



جامعة ميدأوشن

كلية الإدارة

قسم.....

Title:

**The role of digital technology in improving the efficiency of  
operations in companies in the Kingdom of Saudi Arabia**

دور التكنولوجيا الرقمية في تحسين كفاءة العمليات في الشركات بالمملكة العربية السعودية

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I thank God Almighty for granting me success in this research, and I am pleased to thank my dear parents for what they have given me throughout my life.

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I extend my thanks to all my friends who have been of assistance to me in the path of science

## **English abstract**

The current research aims to identify the reality of applying digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia. Identify the impact of digital technology in improving the efficiency of operations in companies in the Kingdom of Saudi Arabia. Identify the challenges facing the application of digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia. The researcher used the descriptive analytical method by conducting a questionnaire with a sample of 131 individuals. The results indicate: The results indicate that the Saudi government is actively working to promote digital transformation through initiatives such as Vision 2030 and that “automation reduces human error, increases speed, and frees up employee time to focus on higher value activities where the availability and quality of technology infrastructure plays a role.” , such as high-speed Internet connectivity and services. Cloud computing plays a critical role in enabling digital transformation efforts.

**Keywords:** Cloud computing, automation, connectivity, infrastructure, technology

## Arabic abstract

يهدف البحث الحالي إلى التعرف على واقع تطبيق التقنية الرقمية لتحسين كفاءة العمليات في الشركات في المملكة العربية السعودية. التعرف على أثر التقنية الرقمية في تحسين كفاءة العمليات في الشركات في المملكة العربية السعودية. التعرف على التحديات التي تواجه تطبيق التقنية الرقمية لتحسين كفاءة العمليات في الشركات في المملكة العربية السعودية. واستخدم الباحث المنهج الوصفي التحليلي من خلال 1 من خلال استبيان مع عينة مكونة من 131 فرداً. وتشير النتائج إلى: تشير النتائج إلى أن الحكومة السعودية تعمل بنشاط على تعزيز التحول الرقمي من خلال مبادرات مثل رؤية 2030 وأن "الأتمتة تقلل من الخطأ البشري، وتزيد من السرعة، ويتيح وقت الموظف للتركيز على الأنشطة ذات القيمة الأعلى حيث يلعب توفر البنية التحتية التكنولوجية وجودتها، مثل الاتصال والخدمات بالإنترنت عالي السرعة. تلعب الحوسبة السحابية دوراً حاسماً في تمكين جهود التحول الرقمي

**الكلمات المفتاحية :** البنية التحتية ، التكنولوجيا ، الأتمتة ، جودتها، الحوسبة السحابية

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# **Chapter 1 : Introduction**

## **1.1. Introduction**

In the Kingdom of Saudi Arabia, digital technology has emerged as a transformative force, revolutionizing the way businesses operate and enhancing their efficiency. With its vast potential and widespread adoption, digital technology has become a pivotal tool for companies in various industries, enabling them to streamline processes, optimize resources, and achieve higher levels of productivity. This introduction explores the significant role played by digital technology in improving the efficiency of operations in companies across Saudi Arabia(Hanna et al.,2019).

Digital technology encompasses a wide range of tools and systems, including cloud computing, big data analytics, artificial intelligence (AI), internet of things (IoT), and automation. These technologies have enabled companies in Saudi Arabia to overcome traditional barriers and unlock new opportunities for growth and competitiveness. By leveraging digital solutions, businesses have been able to enhance their operational efficiency in several key areas(Ramanathan et al.,2022).

One area where digital technology has made a profound impact is in supply chain management. Through the use of advanced analytics and real-time data, companies can gain greater visibility into their supply chains, enabling them to optimize inventory levels, minimize lead times, and improve overall coordination. By adopting digital platforms, businesses in Saudi Arabia have been able to streamline their supply chain operations, reduce costs, and enhance customer satisfaction(Anastasiadis et al.,2018).

Furthermore, digital technology has revolutionized communication and collaboration within organizations. With the advent of digital communication tools such as video conferencing, instant messaging, and project management software, teams can seamlessly connect and collaborate

regardless of their physical locations. This has not only improved internal communication but has also facilitated effective collaboration with external partners, suppliers, and customers, leading to faster decision-making and improved operational efficiency(Vasilenko et al.,2021).

Digital technology has also played a significant role in transforming customer experiences in Saudi Arabian companies. With the rise of e-commerce, mobile applications, and online platforms, businesses can now provide personalized and seamless experiences to their customers. Through data-driven insights and AI-powered algorithms, companies can understand customer preferences, anticipate their needs, and deliver tailored solutions. This has not only enhanced customer satisfaction but has also streamlined sales and marketing processes, resulting in increased operational efficiency(Stupina et al.,2021).

Moreover, digital technology has enabled companies to automate repetitive and time-consuming tasks, freeing up valuable human resources for more strategic and value-added activities. Robotic process automation (RPA) and AI-powered bots have been deployed to automate various administrative tasks, data entry, and customer service operations. By automating these processes, companies can significantly reduce errors, improve response times, and allocate their workforce to more complex and strategic tasks, thus enhancing operational efficiency(Raj et al.,2023).

## **1.2. Problem Statement**

Despite significant advances in digital technology, many companies in Saudi Arabia still face challenges in fully harnessing its potential to improve operational efficiency. While some companies have successfully adopted digital solutions, a substantial number still suffer from outdated processes and limited technology integration. This problem statement aims to highlight the key issues that hinder the effective use of digital technology and its impact on operational

efficiency in Saudi companies(Madhanhire & Mbohwa, 2016).One notable challenge is the lack of digital infrastructure and connectivity across the country. While major urban centers in Saudi Arabia have seen significant developments in digital infrastructure, rural areas and small businesses often face limited access to high-speed internet and reliable connectivity. This digital divide hinders the adoption and implementation of digital technologies, preventing companies from fully leveraging their potential to enhance operational efficiency. According to the problem statement, the current research tries to answer the following question:

### **1.3. Study Purposes**

The current research aims to

1. Identify the reality of applying digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia
2. Identify the impact of digital technology in improving the efficiency of operations in companies in the Kingdom of Saudi Arabia
3. Identify the challenges facing the application of digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia

### **1.4. Study Questions**

1. What is the reality of applying digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia?
2. What is the impact of digital technology on improving the efficiency of operations in companies in the Kingdom of Saudi Arabia?
3. What are the challenges facing the application of digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia?.

## **1.5. Importance of The Study**

The study holds significant importance in multiple aspects, including scientific significance, practical significance for companies, and relevance to policymakers and governmental organizations.

### **1.5.1. Scientific Importance:**

The research contributes to the existing body of knowledge in the field by exploring the role of digital technology in enhancing operational efficiency within companies in the Kingdom of Saudi Arabia. By investigating the challenges and opportunities associated with digital technology adoption, the study fills a gap in understanding the specific context of Saudi Arabian companies. This research provides valuable insights into the impact of digital technology on operational efficiency within this particular business environment. The findings can contribute to academic discussions and pave the way for further research in the field of digital transformation and its implications for business operations.

### **1.5.2. Practical Importance:**

The study offers practical significance by providing actionable insights and recommendations for companies operating in the Kingdom of Saudi Arabia. By identifying the challenges that hinder the effective utilization of digital technology, the research enables organizations to understand the barriers they may face and develop strategies to overcome them. The findings and recommendations derived from this research can guide businesses in making informed decisions regarding digital technology adoption, infrastructure development, talent acquisition, and training programs. By implementing the practical recommendations, companies can enhance their operational efficiency, improve competitiveness, and drive sustainable growth in the digital era.

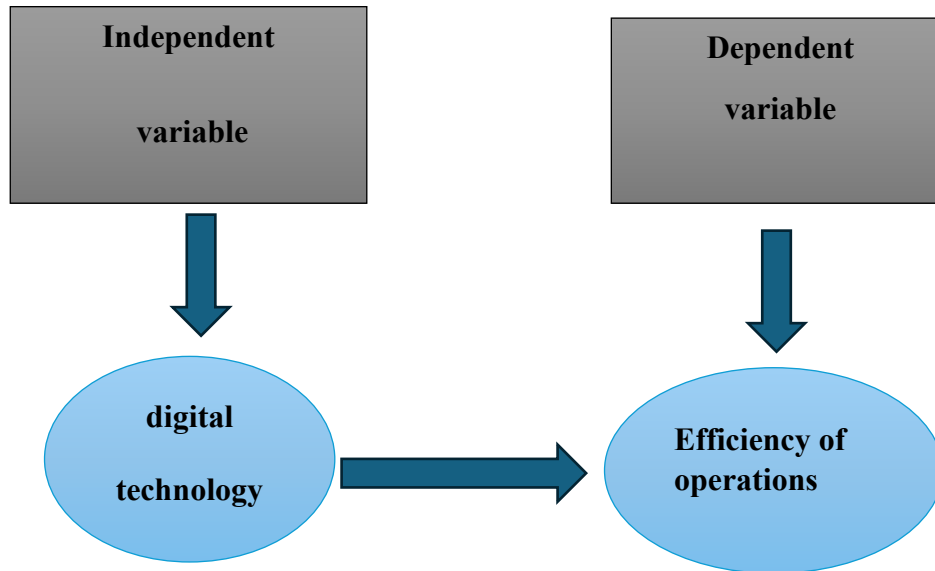
The research is also significant for policymakers and governmental organizations in Saudi Arabia. It sheds light on the specific challenges faced by companies in adopting digital technology and emphasizes the importance of addressing these challenges at a broader level. Policymakers can leverage the research findings to develop supportive policies, initiatives, and regulations that encourage digital transformation, promote digital infrastructure development, and foster digital literacy in the business sector. By aligning the efforts of the government, businesses, and other stakeholders, the research contributes to the overall economic development and digital transformation agenda of Saudi Arabia. the study's importance lies in its scientific contribution to the field, practical insights for companies, and its relevance to policymakers and governmental organizations. By expanding the understanding of digital technology's impact on operational efficiency, providing practical recommendations, and informing policy development, this research aims to drive positive change, enhance competitiveness, and foster economic growth in the Kingdom of Saudi Arabia.

## **1.6. Hypothesis of The study**

Therefore, the current research is based on the following hypotheses:

- There is a statistically significant impact of digital technology on companies in the Kingdom of Saudi Arabia
- There is a statistically significant effect of digital technology in improving the efficiency of operations in companies in the Kingdom of Saudi Arabia

## 1.7. Theoretical Model



**Is clear to us from the previous figure that the current research is trying to study**

The role of digital technology in improving the efficiency of operations in companies in the Kingdom of Saudi Arabia

- **Independent variable:** It represents the independent variable of the research
  - digital technology
- **Dependent variable:** The search dependent variable is:
  - efficiency of operations

## **Chapter 2: Literature Review**

### **2.1. What is digital transformation?**

#### **2.1.1 Definition of digital transformation:**

The term digital transformation is considered one of the most widespread terms among academics and consultants in recent years. It has been defined in previous literature from different points of view. These definitions can be presented, which represent different points of view. Each researcher has his own understanding of this term. For example, it can be defined as “the use of digital technologies.” New technologies such as social media, mobile technology, analytics, or embedded devices to enable key business improvements including improved customer experiences, streamlined operations, or new business models” (Fitzgerald, et, al, 2014).

also defined it as “the actions taken by organizations to integrate digital technology into all areas of business, which fundamentally changes how the organization provides value to customers, and companies use innovative digital technologies in order to make cultural and operational transformations that better align with the requirements of... "changing customers(Liu et al.,2019).

It also “brings about a radical change in work through the great technical development that has occurred to serve beneficiaries faster, and digital transformation provides huge possibilities for building effective and sustainable societies by achieving a radical change in the services of various parties, including consumers, employees, and beneficiaries, while improving their productivity through a series of appropriate processes(Bounfour, (2016).

It is “the process that aims to improve institutions and entities by initiating significant changes to their characteristics using combinations of information, computing, and communications technologies(Wassel et al.,2021).

It is also "the process of converting printed materials, or stored on microfilm or microfiche, and materials in analog form, which include audio tapes and video tapes through scanning, or re-entry, into materials in digital form, which is the form that the computer can handle, and that By formatting it into separate units of data called “bytes,” and storing it on internal storage media such as hard disks or external storage media such as laser disks(De Haes et al.,2020).

Digital transformation represents “a major radical change in the provision of services and not a cumulative change, as it helps achieve competitiveness and sustainability, because it helps provide services faster and better. It is the process of organizations moving to a model that relies on digital in innovating services and products(Mohamed, 2020)

Digital transformation can be defined as “an electronic system that facilitates government agencies to define their services and set their goals and action plan to transform them from traditional services to electronic ones to raise the level of their electronic development to publish government services information on the national portal for e-government transactions with the aim of facilitating beneficiaries’ access to government services and raising the level of transparency, and evaluating The extent of progress in electronic services in a correct and accurate manner(Kreitstshtein, 2017)

It is also known as “transformation in business or government, i.e. making radical changes that affect the business model, operations, and procedures. The transformation may involve the process of changing the product or the method of providing the service completely, and it may be

a strategy that interferes in the entire functions of the organization, from sales to supply, information technology, and the entire value chain( Nieminen ,2014)

It is a form of electronic documentation, where the digitization process is carried out by transferring the document on an electronic medium. It takes two forms: digitization in the form of an image and digitization in the form of text, meaning that some modifications and transformations can be made to it after processing the text with the help of a special character recognition program(Landeta Echeberria, 2020).

We conclude from the previous definitions that digital transformation requires the presence of a business model and technical and digital capabilities that are combined to produce innovative services and products compared to traditional means of providing services, as well as developing operational efficiencies, reducing costs, and attracting a larger audience and customers to achieve competitive advantage(Ibukun & Ruzhanskaya, 2021).

### **2.1.2 The origins of digital transformation:**

The emergence of digital transformation has gone through a number of revolutions as follows (Ibukun& Ruzhanskaya,2021).

The First Industrial Revolution began at the end of the eighteenth century, when the mechanical manufacturing process was invented using steam and water. The Second Industrial Revolution erupted at the beginning of the twentieth century. At this time, the general industrialization process was implemented, relying on combustion engines and electricity to supply machines with energy. At this time, assembly paths were granted for the first time, and reliance was placed on modern chemicals and materials, and communication became Easier(Tylsar et al.,2019).

In the seventies of this stage, automation and robots were granted, which resulted in entering a new period called the Third Industrial Revolution, where electronics, information technology, computers, and the Internet are the beginning of the new information age. This stage began in 2015 until now, relying on tangible electronic production systems that connect the world with virtual and physical production. The industrial revolution and digital operations combine digital transformation processes and the integration of value chains and products (Balic & Ebrahimi, 2017).

### **2.1.3 The importance of digital transformation:**

In light of the speed of technological development and the intensification of competition, the system of transformation, especially what is happening to the global economy as a result of the recent global financial crisis, which has raised inflation rates in the most important countries of the world and which has forced organizations in those countries to search for opportunities in other developing countries that were not affected by the crisis, is considered a solution. Finance, due to its digital backwardness, and here the importance of digital transformation appears because it helps protect the organization from external threats, and allows it to benefit from opportunities before its competitors, and also adapt to the new rules of internal and external markets (Kaous et al., 2021).

### **2.1.4 Benefits of digital transformation:**

Digital transformation brings about a range of benefits for organizations. Firstly, it enables organizations to establish relationships with customers across borders through the internet, eliminating the need for physical presence in other countries. Secondly, digital transformation allows organizations to transition from paper-based management to digital management. This

facilitates faster decision-making and improves service performance by enabling efficient data storage and information transfer(Reis et al.,2018).

Thirdly, digital companies often enjoy a monopoly due to network effects, usage restrictions, and multifaceted systems such as e-commerce platforms. Fourthly, digital transformation enables the digitization of products, allowing for the exchange of various electronic goods such as written information, pictures, videos, and software(Schwertner,2017).

Fifthly, digital transformation emphasizes the importance of intangible assets, including intellectual property, which can be leveraged for competitive advantage. Sixthly, size becomes crucial in the digital economy, as the value of digital platforms often increases with the number of users. This is significant considering the large fixed costs associated with digital platforms. Seventhly, digital transformation creates value in data, providing opportunities for user and customer engagement. Organizations can leverage data to gain insights, personalize experiences, and improve decision-making. Lastly, digital transformation introduces new payment methods in the field of e-commerce, facilitating various forms of electronic payment and transaction settlement(Toanca,2016).

### **2.1.5 Digital transformation goals**

Digital transformation aims to achieve several objectives, including enhancing the quality of services and making procedures easier for beneficiaries. It also contributes to developing and improving organizational and operational efficiency. Digital transformation provides the opportunity to expand, reach new categories of customers, and offer innovative and creative services away from traditional methods(Al- Falooi &Ward,2021).

In addition, digital transformation helps increase productivity, ideas, and competitiveness. It offers developing country organizations the opportunity to connect with global markets and facilitates supply chains and financial inclusion.

#### **2.1.6 Dimensions of digital transformation:**

Digital transformation is considered one of the important means of developing societies, eliminating manifestations of corruption in them, and taking it towards progress and development. Therefore, all countries have sought to establish electronic governments to improve their services to achieve the highest rates of quality and transparency in them, and to exploit all the advantages it provides, as it is one of the effective methods for providing services. To the consumer and deliver it as quickly as possible, and to learn about the reality of electronic transformation, it is possible to address the determinants of digital transformation and some of the main indicators and requirements(Sousa & Rocha,2019).

to four dimensions of digital transformation, These are the decisions that concern the organization's relationship with the external environment. It is a type of leadership that aims to identify the needs of employees in the organization, work to satisfy them, and calls for developing employees' capabilities to keep pace with changes and developments. It is the set of values, foundations and concepts prevailing among employees in the organization. They are all employees of the organization, and each individual has different job tasks that are integrated with each other to achieve the organization's desired goals(Fonseca & Picoto,2020).

Spreading the culture of digital transformation: The presence of a strong organizational culture is extremely important for improving the sharing of resources, knowledge, skills, development, and the organization's adaptation as a whole to new practices. It also plays an

important role in encouraging the organization's members and customers to adopt these practices

Technical requirements: The digital transformation process requires the use of a set of specialized devices, operating systems, software and storage media that are operated by information centers and technical environments using all assets(Verina, & Titko, 2019).

Procedural requirements: The digital transformation process requires establishing sound procedural rules for using and storing customer data in a safe manner, through developing an information security strategy that ensures controlling the privacy of information and data and ensuring their effectiveness, as the organization issues rules and regulations that allow for easy digital transformation and meet the business needs of By establishing organized rules to prevent electronic theft, theft and violation of information privacy(Sainger,2018).

#### **2.1.7 Digital transformation techniques:**

Previous studies indicate that there are many new digital technologies that have been used in many sectors and have influenced them, and the most important of these technologies are: the Internet of Things, mobile devices, cloud computing, and social media (Naseer, 2021).

The Internet of Things is a modern technological phenomenon resulting from new developments in information technology and the Internet. What is meant by the Internet of Things is to connect many devices and things surrounding the Internet with the ability to control them through mobile devices. The main goal of implementing the Internet of Things in companies is to digitize it. Transforming traditional companies that focus on physical objects into data-driven companies in order to add value to the product(Sainger,2018).

These are portable device technologies that have an Internet connection based on wireless communications, such as smart mobile phones and tablet computers.

Cloud computing: After the widespread spread of the Internet and tremendous technological development, users moved from the infrastructure of classical information technologies, which provides a local scope and limited service opportunities. The cloud is defined as a huge network of computers connected in one network that works in parallel and can be accessed publicly. Over the Internet, and unlike traditional computing, cloud computing has many advantages, including(Vial,2021).

- Cloud computing provides the opportunity to store data anytime and anywhere.
- It can be easily accessed through internet connected devices such as mobile devices and desktop computers.
- Information systems based on them provide more efficient data processing capabilities.

Social media: Social media includes several platforms, including: Twitter, Facebook, Instagram, YouTube, LinkedIn, and the main feature of social media is the ability to communicate with others from all over the world and access, share and disseminate information on a continuous and regular basis.

#### **2.1.8 Steps for digital transformation**

As a digital strategist, my role involves developing and implementing a comprehensive digital strategy for the organization. This includes assessing the current digital capabilities of the organization and determining ways to measure and improve them. I also work on adjusting the organizational structure to be more flexible and adaptable to the digital strategy, which may involve changes to processes, systems, and staffing(Crissi et al.,2021).

In addition to this, I identify and address any challenges or difficulties that may arise during the digital integration process. This can include issues related to technology, data management,

and employee skills and training. To ensure the success of the digital transformation, I establish a dedicated digital transformation unit responsible for tracking and managing the process. This unit serves as a centralized hub for all digital initiatives and helps to ensure that the organization is moving in a cohesive and coordinated direction with its digital strategy(Khitskov et al.,2017).

#### **2.1.9 Digital transformation models:**

Management literature refers to many models of transformation from the traditional organization to the digital organization. The following are the most important models applied to the digital transformation of organizations (Teichert,2019).Through which traditional organizations are transformed into digital organizations using operations research, computer science, and management sciences without focusing on the behavioral aspect of the organization, this leads to a high rate of resistance and rejection of electronic applications in decision-making.

It depends on the interaction between technical variables and behavioral and organizational variables when implementing transformation processes. Behavioral model: It focuses on behavioral variables more than technical variables, especially in software development. Digital transformation is based on subscribing to an international or local information network for a specific period until the transformation is completed, or relying on an information company to provide the service in partnership(Heilig et al.,2017).

It relies on a group of communications and information companies instead of a single company in managing digital files. It depends on the capabilities of financial institutions to transform from the paper model to the digital model, and then financing is done gradually in light of the organization's business volume and financial position, and it does not require analytical feasibility studies or measuring digital needs in advance. This system assumes that

communications and information are capital assets of the organization. The organization's position in the activity or sector to which it belongs is also determined according to the information and communications technology that the organization possesses. This model is based on the necessity and importance of networking for information and communications technology to achieve goals and the benefit of the Internet to support political decisions(Porfirio et al., 2021).

This model is based on measuring companies' competitive positions and continuous development in the information and communications system according to competitors' trends and the requirements of decision makers. Where the transfer is through renting computers and completing the work of others, and the transfer philosophy is based on the experience of companies specialized in communications and information technology and program and systems analysis being much broader than the experiences of the users of that technology. This model is based on the philosophy of systems and the desire for integrated transformation of all organizational levels and departments to build the digital institution(Bonnet & Westerman,2020).

#### **2.1.10 Levels of digital transformation:**

Digital transformation typically occurs on three levels: at the leadership level, where the organization adopts and supports the transformation and keeps up with its developments; at the strategy level, where digital transformation becomes central to the organization's mission and is reflected in its objectives; and at the cultural level, where the effects of digital transformation are apparent in all details of the institution, including employees, work environment, procedures, standards, and values(Ivančić et al.,2019).

#### **2.1.11 Digital transformation requirements**

Providing the basic structures and strategies involved in building electronic platforms, as building platforms requires creating an interactive medium on the Internet that activates communication between government organizations and between them and citizens and between them and their providers. Solve existing problems in real life before switching to the digital environment, including existing problems of documentation and electronic signature(Piccinini et al.,2015).

Solving the legal problems of commercial exchanges and providing their regulatory and technical means, as all exchanges that deal with money must be placed on the Internet, such as the possibility of paying fees and various government bills directly online, and making this process interactive, meaning that it is extended to include everyone who performs commercial transactions with government institutions (Fenech et al.,2019).

#### **2.1.12 Obstacles facing digital transformation:**

Digital transformation faces several challenges, including the scarcity of technical skills among employees, coordination issues, and organizational culture problems. According to (Albukhitan,2020)the lack of technical skills is a significant factor that must be considered when preparing and formulating a digital strategy. Moreover, coordination is crucial, and the absence of good communication between individuals and the strategic summit can lead to the failure of the digital transformation process. Organizational culture is another challenge that can hinder digital transformation, as it may be based on outdated values, beliefs, customs, and myths that resist change.

Other organizational challenges include the absence of a sense of need, lack of cooperation, team spirit, and teamwork, weak infrastructure related to information and communication

technology, fear of failure, lack of competence and experience of organizational staff, and lack of financing and financial capabilities. Additionally, legislation and laws can also constitute an obstacle to digital transformation, making it slow and causing losses to the region(Icolás-Agustín, et al.,2022).

To overcome these challenges, it is essential to have a well-planned digital strategy that takes into account the organization's specific needs and constraints. The strategy should also be communicated effectively to all stakeholders to ensure everyone is on the same page. Furthermore, the organization should invest in training and development programs to enhance the technical skills of its employees and foster a culture of innovation and change. Finally, the organization should establish a digital transformation unit to track and manage the digital transformation process, provide support and training to employees, and ensure that the organization's digital strategy remains aligned with its overall goals(Kane,2019).

#### **2.1.13 Effects of digital transformation:**

Digital transformation has a significant impact on companies, leading to fundamental changes in the way they work and their business models. It enables the introduction of new business models that rely on digital technology platforms. Digital transformation also increases production efficiency, providing new opportunities to improve and develop operations, leading to higher levels of productivity and work efficiency(Nasser,2021).

In addition, digital transformation improves the work environment by enhancing occupational safety through the use of sensors in the workplace. It also provides flexibility, enabling organizations to quickly adapt to changes in environmental conditions and meet changing market needs. Furthermore, digital transformation supports the decision-making process by

increasing the information available to management and providing new types of information from various sources, thereby improving the quality of administrative decisions (Danneels & Viaene, 2022).

#### **2.1.14 Risks of digital transformation**

Digital technologies and resources have become an integral part of the culture, processes and values of organizations and their stakeholders, and this has forced a major shift in how technologies are used within organizations to support these processes (Brosnan, et al, 2023).

Companies and organizations in various sectors have realized the risks of digital transformation, and one of the most prominent risks they face is that despite the many advantages that digital technology offers to institutions and their customers, modern technology has many risks that many institutions are exposed to. Digital transformation can destroy, leading to... Negative effects on competition between banks and companies in terms of speed, prices, and customer retention, and may result in many operational risks related to digital transformation. Organizations may be exposed to many processes represented by lack of information, external interference, and human errors, in addition to data quality and protection (Bilyalova et al., 2020)).

In addition, there are additional risk factors, including: Cyber risks: Due to digital technological developments, many companies and institutions rely on complex information technology systems and software for the purpose of operation, and these systems can be complex and require a long time to complete their work, and this leads to their exposure. To external and internal threats, which leads to reduced transparency in operations and weak business models due to disruptions in the work of service providers (Morze & Strutynska, 2021)

Digital transformation involves a heavy reliance on digital technologies, which can increase the risks associated with this process. The large number of connected devices can also increase the size of targeted sites, posing additional risks. Digital innovation can go beyond electronic security measures, making it difficult to fully protect against threats. Furthermore, the integration between information technology systems, the Internet, and operational technology can create new vulnerabilities and increase the complexity of managing security(Tekic& Koroteev,2019).

## **2.2. The efficiency of operations**

### **2.2.1. Measuring Operational Efficiency**

Improving operational efficiency begins with measurement, which involves assessing the ratio of output to input. While many companies tend to focus on measuring inputs such as unit production cost or man-hours per unit, it's essential to recognize that operational efficiency encompasses both input and output aspects. Solely relying on input indicators like unit production cost can be limiting. Instead, companies should establish, measure, and monitor various performance indicators across both input and output dimensions. The specific performance indicators will vary depending on the industry, but typically, they fall into these categories(Morze, 2021).

#### **Input:**

- Operational expenditure (OPEX)
- Capital expenditure (CAPEX)
- Headcount (including partner headcount)

#### **Output:**

- Revenue
  - Customer numbers/distribution across segments
  - Quality

- Growth
- Customer satisfaction

By comparing and analyzing these indicators, companies can gain a comprehensive understanding of their operational efficiency and identify areas for improvement.

### **2.2.2. Comparing Operational Efficiency**

When aiming to compare metrics with industry peers through benchmarking, it's crucial to define, measure, and track performance indicators related to load and complexity as well. Even within the same industry, variations in customer behavior between different markets or countries can significantly impact resource allocation and costs. Failing to account for such load and complexity factors can lead to inaccurate assessments of operational efficiency.

When interpreting the quantitative results of benchmarking, strategic differentiation must be taken into account. Costs stem from the execution of activities, and cost advantage emerges from executing specific activities more efficiently than competitors. Similarly, differentiation arises from both the selection of activities and how they are executed( Danneels,2021).

Qualitative interpretation of benchmarking results necessitates consideration of the company's strategy and those of its peer group members. Neglecting this can result in misattributing quantitative results to inefficiencies rather than strategic choices. For instance, one company may pursue a low-price differentiation strategy, requiring low unit production costs and efficient distribution. Conversely, another company may prioritize premium quality differentiation, where unit production costs are less critical but customer satisfaction, loyalty, and high revenue per customer are paramount. Understanding actual quality levels is also essential in this context(Kane,2019).

### **2.2.3. Improving Operational Efficiency**

To enhance operational efficiency, companies typically consider several alternatives, with the most common being:

1. "Same for less": Achieving the same output with reduced input.
2. "More for same": Generating more output with the same input.
3. "Much more for more": Producing significantly more output with increased input.

It's a widespread misconception that reducing costs in absolute terms always accompanies operational efficiency improvements. While this holds true for the "same for less" alternative, it's not the case for the other two. Increasing costs can indeed be operationally efficient if the output grows proportionally more.

For instance, a manufacturing company might achieve "same for less" by streamlining operations through centralization, automation, or process optimization, thereby reducing total personnel costs while maintaining production volume.

In contrast, a "more for same" approach could involve a manufacturing company decreasing the production of defective products without additional resources, potentially reducing after-sales costs. This might be facilitated by implementing quality management systems, enhancing personnel training programs to focus on quality, or setting higher quality standards for subcontractor agreements(Sainger,2018).

As for "much more for more," a manufacturing company might invest in a new production facility capable of producing refined products that command a premium price, offsetting the additional costs. Similarly, a service company might expand its customer service offerings to boost satisfaction and loyalty, ultimately justifying the increased investment.

Each of these alternatives represents different paths to improving operational efficiency, tailored to the company's specific goals and circumstances.

### **2.3. Methods of Operational Efficiency**

Financial statement analysis aims to interpret and assess the significance of financial data, providing insights into past performance, forecasting future performance, and evaluating the financial strength of a firm. It involves evaluating a company's historical, current, and projected financial performance and condition to identify strengths and weaknesses, laying the groundwork for informed financial decision-making and planning (Teichert, 2019).

Key methods of financial analysis include:

1. Horizontal analysis: This involves comparing and interpreting similar items across financial statements from different accounting periods to assess changes over time.
2. Vertical analysis: This method compares and interprets two items or variables within the same financial statement for a given accounting period, helping to understand the composition of financial data.
3. Static and dynamic analysis: Static analysis examines the relationships among items within a single set of financial statements, while dynamic analysis tracks changes in these items across successive statements. Static analysis aligns with vertical analysis, while dynamic analysis corresponds to horizontal analysis.
4. Internal and external analysis: Internal analysis entails the examination of financial data by a company's management for internal decision-making purposes. External analysis involves the review of financial statements by external parties such as investors, lenders, government agencies, creditors, and customers to make relevant decisions.

These methods provide various perspectives for assessing a company's financial health and performance, facilitating informed decision-making by both internal stakeholders and external parties.

#### **2.2.4. Techniques of Operational Efficiency**

Several widely used techniques, or tools, in financial analysis include:

**Ratio Analysis:** This involves studying the arithmetic relationships between different financial figures. Ratios are computed to assess aspects such as profitability, liquidity, solvency, leverage, valuation, and turnover of a company.

**Trend Analysis, Common Size Statement Analysis, and Comparative Statement Analysis:** Trend analysis examines the variations of significant items over a series of financial statements, providing insights into business performance over time. Common size statements express all items as percentages of a common base, facilitating comparisons and analysis of changes in proportions. Comparative statement analysis involves comparing financial statements from different periods to identify trends and patterns(Bonnet , 2020).

**Funds Flow Analysis:** This analysis, also known as the statement of sources and uses of funds, tracks the movement of funds within a company over a specific period. It helps understand changes in the structure of assets, liabilities, and owner's equity.

**Cost-Volume-Profit (CVP) Analysis:** CVP analysis, or break-even analysis, evaluates how changes in output volume affect profit levels by considering variable and fixed costs. It aids in profit planning and decision-making under varying business activity levels and pricing scenarios.

**Index Analysis:** Index analysis involves expressing items in comparative financial statements relative to a base year, with all items in the base year set to a value of 100. This facilitates comparisons of performance over time(Piccinini et al.,2015).

**Leverage Analysis:** Leverage analysis assesses the impact of one financial variable on another. Financial leverage measures the effect of changes in earnings per share due to variations in book

profits, while operating leverage evaluates the impact of changes in production and sales quantities on profits. Total leverage considers the combined effects of financial and operating leverage.

Balanced Scorecard: This approach integrates financial and non-financial performance measures to provide a comprehensive view of a company's performance. It focuses on four perspectives: financial, customer, internal business, and learning and growth, linking objectives and measures through cause-and-effect relationships to aid in strategy execution and performance evaluation.

These techniques offer valuable insights into a company's financial health and performance, aiding decision-making and strategic planning processes(Fenech et al., 2019).

### **2.3. Summary of past studies**

#### **1. Study by (Martínez-Caro, et al., 2020).Title: Digital technologies and firm performance: The role of digital organizational culture.**

In their 2020 study, Martínez-Caro, Cegarra-Navarro, and Alfonso-Ruiz delved into the intricate interplay between digital technologies and firm performance, with a specific emphasis on the pivotal role played by digital organizational culture. Their research sought to unravel the ways in which the adoption and assimilation of digital technologies within the organizational fabric influence overall performance metrics. By scrutinizing this relationship, the researchers aimed to furnish valuable insights into how companies can strategically harness digitalization to bolster their competitive edge and operational efficacy amidst the dynamic landscape of digital transformation. The researchers aim to understand how digital technologies impact firm performance and how the organizational culture around digitalization influences this relationship. The study employs a quantitative research approach and collects data from a sample of firms in the Spanish manufacturing sector. The findings of the study reveal that the adoption and use of digital technologies positively affect firm performance. Additionally, the study highlights the

crucial role of digital organizational culture as a mediator in this relationship. The presence of a digital organizational culture, characterized by openness to change, digital skills, and effective communication, enhances the positive impact of digital technologies on firm performance. The research emphasizes the significance of fostering a digital organizational culture to maximize the benefits of digital technologies and improve firm performance.

## **2. Study by (Haleem et al., 2022).Title: Understanding the role of digital technologies in education**

The study conducted by Haleem, Javaid, Qadri, and Suman (2022) aims to provide a comprehensive review of the role of digital technologies in education. The researchers seek to understand how digital technologies are being utilized in educational settings and their impact on teaching and learning processes. The study employs a systematic literature review approach, analyzing a range of relevant studies. The findings of the study highlight several key aspects. Firstly, digital technologies have revolutionized the way educational content is delivered, making it more interactive, engaging, and accessible. These technologies offer diverse resources such as online courses, educational apps, and virtual reality tools that enhance the learning experience. Secondly, digital technologies support personalized learning, allowing students to learn at their own pace and style. They also facilitate collaboration and communication among students and teachers, enabling a more interactive and dynamic learning environment. Additionally, the study emphasizes the potential of digital technologies in bridging the educational gap, particularly in underserved areas and remote locations. However, the researchers also acknowledge certain challenges, such as the need for digital infrastructure and digital literacy among educators and students. The research underscores the importance of integrating digital technologies effectively into educational practices, considering pedagogical principles and addressing the associated

challenges. Overall, the study provides insights into the significant role of digital technologies in transforming education and improving learning outcomes.

3. **Study by (Triwahyono et al., 2023). Title : Analyzing the role of technological innovation in improving the operational efficiency of MSMEs.**

The study conducted by (Triwahyono et al., 2023) focuses on analyzing the role of technological innovation in improving the operational efficiency of Micro, Small, and Medium Enterprises (MSMEs). The researchers aim to understand how technological innovations can positively impact the operational efficiency of MSMEs and contribute to their overall performance. The study utilizes a combination of quantitative and qualitative research methods, including surveys and interviews, to gather data from MSMEs. The findings of the study indicate that technological innovation plays a significant role in enhancing various aspects of operational efficiency, such as production processes, inventory management, customer relationship management, and decision-making. The study emphasizes the importance of MSMEs embracing technological innovations to stay competitive in the market and achieve sustainable growth. The research provides valuable insights and recommendations for MSMEs seeking to leverage technological innovation to enhance their operational efficiency and business performance.

4. **Study by (Lee et al., 2023).Title: Adopting smart supply chain and smart technologies to improve operational performance in manufacturing industry**

The aim of the study conducted by Lee et al. (2023) is to explore the adoption of smart supply chain and smart technologies to improve operational performance in the manufacturing industry. The study focuses on understanding the impact of these technologies on various aspects of operational performance, such as cost reduction, quality improvement, delivery reliability, and flexibility. The researchers conducted a comprehensive literature review and collected data from

manufacturing firms to analyze the relationship between the adoption of smart technologies and operational performance. The findings of the study suggest that the adoption of smart supply chain and smart technologies can significantly enhance operational performance in the manufacturing industry. The study provides valuable insights for manufacturing firms looking to leverage these technologies to improve their operations and gain a competitive advantage.

5. **Study by (Lee et al., 2024).Title : Digital supply chain transformation: The role of smart technologies in operational performance in manufacturing industry**

The study focuses on understanding the impact of these technologies on various aspects of operational performance, such as cost reduction, quality improvement, delivery reliability, and flexibility. The researchers conducted a comprehensive literature review and collected data from manufacturing firms to analyze the relationship between the adoption of smart technologies and operational performance. The findings of the study suggest that the adoption of smart supply chain and smart technologies can significantly enhance operational performance in the manufacturing industry. The study provides valuable insights for manufacturing firms looking to leverage these technologies to improve their operations and gain a competitive advantage

## **Chapter3: Research Methodology**

### **3.1. Introduction**

During this chapter, the methodology of the study that was followed during the research will be presented by presenting the methodology used as well as a description of the sample that was applied to it, in addition to a comprehensive and accurate description of the tool that was used and the method used in its preparation and displaying the extent of its validity and reliability, in addition to clarifying the statistical methods and treatments used. It was mainly relied upon in analyzing the hypotheses of the study in order to reach reliable scientific results.

### **3.2. Research Design**

This study was conducted to answer the questions that were raised, and therefore the study relied on the quantitative approach to identify the impact of modern technology on marketing management in the Kingdom of Saudi Arabia

### **3.3. The Research Sample**

A random sampling method was used to select the study sample. Where the questionnaire was applied electronically via social networking sites to obtain the study sample, and the study sample consisted of (131) individuals from marketer and influencer in the Kingdom of Saudi Arabia, and the following table shows the characteristics of the sample:

**Table 1 Showing the Characteristics of the research sample.**

| <b>Characteristics</b> | <b>Sub Characteristics</b> | <b>N</b> | <b>%</b> |
|------------------------|----------------------------|----------|----------|
| <b>Age</b>             | 25- 35                     | 58       | 44.3     |
|                        | 36- 45                     | 67       | 51.1     |
|                        | 46 To Above                | 6        | 4.6      |
| <b>Gender</b>          | Male                       | 52       | 39.7     |
|                        | Female                     | 79       | 60.3     |
| <b>Educational</b>     | High                       | 44       | 33.6     |

|                          |                     |            |             |
|--------------------------|---------------------|------------|-------------|
|                          | Master              | 77         | 58.8        |
|                          | Doctorate           | 10         | 7.6         |
| <b>Seniority at work</b> | less than 5 years   | 68         | 51.9        |
|                          | From 5 to 10 years  | 45         | 34.4        |
|                          | From 11 to 15 years | 18         | 13.7        |
| <b>Total</b>             |                     | <b>131</b> | <b>100%</b> |

### 3.4. Study Tools

#### 3.4.1. Tool Description

The study tool consisted of a questionnaire applied electronically, and the questionnaire consisted of two main parts:

- The first part: contains the basic data of the study sample.
- The second part: related to the items of the questionnaire, and it was divided into Four sub-axes, as follows:
  1. What is the reality of applying digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia? It consists of 5 Items.
  2. What is the impact of digital technology on improving the efficiency of operations in companies in the Kingdom of Saudi Arabia? It consists of 5 items.
  3. What are the challenges facing the application of digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia? It consists of 5 items.

The questionnaire will be used to collect data through the five-point Likert scale, which can be expressed through the following table:

**Table 2 The five- point Likert scale**

|               |                   |       |         |          |                      |
|---------------|-------------------|-------|---------|----------|----------------------|
| Term          | Strongly<br>Agree | Agree | Neutral | Disagree | Strongly<br>Disagree |
| Answer degree | 5                 | 4     | 3       | 2        | 1                    |

### **3.4.2. The Validity**

Internal consistency was used to measure the validity of the tool by assessing the extent to which each item of the questionnaire is consistent with its corresponding construct. Pearson correlation coefficient was used to measure the correlation between each item and the total score of the construct it belongs to, as shown in the following table:

**Table 3 measure the correlation between each item and the total score of the construct**

| No | Pearson<br>correlation | Sig.(2-<br>tailed) | No | Pearson<br>correlation | Sig.(2-<br>tailed) | No | Pearson<br>correlation | Sig.(2-<br>tailed) |
|----|------------------------|--------------------|----|------------------------|--------------------|----|------------------------|--------------------|
| 1  | 0.455                  | 0.000              | 1  | 0.621                  | 0.000              | 1  | 0.682                  | 0.000              |
| 2  | 0.561                  | 0.000              | 2  | 0.376                  | 0.000              | 2  | 0.540                  | 0.000              |
| 3  | 0.536                  | 0.000              | 3  | 0.675                  | 0.000              | 3  | 0.634                  | 0.000              |
| 4  | 0.695                  | 0.000              | 4  | 0.474                  | 0.000              | 4  | 0.544                  | 0.000              |
| 5  | 0.678                  | 0.000              | 5  | 0.716                  | 0.000              | 5  | 0.652                  | 0.000              |

Through this table, it is evident that all items have correlation coefficients ranging from 0.376 to 0.675, and all of them were significant at a significance level of (0.000), indicating that the questionnaire has a high level of reliability.

### **3.4.3. The Reliability**

To calculate the questionnaire's reliability coefficient, we used Cronbach's alpha coefficient to determine the degree of stability of the tool. The following table shows the reliability coefficient.

**Table 4 Shows the results of Cronbach's alpha coefficient.**

| <b>The dimension</b> | <b>Number of phrases</b> | <b>Axis stability</b> |
|----------------------|--------------------------|-----------------------|
| <b>AX1</b>           | 5                        | 0.78                  |
| <b>AX2</b>           | 5                        | 0.74                  |
| <b>AX3</b>           | 5                        | 0.75                  |

The previous table shows that the questionnaire has a high level of reliability, where the Cronbach's alpha coefficient values for the questionnaire's axes ranged from 0.74 to 0.78. This indicates that the scale has a high level of stability, meaning that the results are consistent each time the scale is applied. Therefore, this questionnaire can be relied upon to generalize the results.

### **3.5. Data Collections Procedures**

In the beginning, the questionnaire was designed by looking at the previous studies about the research, and through the theoretical frameworks that were collected. After designing the questionnaire, it was presented to several arbitrators, and the necessary amendments were made through deletion and addition.

Then both the validity and reliability criteria of the tool were calculated. After that, the questionnaire was prepared electronically and distributed for the use of social networking sites such as Facebook and WhatsApp, and after application, data were collected to reach reliable scientific results.

### **3.6. Method of Analysis**

The data collected from the sample were entered using the program (SPSS-V.22). The statistical methods that were used to process the data varied, including:

- Cronbach's Alpha coefficient to ensure consistent performance.

- Use frequencies and percentages to determine the significance of the sample's responses to the questionnaire items.
- Correlation coefficient for the calculation of honesty.
- Regression analysis.

## Chapter 4: Analysis and Results

### 4.1. Introduction:

This chapter discusses the statistical analysis of the collected data. It consists of a set of analytical processes that are followed to obtain clear and meaningful scientific information and results that meet the objectives of the study and answer its research questions.

### 4.2. Research Findings

#### 4.2.1. First Question Result

Both means and standard deviations were used to analyze the reality of applying digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia? The results showed that... (the rest of the sentence is missing, please provide more context or information to complete the translation).

**Table 5 the reality of applying digital technology to improve the efficiency of operations**

| No | phrases                                                                                                                                                                                            | Mean | SD    | Order |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|-------|
| 1  | The Saudi government is actively promoting digital transformation through initiatives such as Vision 2030                                                                                          | 3.85 | 0.799 | 1     |
| 2  | The availability and quality of technology infrastructure, such as high-speed Internet connectivity and cloud computing services, play a critical role in enabling digital transformation efforts. | 3.63 | 1.069 | 3     |

|   |                                                                                                                                                                                                             |      |       |   |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|---|
| 3 | Automation reduces human error, increases speed, and frees up employee time to focus on higher-value activities.                                                                                            | 3.85 | 0.881 | 2 |
| 4 | Digital technology allows businesses to better understand their customers and deliver personalized experiences to them.                                                                                     | 3.35 | 1.088 | 8 |
| 5 | Digital tools such as project management software, cloud collaboration platforms, and video conferencing tools facilitate communication and collaboration between teams, regardless of geographic locations | 3.62 | 0.976 | 4 |

The previous table shows the results of the axis of the questionnaire that measures the reality of applying digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia Where it was found that item (1) which stipulated “The Saudi government is actively promoting digital transformation through initiatives such as Vision 2030.” The highest arithmetic mean (3.85) and standard deviation (0.799) were obtained, followed by item (3), which stated: “Automation reduces human error, increases speed, and frees up employee time to focus on higher-value activities.” With an arithmetic mean value of (3.85), and a standard deviation of (0.816). Then item (2), which stated: “The availability and quality of technology infrastructure, such as high-speed Internet connectivity and cloud computing services, play a critical role in enabling digital transformation efforts.” With an arithmetic mean value of ( 3.63), and a standard deviation of (0.881).

The results indicate that the Saudi government is actively promoting digital transformation through initiatives such as Vision 2030 and that “automation reduces human error, increases speed, and frees employee time to focus on higher-value activities where the availability and quality of

technological infrastructure, such as high-speed Internet connectivity and services, come into play.” Cloud computing plays a crucial role in enabling digital transformation efforts

#### 4.2.2. Second Question result

To understand the impact of digital technology on improving the efficiency of operations in companies in the Kingdom of Saudi Arabia, the results have shown that.

**Table 6 the impact of digital technology on improving the efficiency of operations**

| No | Phrase                                                                                                                                                                                      | Mean | S. D  | order |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|-------|
| 1  | Digital communication tools, such as email, instant messaging, and collaboration platforms, facilitate real-time communication and collaboration between employees, teams, and departments. | 3.63 | 1.024 | 3     |
| 2  | Digital tools and platforms enable companies to streamline their business processes by digitizing workflows, eliminating paper-based processes, and reducing manual intervention.           | 3.65 | 0.976 | 2     |
| 3  | Digital technologies provide businesses with greater flexibility and scalability to adapt to changing business conditions, market dynamics and customer demands.                            | 3.51 | 1.091 | 5     |

|   |                                                                                                                                                                                                                                                      |      |       |   |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|---|
| 4 | Advanced analytics tools and techniques help companies gain valuable insights into their operations, customer behavior, market trends, and performance metrics.                                                                                      | 3.60 | 1.087 | 4 |
| 5 | The impact of digital technology on improving operational efficiency in businesses is transformative, enabling organizations to streamline operations, enhance productivity, improve resource allocation, and deliver superior customer experiences. | 3.81 | 1.024 | 1 |

The previous table shows the results of the axis of the questionnaire that measures the impact of digital technology on improving the efficiency of operations in companies in the Kingdom of Saudi Arabia Where it was found that item (5) which stipulated “The impact of digital technology on improving operational efficiency in businesses is transformative, enabling organizations to streamline operations, enhance productivity, improve resource allocation, and deliver superior customer experiences..” The highest arithmetic mean (3.81) and standard deviation (1.024) were obtained, followed by item (2), which stated: “Digital tools and platforms enable companies to streamline their business processes by digitizing workflows, eliminating paper-based processes, and reducing manual intervention..” With an arithmetic mean value of (3.65), and a standard deviation of (0.976). Then item (1), which stated: “Digital communication tools, such as email, instant messaging, and collaboration platforms, facilitate real-time communication and collaboration between employees, teams, and departments..” With an arithmetic mean value of (3.63), and a standard deviation of (1.024).

The results indicate the impact of digital technology: “Improving operational efficiency in companies is transformative, as it enables organizations to streamline operations, enhance productivity, improve resource allocation, and deliver superior customer experiences. Digital tools and platforms enable companies to streamline their business processes by digitizing workflows, eliminating paper-based processes, reducing manual intervention. Digital communication tools, such as email, instant messaging, and collaboration platforms, facilitate real-time communication and collaboration between employees, teams, and departments.

#### 4.2.3. Third Question result

**Table 7 the challenges facing the application of digital technology to improve the efficiency of operations in companies**

| No | Phrase                                                                                                                                                    | Mean | S. D  | Order |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|-------|
| 1  | As digitalization increases, so does exposure to cybersecurity threats, such as data breaches, malware attacks, and ransomware.                           | 3.82 | 0.866 | 2     |
| 2  | Integrating digital solutions with existing systems is complex and time-consuming, requiring customization, data migration, and interoperability testing. | 3.62 | 1.019 | 5     |
| 3  | Many companies operate with legacy systems and processes that may not easily adapt to new digital technologies.                                           | 3.76 | 0.929 | 3     |

|   |                                                                                                                                              |      |       |   |
|---|----------------------------------------------------------------------------------------------------------------------------------------------|------|-------|---|
| 4 | Implementing digital technologies requires a significant upfront investment in hardware, software, training, and infrastructure.             | 3.93 | 0.843 | 1 |
| 5 | Collecting, storing and processing large amounts of data raises concerns about data privacy and compliance with regulations such as the GDPR | 3.75 | 0.931 | 4 |

The previous table shows the results of the axis of the questionnaire that measures the challenges facing the application of digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia Where it was found that item (4) which stipulated “Implementing digital technologies requires a significant upfront investment in hardware, software, training, and infrastructure.” The highest arithmetic mean (3.93) and standard deviation (0.843) were obtained, followed by item (1), which stated: “As digitalization increases, so does exposure to cybersecurity threats, such as data breaches, malware attacks, and ransomware.” With an arithmetic mean value of (3.82), and a standard deviation of (0.866). Then item (3), which stated: “Many companies operate with legacy systems and processes that may not easily adapt to new digital technologies” With an arithmetic mean value of ( 3.76), and a standard deviation of (0.929).

The results indicate that implementing digital technologies requires significant upfront investment in hardware, software, training, and infrastructure. As digitization increases, exposure to cybersecurity threats increases, such as data breaches, malware attacks, and ransomware. Many companies operate with legacy systems and processes that may not adapt easily. With new digital technologies

### **4.3. Research Recommendations**

Identify repetitive and rule-based tasks within your operations and automate them using RPA. This technology can handle tasks such as data entry, invoice processing, and report generation, freeing up valuable employee time and reducing errors.

Move your operations to the cloud to enhance scalability, flexibility, and collaboration. Cloud-based tools and platforms provide easy access to data and applications from anywhere, streamline collaboration among teams, and eliminate the need for on-premises infrastructure maintenance.

Utilize data analytics tools to gain insights into your operations and identify areas for improvement. Analyze operational data to optimize processes, reduce waste, and enhance resource allocation. Use predictive analytics to anticipate demand patterns, optimize inventory levels, and improve supply chain efficiency.

Integrate all your core business functions, such as finance, HR, procurement, and inventory management, into a single ERP system. This allows for seamless data flow, real-time visibility, and improved coordination across departments, leading to streamlined operations and improved efficiency.

Deploy IoT devices to monitor and gather data from various operations and processes. This data can be used to identify inefficiencies, predict maintenance needs, and optimize resource utilization. For example, IoT sensors can track equipment performance, energy usage, or inventory levels.

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## **Appendixes**

# **SURVEY INSTRUMENT**

**Dear Employee,**

The purpose of our current research is to investigate " The role of digital technology in improving the efficiency of operations in companies in the Kingdom of Saudi Arabia" in order to obtain a master's degree. We will collect data by asking you to answer questions in a questionnaire. Your responses are crucial in achieving the objectives of the study, and we value your practical experience. It is important that you answer the questionnaire items clearly and impartially as this will help us to obtain reliable scientific results. We assure you that your answers will be kept strictly confidential and will only be used for scientific purposes. Your contribution to this study is greatly appreciated.

**Thank you.**

## 1. Demographic data

Please answer the following questions

|                           |                          |                           |                            |
|---------------------------|--------------------------|---------------------------|----------------------------|
| <b>Age:</b>               |                          |                           |                            |
| <b>Gender:</b>            |                          |                           |                            |
| <b>Department:</b>        |                          |                           |                            |
| <b>Educational level:</b> | <b>High education</b>    | <b>Master degree</b>      | <b>Doctorate degree</b>    |
|                           |                          |                           |                            |
| <b>Seniority at work:</b> | <b>less than 5 years</b> | <b>From 5 to 10 years</b> | <b>From 11 to 15 years</b> |
|                           |                          |                           |                            |

## 2. Questionnaire terms

Please, mark with (✓) on your selection.

| 1. What is the reality of applying digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia? |                                                                                                                                                                                                    |                |       |         |          |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|
| No                                                                                                                                         | Term                                                                                                                                                                                               | Strongly agree | Agree | Neutral | disagree | Strongly disagree |
| 1                                                                                                                                          | The Saudi government is actively promoting digital transformation through initiatives such as Vision 2030                                                                                          |                |       |         |          |                   |
| 2                                                                                                                                          | The availability and quality of technology infrastructure, such as high-speed Internet connectivity and cloud computing services, play a critical role in enabling digital transformation efforts. |                |       |         |          |                   |
| 3                                                                                                                                          | Automation reduces human error, increases speed, and frees up employee time to focus on higher-value activities.                                                                                   |                |       |         |          |                   |
| 4                                                                                                                                          | Digital technology allows businesses to better understand their customers and deliver personalized experiences to them.                                                                            |                |       |         |          |                   |

|   |                                                                                                                                                                                                             |  |  |  |  |  |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| 5 | Digital tools such as project management software, cloud collaboration platforms, and video conferencing tools facilitate communication and collaboration between teams, regardless of geographic locations |  |  |  |  |  |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|

**2. What is the impact of digital technology on improving the efficiency of operations in companies in the Kingdom of Saudi Arabia?**

|   |                                                                                                                                                                                                                                                      |  |  |  |  |  |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| 1 | Digital communication tools, such as email, instant messaging, and collaboration platforms, facilitate real-time communication and collaboration between employees, teams, and departments.                                                          |  |  |  |  |  |
| 2 | Digital tools and platforms enable companies to streamline their business processes by digitizing workflows, eliminating paper-based processes, and reducing manual intervention.                                                                    |  |  |  |  |  |
| 3 | Digital technologies provide businesses with greater flexibility and scalability to adapt to changing business conditions, market dynamics and customer demands.                                                                                     |  |  |  |  |  |
| 4 | Advanced analytics tools and techniques help companies gain valuable insights into their operations, customer behavior, market trends, and performance metrics.                                                                                      |  |  |  |  |  |
| 5 | The impact of digital technology on improving operational efficiency in businesses is transformative, enabling organizations to streamline operations, enhance productivity, improve resource allocation, and deliver superior customer experiences. |  |  |  |  |  |

**3. What are the challenges facing the application of digital technology to improve the efficiency of operations in companies in the Kingdom of Saudi Arabia**

|   |                                                                                                                                                           |  |  |  |  |  |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|
| 1 | As digitalization increases, so does exposure to cybersecurity threats, such as data breaches, malware attacks, and ransomware.                           |  |  |  |  |  |
| 2 | Integrating digital solutions with existing systems is complex and time-consuming, requiring customization, data migration, and interoperability testing. |  |  |  |  |  |
| 3 | Many companies operate with legacy systems and processes that may not easily adapt to new digital technologies.                                           |  |  |  |  |  |
| 4 | Implementing digital technologies requires a significant upfront investment in hardware, software, training, and infrastructure.                          |  |  |  |  |  |
| 5 | Collecting, storing and processing large amounts of data raises concerns about data privacy and compliance with regulations such as the GDPR              |  |  |  |  |  |