristics of the respondents representing the study sample by finding the frequencies and percentages of answers to the questions related to the demographic data in the questionnaire.

The sample size and selection of participants, like accountants, programmers, and auditors, are representative because their functions are at the core of the banks' operations and digitization processes. Accountants provide accurate financial reporting and compliance, programmers drive technological development, while auditors oversee risk management and internal controls, thereby collectively reflecting the major functions required for operational efficiency within the banking sector. This research focuses solely on commercial banks because they are the most important economic drivers in Jordan, bearing in mind that most of the country's transactions, credit facilities, and customer dealings take place through them. By excluding other types of financial institutions, this allows for a more focused investigation of digital transformation impacts within the sector with the most direct and widespread implications regarding operational efficiency and customer engagement.

Table (1): "Description of the demographic characteristics of the auditors representing the study population"

"variable"	**Target group**	**n=223**	**percentage**
Academic qualification	Bachelor's	101	45.3
	Master's	89	39.9
	PhD	33	14.8
Scientific specialization	Accounting	123	55.1
	Financial and Banking Sciences	14	6.3

"variable"	Target group	n=223	percentage
	Programmers/IT	79	35.4
	Other	7	3.1
Job Title	Senior Auditor	10	4.5
	Accountants	118	52.9
	Programmer	79	35.4
	Auditor	16	7.1
Number of years of work experience	Less than 5 years	51	22.9
	5 years - less than 10 years	68	30.4
	10 years - less than 15 years	51	22.9
	15 years - less than 20 years	39	17.5
	20 years and above	14	6.3
Number of professional certificates	One certificate	69	30.9
	Two certificates	33	14.8
	More than two certificates	12	5.4
	Nothing	109	48.9
the total		**223**	**100**

Table (1) shows that (45.3%) of the study sample hold a bachelor's degree, (39.9%) of them hold a master's degree, and (14.8%) of them hold a doctorate. This indicates the high level of scientific knowledge among the sample, and their possession of scientific skills and competencies, especially in the field of accounting and programming. This is confirmed by the high percentage of study sample members, as shown in Table (1) that (55.1%) of the study sample members holding accounting degree, (35.4%) of them are programmers and IT, (6.3%) of them are from finance and banking, and (3.1%) are in different specializations. This distribution of sample members is consistent with the number "of employees according to the administrative hierarchy in organizations" in general, where the number decreases in senior management positions and, in contrast, the number increases in middle and then lower management positions. It is also clear from Table (1) that the accounting percentage was (52.9%), and the percentage of programmers was (35.4%), followed by auditors with a percentage of (7.1%), and finally a chief auditor with a percentage of (4.5%).

As shown in the table above, "the largest percentage of the study sample" has high "experience ranging from 5 years to less than 10 years, which amounted to (30.4%)," and (22.9%) of them had experience ranging between (5 years - less than 10 years) and (10 years - less than 15 years), which "indicates that the study sample possesses the competencies and practical" skills in this field. It was found that (48.9%) of the sample do not have professional certificates, and this may be due on the one hand to the difficulty of obtaining these certificates, and the lack of time to obtain these certificates, and on the other hand it may be due to the cost of obtaining these certificates.

Data collection sources

In the collection of data, the researcher used both secondary and primary sources. The secondary sources entailed scientific and literary references to digital transformation and operational efficiency in developing the theoretical framework. Primary data collection was done through a questionnaire designed on the study topics, informed by the secondary sources.

This questionnaire aimed to extract "the opinions of the study sample members on the study topics. The" questionnaire consisted of the following parts:

Part One: Demographic data, which includes (5) questions that examine the general characteristics of the respondents from the study sample, in terms of academic qualification, academic specialization, job title, number of years of work experience, and number of professional certificates. The aim of posing these questions is to obtain a general idea about the personal and professional characteristics of the study sample in Jordanian commercial banks.

Part Two: Study variables, which included (25) paragraphs related to measuring the study variables, distributed as follows: (15) paragraphs to measure the Digital Transformation variable, with (5) paragraphs for each dimension, and (10) paragraphs to measure the Operational Efficiency variable. The presentation of these paragraphs aims to obtain the participants' opinions about the study variables and the level of interest in them, by determining the degree of agreement with them.

The questionnaire was designed according to the five-point Likert scale, which included five degrees of agreement: "(strongly agree = 5, agree = 4, somewhat agree = 3, disagree = 2, and strongly disagree = 1)". The level of importance was also classified into three levels to provide a more accurate analysis of the extent of the sample's interest in the study topics. They were determined according to the arithmetic mean limits of the five-point Likert scale, as follows:

Table (2): Relative importance level and corresponding arithmetic mean limits

Relative importance level	Low	Medium	high
Arithmetic mean limits	1 less than 2.33	2.33 less than 3.66	3.66 less than 5

Study instrument reliability test

The purpose of the research tool's reliability test is to gauge how coherent and consistent the participants' responses to the questionnaire items are. Given that its results fall between 0 and 1, the Cronbach's Alpha Coefficient is one of the most widely utilized tests for this purpose. The tool's dependability rises as the Cronbach's Alpha Coefficient value rises beyond 0.70, indicating a high degree of stability and, consequently, the potential for using the tool in statistical analysis. The values of the Cronbach's Alpha coefficients, which are used to assess the research tool's reliability, are displayed in the following table. According to Table (3), every value was higher than 0.70 and fell between 0.854 and 0.912, indicating a high level of stability and dependability of the

Table (3): Cronbach's alpha coefficient values for the study tool

No	Variable	Number of paragraphs	alpha value
1	Technologies	5	0.912
2	Processes	5	0.854
3	People	5	0.901

"Data Analysis and Hypothesis Testing"

Description of Study Variables

The description of the study variables aims to explore The Impact of Digital Transformation on Operational Efficiency in Jordanian Commercial Banks, by calculating the arithmetic means and standard deviations of these variables and their dimensions, and determining their level of relative importance.

Table (4) shows that the respondents agreed on the existence of a high interest in digital transformation, as the arithmetic mean of digital transformation was (3.960) and the standard deviation was (0.623). The sample members also agreed on the dimensions of this dimension, as (technologies) came in first place and the arithmetic mean of this dimension was (3.991) with a standard deviation of (0.616), followed by (people) and ranked second, as the arithmetic mean of this dimension was (3.951) with a standard deviation of (0.728), followed by (processes) with an arithmetic mean of (3.938) and a standard deviation of (0.711), and all dimensions of digital transformation had a high relative importance. The sample members also agreed on the existence of a high interest in Operational Efficiency, as the arithmetic mean was (3.934) and the standard deviation was (0.631). This dimension also appeared to have a high relative importance.

Table (4): Description of study variables

No	Variable/Dimension	Arithmetic mean	Standard deviation	"Rank"	"relative importance"
1	**Digital Transformation**	**3.960**	**0.623**	**-**	**High**
2	Technologies	3.991	0.616	1	High
3	Processes	3.938	0.711	3	High
4	People	3.951	0.728	2	High
5	**Operational Efficiency**	**3.934**	**0.631**	**-**	**High**

"The study hypotheses aimed to identify the potential impact of digital transformation on operational efficiency in Jordanian commercial banks, and to

identify the" potential impact of each of technologies, processes and people on operational efficiency in Jordanian commercial banks. To achieve this, a main hypothesis was formulated, from which three sub-hypotheses were derived, and they were subjected to linear regression analysis.

Main hypothesis test results

The main hypothesis of the study aimed to identify the impact of digital transformation on operational efficiency. The text of this hypothesis is as follows:
H0: "There is no statistically significant effect at the significance level (α≤ 0.05) of digital transformation in its dimensions (technologies, processes, people) on operational efficiency in Jordanian commercial banks".

Table (5): The relationship and impact of digital transformation on operational efficiency

independent variable	Non-standard transactions		Standard Transactions			Degrees of linear correlation	
	B	"Standard error"	β	T	"Sig. T"	VIF	Allowable variance
technologies	0.275	0.041	0.274	6.707	0.000	4.352	0.230
people	0.351	0.057	0.349	6.159	0.000	4.147	0.241
processes	0.265	0.047	0.263	5.638	0.000	3.331	0.300
R			**0.822**				
R^2			**0.676**				
F			**214.114**				
Sig. F			**0.000**				

Dependent variable: operational efficiency

The values of Table (5) indicate the relationship between **"**digital transformation and its impact on operational efficiency in Jordanian commercial banks**"**, as it was shown that digital transformation is strongly associated with operational efficiency, reaching (R=0.822), and contributed to explaining (67.6%) of the change in operational efficiency (R^2=0.676), and it was also shown that its impact was significant on

operational efficiency (F=214.114, Sig.F=0.000). Based on the above, it is clear that: "There is a statistically significant impact at a significance level (0.05≥α) for digital transformation in its dimensions (technologies, processes, people) on operational efficiency in Jordanian commercial banks."

"Sub-hypothesis Test Results"

H01: "There is no statistically significant role at α≤0.05 for technologies in operational efficiency in Jordanian commercial banks".

Table (5) shows that technologies have a relationship and impact with operational efficiency (B=0.275), and that their impact was significant on operational efficiency (T=6.707, Sig.T=0.000). Based on the above, it is clear that: "There is a statistically significant role at α≤0.05 for technologies in operational efficiency in Jordanian commercial banks."

The second hypothesis H02: There is no statistically significant role at α≤0.05 for processes in operational efficiency in Jordanian commercial banks.

Table (5) shows that processes are related to operational efficiency (B=0.265), and that its effect was significant on operational efficiency (T=5.638, Sig.T=0.000). Based on the above, it is clear that: "There is a statistically significant role at α≤0.05 for processes in operational efficiency in Jordanian commercial banks"

The third sub-hypothesis H03: There is no statistically significant role at α≤0.05 for people in operational efficiency in Jordanian commercial banks.

It is clear from Table (5) that people are related and influential with operational efficiency (B=0.351), and that their effect was significant on operational efficiency (T=6.159, Sig.T=0.000). Based on the above, it is clear that: H03: "There is a statistically significant role at α≤0.05 for people in operational efficiency in Jordanian commercial banks."

These results have great real-world implications for the banking industry in terms of how to meet the demands of a rapidly digitizing global economy. Given that digital transformation was found to affect operational efficiency, banks that invest in automation, artificial intelligence, and big data analytics could expect streamlined processes, reduced transaction times, and increased customer

satisfaction. Emphasis on human capital shows that it is necessary to continuously train employees to be able to exploit these technologies, enabling innovation and adaptability in a changing industry. In addition, the increase in the speed and reliability of data transfer due to digital transformation creates more trust with customers and helps compliance with regulations, crucial for sustaining competitiveness. The above findings indicate that the need for banks to make a shift toward digital transformation is not just about upgrading their technology but a strategic initiative toward better performance, cost reduction, and value delivery in a secured and efficient way.

Conclusion

The study's goal was to show how digital transformation, in all of its facets—people, processes, and technologies; affects operational efficiency in Jordanian commercial banks. Given that the industry is clearly seeing a trend towards improving digital technology, the findings indicated that Jordanian commercial banks are becoming more interested in digital transformation. The adoption and "application of digital tools, in addition to" training staff to stay up to date with the growing complexity of financial operations and guaranteeing the quality of accounting and financial data are clear indications of this interest. The growing interest in operational efficiency among Jordanian commercial banks is indicative of their management's high level of awareness and comprehension of the value of operational efficiency, which helps to safeguard assets and resources and improve financial performance. This trend goes beyond just improving financial performance; it also involves boosting stakeholder and investor confidence as they see that banks take operational efficiency seriously, making them more appealing as a trustworthy place to invest.

The results showed that the use of digital transformation, including its dimensions: technologies, processes, and people, significantly impacted operational efficiency within Jordanian commercial banks. This goes to underline that digital transformation deserves a topmost priority in order to enhance speed and reliability for data transfer while building confidence among its customers

and investors. This, in turn, calls for the need to increasingly invest in human capital and digital transformation initiatives to be at par with modern technologies for efficiency, cost reductions from traditional transactions, and offering better services that are effective and secure.

For strengthening the outcomes of digital transformation and its sustainability within the commercial banks operating in Jordan, an enabling strategic partnership with technology companies would help avail them of knowledge and the newest tools to develop adequate responses and increase competitiveness. Meanwhile, joint collaboration with various educational institutions, different training centers for digital skills involving AI, Data Analytics, Cyber Security, etc., will definitely address workforce preparedness against technological advancement. Upskilling through continuous learning and introducing innovation labs would also nurture the culture of innovation and flexibility in coping with change. Further, embedding customer-oriented technologies, such as AI-driven chatbots and personalized financial services, has been recommended to ensure increased customer satisfaction and loyalty. Finally, the bank needs to increase digital awareness campaigns that call on employees and customers to embrace this adoption to integrate the tools seamlessly and leverage their full potential.

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