Digital transformation in health institutions and its role in improving the quality of health care services in light of the Corona pandemic - the experience of the Kingdom of Saudi Arabia-

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Abstract:

Our study aims to identify the role played by digital transformation in health institutions in improving the quality of health services in light of the Corona pandemic. In order to answer the question and the problem posed, the descriptive approach was used, which allowed us to collect information and data and analyze it according to the requirements of the study.

The study reached a set of results, the most important of which is that in light of the outbreak of the Corona pandemic and despite its negative repercussions, it had an important role in moving towards the health digitization of the health sector, and activating e-health during the pandemic through an integrated set of electronic methods and technologies, which in turn contributed to the improvement of Health care services.

Through the experience of the Kingdom of Saudi Arabia, and thanks to electronic work in health institutions, represented by electronic systems, programs and applications such as "wasfaty", "Mawid", "Rasd and Sehha" and "electronic paramedic"...etc., the Kingdom was able to raise the level of readiness of its health institutions to tackle the Corona pandemic, and to raise the efficiency and quality of services, which increased the satisfaction of beneficiaries.

Keywords: digitization, digital transformation, health care services, Corona pandemic, electronic programs and applications, Saudi Arabia.

JEL Classification Codes:M31, M15,I1

ملخص:

تهدف هذه الدراسة إلى معرفة الدور الذي لعبه التحول الرقمي في المؤسسات الصحية في تحسين جودة الخدمات الصحية في ظل جائحة كورونا، وللإجابة عن التساؤل والأشكال المطروح تم استخدام المنهج الوصفي الذي سمح لنا بتجميع المعلومات والبيانات وتحليلها حسب متطلبات الدراسة.

وتوصلت الدراسة إلى جملة من النتائج أهمها أنه وفي ظل تفشي جائحة كورونا ورغم انعكاساتها السلبية، فقد كان لها دور مهم في التوجه نحو الرقمنة الصحية في القطاع الصحي، وتفعيل الصحة الالكترونية خلال الجائحة من خلال مجموعة متكاملة من الأساليب والتقنيات الالكترونية والتي ساهمت بدورها في تحسين وتميز خدمات الرعاية الصحية.

فمن خلال تجربة المملكة العربية السعودية وبفضل الأعمال الالكترونية في المؤسسات الصحية متمثلة في الأنظمة والبرامج والتطبيقات الالكترونية كتطبيق وصفتي وموعد ورصد وصحة والمسعف الالكتروني...الخ، تمكنت المملكة من رفع مستوى الجاهزية لمؤسساتها الصحية للتصدي لجائحة كورونا، ورفع كفاءة الخدمات وجودتها وزاد من رضا المستفيدين.

كلمات مفتاحية: الرقمنة، التحول الرقمي، خدمات الرعاية الصحية، جائحة كورونا، البرامج والتطبيقات الالكترونية، المملكة العربية السعودية.

تصنيفات JEL: M31، M15، I1

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1. Introduction:

In recent years, services have grown exponentially and increasingly, and have imposed their realistic and distinct position in the economies of countries, thus enhancing their position in the daily life of people in the twenty-first century.

In fact, services are distinguished and different from physical goods in several important points, and this distinction and difference results in the presence of various and multiple divisions for them, and among those divisions in the field of services we find the so-called health care services. In the last decades of the last century, the latter gained a great and increasing importance at various levels, due to the emergence of data and influences mainly caused by the tremendous scientific and technological progress on the one hand, as well as a series of exciting transformations in the contemporary environment on the other hand.

However, the high costs of health care in most countries posed a challenge to the sustainability of services in the future, and an increasing burden on governments, especially with the material and moral pollution that affected the world, which was the most important reason for the spread of various diseases and pandemics. This made countries stand helpless in the face of the large number of patients and the high cost of treatment and medicine on the one hand, and the continuation of providing high-quality services on the other. In order to meet the challenges of high costs, it was necessary to search for alternative options, consider the best ones to provide services, rationalize management and planning systems necessary to ensure cost-effective procurement of services, as well as the continued availability of high-quality bodies, devices and equipment, especially in light of pandemics. The need for digital transactions arose, and this was the beginning of the digital trend for health care services.

With the growth and spread of epidemics and diseases during the last two decades of this century, the most recent of which was the Covid 19 virus, which swept the whole world, an epidemic that began with a limited number of infected people and deaths, and then spread quickly across continents to become a pandemic, it still threatens the life and health of millions of residents and impedes economic development and social.

In the face of these rapid changes, and in an effort to move towards providing more freedom in the practice of various activities in various sectors in all countries of the world on their various political and economic orientations, in addition to the tremendous progress in recent times in information and communication technology, the need for e-marketing has emerged, whether goods or services Through the Internet and using electronic methods and technologies, with which it is expected that radical changes will occur in the infrastructure of the various economic sectors, including the health sector, which will not be immune or isolated from these developments.

Through this research paper, we will learn about the theoretical aspects related to digitization, digital transformation, health care services and the Corona pandemic, and how the pandemic contributed to activating the trend towards digitization, and the role of the latter in improving the quality of health care services.

To answer this question, the following problematic was raised: How can digital transformation in health institutions contribute to improving the quality of health care services in light of the Corona pandemic?

Under this main problematic, the following sub-questions fall:

-What is the concept of digitization and digital transformation?

-What is the concept of health care services?

-What is the Corona pandemic?

- How did the Corona pandemic contribute to activating the trend towards health digitization?

- How has electronic transformation in the health institutions of the Kingdom of Saudi Arabia contributed to improving health care services?

Through the foregoing, and to answer the problem, the research will be addressed through the following elements:

First: A theoretical introduction to digitization, digital transformation, health care services, and the Corona pandemic

Second: The importance of digitization in the health sector in light of the Corona pandemic

Third: The experience of health digital transformation in the Kingdom of Saudi Arabia.

1.1 Importance of Research:

- Given the importance of the great role of health institutions in any society, it is necessary to identify the various technological means used in these institutions, and to strive to improve and speed up decision-making using these methods;
- The success, survival and continuity of the health institution in the contemporary environment depends on its excellence in the field of digitization;
- The role of health digitization in improving the quality of health services;
- Presenting some electronic systems, programs and applications as one of the methods of digitization, as well as using them to study their impact on improving the quality of service provided to patients, especially in light of the Corona pandemic.

1.2 Research Objectives:

- Explaining the benefits of digitizing the health sector through the use of information systems, platforms and electronic programs in its various health institutions, especially in light of crises;
- Developing knowledge and spreading a culture of health digitization and health awareness in society, especially in light of the widespread of the Corona pandemic;
- Contribute to the establishment of the concept of health digitization in Algerian health institutions;
- Contribute to enabling health policies and programs to achieve their goals, by supporting research and innovation in the technological field, its development

and its contribution to community service and finding solutions to health problems.

1.3 Research Methodology:

Given the nature of the subject and to be aware of all its aspects, it was obligatory for us to adopt the curricula used in research and economic studies, including the descriptive analytical approach, which allows us to collect information and data and analyze it according to the requirements of the study.

2. A theoretical introduction to digitization, digital transformation, health care services and the Corona pandemic

2.1 The concept of digitization

"Digitization" is a modern term, the concepts and standards around it varied, and differences arose over the definition of the English terms "Digitalization, Digitization, Digital Transformation." In some fields, the distinction between them was clear, while confusion appeared in other fields.

During the last fifteen years, the average use of the term "digitalization" has decreased, while the use of the term "digitization" has increased, and then the use of "digital transformation" has increased in recent years(Ahmed, 2019).

Digitization transforms physical or analog products into digital materials, and digitization is a radical development process in the way the organization works using modern digital technologies that meet the goals of the organization and customers(Ibrahim, 2021, p. 59).

Hubert Alexander Simon (Nobel Prize Winner in Economics for the year 1978) also presented a definition of digitization based on the characteristics of information and communication technology, as it is "every information that individuals can access, whether it is verbal or symbolic, or read by a computer, or found in books and stored in memory Electronic(Salma, 2020, p. 582).

It is a high-end reproduction process to convert a document of any kind into a digital string. This technical work is accompanied by intellectual and clerical work to organize information for indexing and tabulation, and represents the content of the numbered text(Rachid & Khaled, 2020, p. 183).

Based on the above-mentioned definitions, we conclude that digitization is the process of converting printed texts into digital form using modern technology through a computer.

2.2 The concept of digital transformation:

Many scholars emphasize in their definition of digital transformation as: investing in thought and behavior change to bring about a radical transformation in the way of working, by taking advantage of the great technological development to serve the beneficiaries faster and better. Digital transformation provides huge potentials to build effective, competitive and sustainable societies, by achieving a fundamental change in the services of various parties, including consumers, employees and beneficiaries, while improving their experiences and productivity

through a series of proportional processes, accompanied by reformulating the necessary procedures for activation and implementation, and digital transformation also requires enabling a culture Creativity in the work environment.

It involves changing the basic components of the business, starting with infrastructure, operating models, and ending with the marketing of services and products (Hadj, 2020).

2.2.1 Objectives of Digitization:

There are several objectives distributed at the following levels:

Preservation: Digital media is less vulnerable to damage compared to paper media, which is exposed to several risks.

Storage: A CD can store thousands of pages, let alone a DVD. Digitization saves us a lot of space.

Sections: Through networks, especially the Internet, digitization has allowed hundreds of people to view the same document at the same time.

-Speed of retrieval and ease of use: Digital systems are characterized by great speed of retrieval(Souhila, 2006, pp. 82-83).

2.3 The concept of health care services

2.3.1 Definition of health care services

The body responsible for providing health care services is the health institution, which is a social and human structure that aims to achieve and meet specific goals that include inputs and outputs, and it consists of three basic elements, individuals and groups that need health services, individuals or professionals specialized in various health fields, and social and humanitarian organizations that organize a method providing the health service, the method of financing and purchasing services, regulating and legislating services, planning and coordinating, setting goals, and constantly striving to improve services and monitoring(Alaoui, 2005, p. 17).

Health services are a form of service and one of the inputs to health production. It has been defined as “the treatment provided to the patient, whether it is personal, counseling, or medical intervention, which results in patients’ satisfaction and benefit”(Ennadjar, 2007, p. 363).

Health care services are defined as “all activities directed to maintain human health and safety through the treatment and prevention of diseases”(Eddalimi, 2009, p. 145).

It was also defined as "all services provided by health institutions, whether treatment directed to the individual or preventive treatment directed to the community and the environment, or productivity such as medicines, medical preparations, medical

devices and others, with the aim of raising the health level of individuals and satisfying the desires associated with this service."

It is also defined as "all the services provided by health institutions, whether they are treatment directed to the individual or preventive directed to society and the environment, or productivity such as medicines, medical preparations, medical devices and others, and this is to raise the health level of individuals and meet the desires associated with this service"(Abdelkader, 2012, p. 216).

The concept of product in the hospital industry refers to the physical products provided by the health institution, such as medicine and food, or other services such radiology and analyzes, or non-material services such as clinical examination, surgeries, health and nutritional awareness, nursing services and others (Nusairat, 2014, p. 136).

2.3.2 Characteristics of health care services

Health care services derive their characteristics from the specifics of the services themselves. They are characterized by the following characteristics:

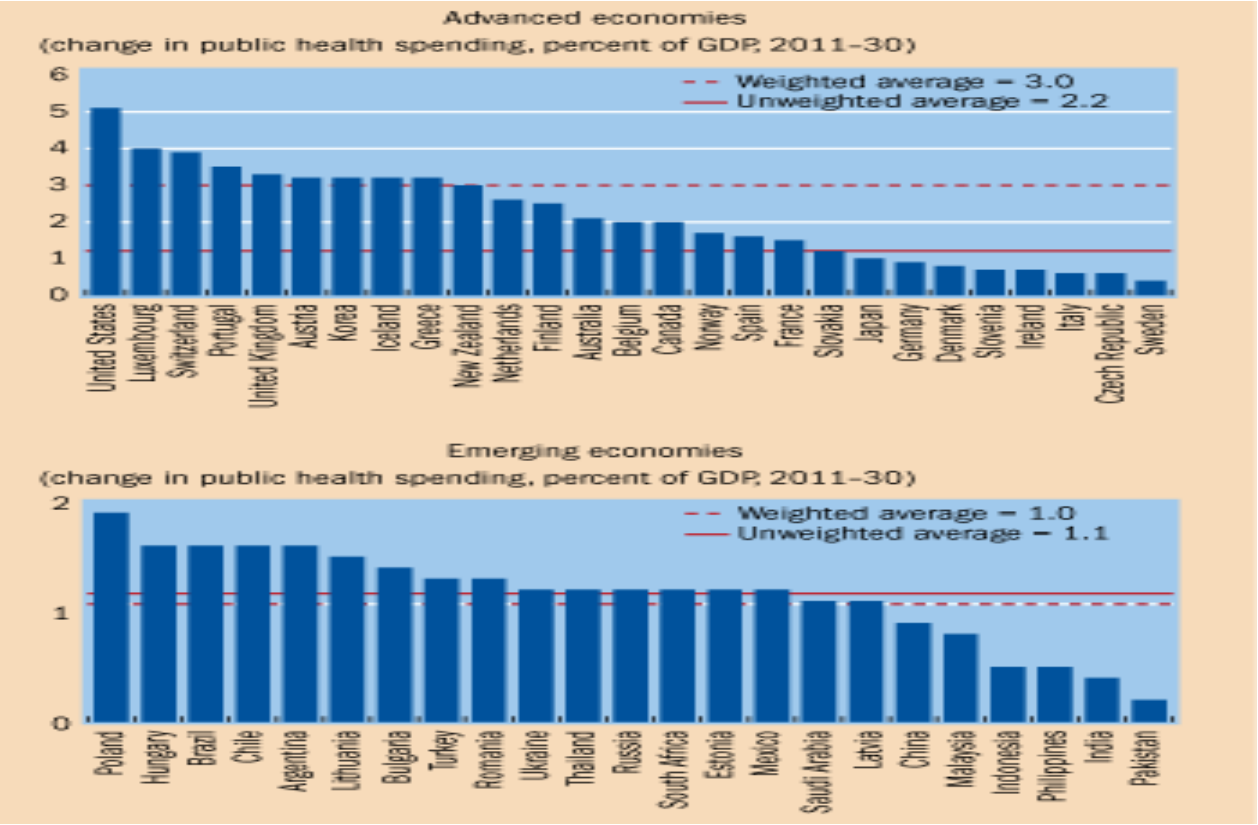
The health service is an intangible product (tangible);

- patient participation in service procedures;
- simultaneous;
- vulnerable to damage;
- Heterogeneity.

2.3.3 The importance of health care services

Health services are of great importance because they are related to the life of the individual and society. It seeks to raise the quality of people's life and build a healthier society. Health care is provided through the health system, which includes all the organizations and institutions working in this sector and all the material and human resources affiliated with it. This system seeks a main objective of promoting or maintaining health, and the ultimate responsibility for the health system relies on the government, because most health care is provided by both public and private sectors, and given the importance of health services, spending on them was expected to raise during the period extending from 2011 to 2030, both in advanced economies, at 3% of the GDP of emerging economies, and at 1% of the total output, which is shown in the following figure.

Figure 01: Change in public health spending as % of GDP 2011-2030 in advanced Economies and in Emerging Economies.



Source: Benedict Clements et al.: Addressing Health Care Resources, Journal of .Finance and Development, Vol. 48, No. 1, International Monetary Fund, 2011, p. 43

2.3.4Quality improvement by integrating quality mechanisms in healthcare institutions

Quality health services include providing the right care - at the right time - and responding to the needs and preferences of service users, while minimizing harm and wasting resources. Quality health care increases the likelihood of desirable health outcomes and is consistent with seven measurable characteristics: effectiveness, safety, population focus, timeliness, equity, integrity of care, and efficiency. In Pakistan, for example, increasing access for health care staff for the first time through the Women Health Workers Program has improved treatment of pneumonia cases and lowered the infant mortality rate(WHO, 2019, pp. 9-10).

The five critical building blocks of quality health care services are: health care workers, health care facilities, drugs and devices, other technologies, information systems, and finance. To ensure that quality is an integral part of the foundations of systems; Governments, officials, health system administrators, patients and clinicians must work together (WHO, 2019, p. 10):

- •Ensuring the presence of qualified health human resources;
- •Ensuring excellence in all healthcare organizations;
- •ensuring the safe and effective use of medicines, devices and other technologies;
- •ensuring effective use of health information systems;
- • Introducing financing mechanisms that support continuous quality improvement;

2.4 Defining the covid19 corona virus pandemic

A pandemic can be defined as a large-scale outbreak of infectious diseases that can significantly increase morbidity and mortality rates over a wide geographic area, and cause significant economic, social and political disruption. Evidence indicates that the possibility of epidemics has increased during the last century due to increased travel and manifestations of globalization, urbanization, changes in land use and greater exploitation of the natural environment, and these trends are likely to continue and will intensify(Sofiane & Kamal, 2021, p. 218).

It was also defined as one of the types of corona viruses, which is a large family of viruses that infect humans and animals, and causes infections in the respiratory tract, ranging from simple influenza to more serious diseases: such as Middle East Respiratory Syndrome “MERS” acute respiratory syndrome. The severe "SARS", and finally the new corona virus "covid 19". There was no presence of the emerging corona virus “Covid 19” before it was discovered in the Chinese city of Wuhan in December 2019 (Linda & Fatima, 2020, p. 54)

3. The importance of digitization in the health sector in light of the Corona pandemic

The Corona pandemic has affected many strategic sectors due to the closure and social distancing policies, such as the education, industry, trade and financial services sectors. The pressure also increased significantly on the health sector, which was not sufficiently prepared to confront this type of epidemic, even in countries with an advanced health system such as the United States of America, France and Italy. Health care services contribute to 10.4% of the global GDP, and the value of e-health exports amounted to nearly $80 billion in 2017, e-health relies on artificial intelligence, big data, electronic health records, and telehealth, and its advantages can be summarized as follows:(Bechari, 2020, p. 584)

- improving the quality of care,
- cost efficiency and resource planning,
- Strengthening the database and evidence to be used at the ideal time,
- Monitoring epidemics and limiting them geographically and demographically, as is the case with Covid 19,
- Diagnose patients' cases, follow up and treat them more accurately.

4. Experience the health digital transformation in the Kingdom of Saudi Arabia

4.1 The reality of digitization in the Kingdom of Saudi Arabia

The year 2020 is an exceptional year by all standards for the Kingdom of Saudi Arabia, despite the repercussions of the Corona pandemic. The Kingdom has made achievements that made it occupy a global position in international reports, as it

recorded impressive progress for the second year in a row in the report (Women, Business Activities, and Law 2021).

It also recorded the only progress in the Middle East and North Africa and was ranked eighth among the twenty countries in the World Competitiveness Yearbook. These achievements came through procedural and legislative reforms that exceeded 555 reforms implemented by the trade system and its partners in the public and private sectors, through the initiatives of the National Transformation Program to improve the business environment(Annual Report The Transformation Continues, 2021, p. 52). The National Transformation Program aims to develop the necessary infrastructure and create an enabling environment for the public, private and non-profit sectors to achieve the Kingdom's Vision 2030, by focusing on achieving excellence in government performance, supporting digital transformation, contributing to the development of the private sector, promoting community development, and ensuring the sustainability of vital resources.

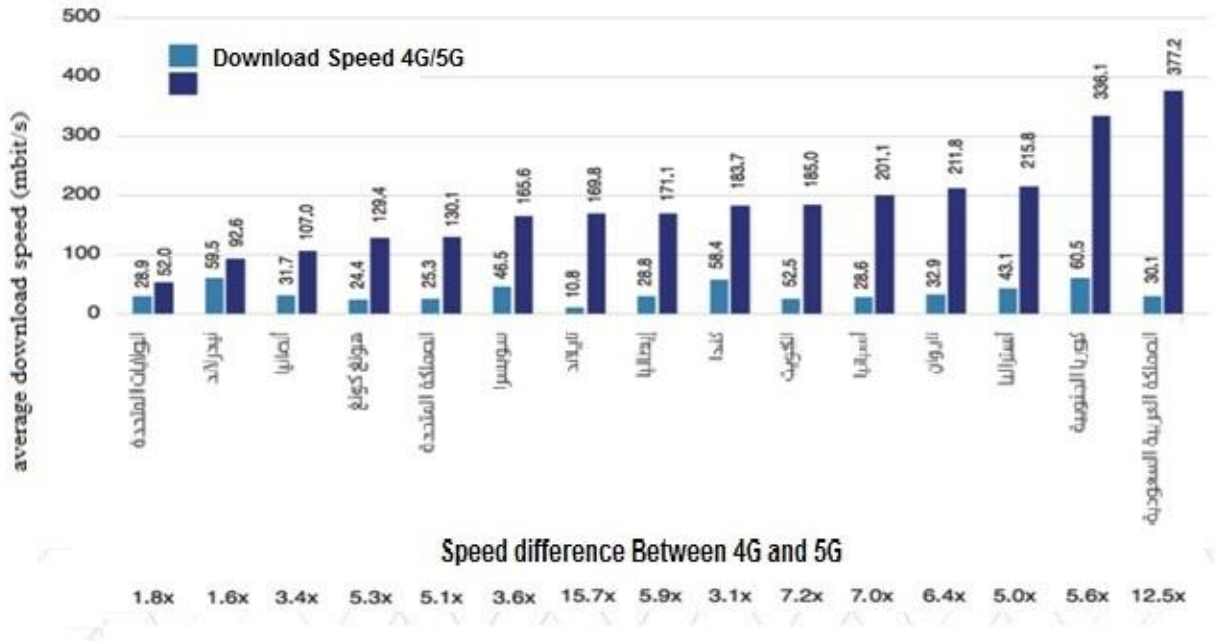
Within the framework of Vision 2030, the Kingdom of Saudi Arabia has witnessed a qualitative growth in e-commerce and business models for digitally provided services, including health care services. It has achieved several levels, through the National Transformation Program, which it was launched from 2016 until the end of 2020, and among the most prominent of these achievements are the following:

- **The title of the most advanced country in digital competitiveness**: within the Global Progress and Competitiveness Report 2020 from the European Center for Digital Competitiveness, which is based on the Competitiveness Report of the World Economic Forum. The Kingdom of Saudi Arabia scored 149 points, ahead of France, China, Japan, the United Kingdom, the United States of America and Germany;
- **Achieving the second rank in the allocation of frequency bands**: where the Kingdom has embarked on implementing the digital transformation plan by developing the national plan for the frequency spectrum, and prioritizing the evacuation, redistribution and allocation of frequency bands, which contributed to the Kingdom achieving the fourth place globally in the spread of the fifth generation technology.
- **Covering remote areas with wireless broadband: which contributed to**:
  - Complete the delivery of basic communications services by 100% in rural and desert areas;
  - Improving the quality of basic telecommunications services provided;
  - Covering more than 576,000 homes in isolated areas with wireless broadband by the end of 2020, compared to 58,000 homes previously in 2017.
- **Improving the quality of digital services provided to beneficiaries**: through:

- Covering more than 3.5 million homes with an optical fiber network in 2020, where it was previously 1.2 million in 2017, and connecting it to all regions of the Kingdom in cooperation with the private sector;
- Increased Internet traffic during the Corona pandemic by 30%;
- Double the internet traffic through the national internet switchboard;
- Increasing internet speed from 9 Mbit/s in 2017 to 109 Mbit/s in 2020.

- **Getting the first place in the average download speeds for 5G service**: according to the report "Measuring the experience of users of 5G networks" issued by OpenSignal in October of 2020, which is a report that measures the average download speeds of 5G networks in fifteen leading countries Globally in the deployment of the fifth generation networks, the Kingdom of Saudi Arabia came at the forefront of the list of download speeds for the fifth generation networks, as shown in the figure below.

Figure 02: Average download speeds of 5G networks, in 15 of the world's leading 5G deployment countries (2020)



Source: Annual Report: The Transformation Continues, - The most prominent achievements of the National Transformation Program until the end of 2020, Saudi Arabia (Vision 2030), 2021, p. 52.www.vision2030.gov.sa

From the figure, we note that the Kingdom of Saudi Arabia ranked first in the average 5G download speed, at a speed of 377.2 Mbit/s, surpassing South Korea, the first country in the rate of 5G network coverage at a speed of 336.1 Mbit/s.

- **Supporting open source solutions**: The "Masdar platform" was launched, which is an integrated platform for Saudi government agencies, public and private

companies, universities and research institutions for open source software, which contributes to stimulating digital innovation and developing the software market.

- **Launching the largest advanced cloud center for Google in the Kingdom**: The Kingdom of Saudi Arabia was added to the areas covered by the global network of the Google cloud platform, as part of the strategic alliance agreement signed by Saudi Aramco with Google Cloud with the support of the Ministry of Communications and Information Technology. Partnership in supporting entrepreneurs and companies through:
    - Effort reduction by 70%;
    - Reduce costs by 30%.
- **Launching the (Ali Baba Cloud) Center for Cloud Computing in Riyadh:** in partnership with the Saudi Telecom Company (STC) and with the support of EWTP Arabia Capital, where $500 million was invested in the Kingdom of Saudi Arabia as part of this partnership in pursuit of digital sustainability.
- **Launching the first center in the Middle East and North Africa for cloud computing**: The center is one of 20 centers around the world, which contributes to promoting a culture of technical innovation and advancing digital transformation.
- **Launching the Digital Knowledge Platform (ThinkTech):** The platform contributed to:
    - More than a million beneficiaries of digital content and 100,000 beneficiaries of events;
    - Launching the "IBM Digital-Nation" platform, in partnership with IBM, to provide a wide range of courses at different levels in emerging technologies, and to make a qualitative leap in the mechanism of information delivery, and to provide innovative solutions and modern and advanced educational experiences.
- **The Digital Giving Initiative**: The initiative (World Summit on the Information Society Prize 2020), presented by the International Telecommunication Union in the path of cultural and linguistic diversity and local content, achieved first place, and this initiative contributed to the launch of the "Ithra" platform, which aims to provide virtual classes to provide educational lectures Remotely.
- **Launching the "Tech Pioneers Program**";
- **Launching the Digital Determination Camps**: It aims to qualify and qualify recent graduates and job seekers, through multiple, intensive, qualitative and specialized training camps.
- **stimulating digital entrepreneurship**;
- **Empowering women in technology**: The Ministry of Communications and Information Technology attaches great importance to empowering women in the ICT sector. Therefore, the Ministry launched the Women Empowerment Program to activate the role of women in the ICT sector. The program has contributed to:
    - The Kingdom of Saudi Arabia received the International Prize for Empowerment of Women in Technology from the International Telecommunication Union;

- The rate of women's participation in the communications and information technology sector and professions increased to 22.91% in the third quarter of 2012.

- **Launching the "Future Skills" initiative**, which aims to build a sustainable model to reduce the gap in the labor market between offers and demands in the fields of communications and information technology.
- **International Hope Hackathon**: In terms of empowering local and global talent, and with the aim of developing digital business solutions to the challenges caused by the Corona pandemic, the Ministry of Communications and Information Technology launched the (Hope Hackathon) remotely, in cooperation with more than 25 local and international partners in order to come up with innovative ideas and solutions to challenges In three different paths:
  - •Digital health
  - •Home entertainment
  - •Electronic games
- **Progress in the United Nations E-Government Development Indicators 2020.**

In the following table, we will show the progress of the Kingdom of Saudi Arabia in the United Nations indicators of e-government development for both 2018 and 2020.

Table 01: The progress of the Kingdom of Saudi Arabia in the United Nations indicators of e-government development

the United Nations assessment of e-government development index			
2018	52 Globally	2020	43 Globally
The progress of the Kingdom of Saudi Arabia: 9 places			12 between 20G
the Communications Infrastructure Index			
2018	67 Globally	2020	27 Globally
The progress of the Kingdom of Saudi Arabia: 40 places			8 between 20G
the Human Capital Index			
2018	50 Globally	2020	35 Globally
The progress of the Kingdom of Saudi Arabia: 15 places			10 between 20G

Source: Annual Report: The Transformation Continues, - The most prominent achievements of the National Transformation Program until the end of 2020, Saudi Arabia (Vision 2030), 2021, p. 52.www.vision2030.gov.sa

Through the above table, we note that the Kingdom of Saudi Arabia has made progress in the United Nations assessment of e-government development index, as it advanced 9 positions during 2020 compared to 2018, and ranked 12th among the G20. It also advanced in the Communications Infrastructure Index by 40 places in 2020 compared to 2018, and the Human Capital Index by 15 places, where it ranked 35 globally in 2020 compared to 2018, when it ranked 50 globally.

- **Launching the "Digital Governance Council" development system**: through the "Yesser" e-Government Program, which is a smart system that provides integrated digital solutions that contribute to facilitating and effective government meetings of the Kingdom's Governance Council.

- **Adopting and developing comprehensive government concepts**: by launching a number of platforms and electronic services that aim to enhance the principle of integration in providing services between government agencies to provide a unified and safe experience for all beneficiaries.

- **The high rate of maturity of digital government services**: Digital government services recorded an improvement of 35.5% between 2018 and 2020, according to the report (The Maturity Index of Digital Government Services), of the e-Government Program (Yesser), which showed a high maturity rate. Digital government services to 81.3% in a number of sectors, including:
  - health sector;
  - The services and development sector;
  - The transport and communications sector;
  - The labor sector and workers;
  - Justice and Islamic Affairs Sector;
  - The financial and commercial sector.

4.2 The contribution of health digitization in the Kingdom of Saudi Arabia on improving the quality of health care services

The initiatives of the National Transformation Program towards e-Health enabled the Ministry of Health in the Kingdom of Saudi Arabia to improve the health sector, by improving the quality and efficiency of health services, facilitating access to them, and enhancing prevention against health risks. The result was also applications, programs, electronic platforms and centers in the service of the citizen in general and the patient in particular, which had a role in activating health digitization, and contributing to addressing the Corona pandemic.

In light of the widespread of the COVID19 virus, and in order to confront the Corona pandemic, the Kingdom of Saudi Arabia, represented by the Ministry of Health, made efforts to digitize the health sector and to activate e-health. These efforts culminated in the following achievements:

4.2.1 Activating E-Health: E-Health was activated during the Corona pandemic, through:

- Launching a number of electronic applications to raise the efficiency and quality of health services, increase the satisfaction rate of beneficiaries, as well as develop additional services in electronic applications. These applications are shown in the table below.

Table 02: The most important e-health applications in the Kingdom of Saudi Arabia

Electronic Applications	**Wasfaty Application**	**Rasd Application**	**Mawid Application**	**937 Application**	**Sehha Application**
	وصفتي wasfaty	رصد	موعد	937	صحة

Source: Annual Report: The Transformation Continues, - The most prominent achievements of the National Transformation Program until the end of 2020, Saudi Arabia (Vision 2030), 2021, p. 52.www.vision2030.gov.sa

- **Wasfati application:** It is an advanced electronic service that aims to raise the level of health services and ensure the availability of pharmaceutical drugs, by linking hospitals and primary health care centers with community pharmacies to facilitate the patient's receipt of medication from the nearest pharmacy for free. Among the most prominent achievements of this system during the end of 2020 are the following:
  - 8.4 million electronic prescriptions;
  - Connecting 74 hospitals and 1,413 primary care centers to the system;
  - 2,193 pharmacies registered.

- **"Rasd" application for electronic drug tracking:** It is an electronic drug tracking application, launched to ensure the availability of essential drugs in the local market, and to ensure their safety and security, through the Food and Drug Authority, with the aim of electronically tracking pharmaceutical products at all stages from production to consumption, by adopting the latest means Technology and its use, which thus aims to combat drug fraud and achieve drug security and availability. This system has contributed to:

  ✓ The registration of more than 4,800 agencies and the implementation of about 1.2 billion operations on drug packages until the end of 2020.
  ✓ All medicines at points of sale are subject to a 100% electronic tracking system.
  ✓ Protecting society, strengthening control and ensuring the safety of medicines.
  ✓ Knowing the sources of medicines and the stages they have gone through from manufacturing to reaching the consumer.

- **"Sehha" application:** is an application to provide innovative and sustainable solutions, keep pace with digital transformation and employ artificial intelligence in the provision of medical services. It was launched to enable individuals to receive health and preventive care from their homes, through

medical consultations via text, audio and video chats, provided by specialized doctors accredited by the The Ministry of Health, in addition to the medical information provided automatically using artificial intelligence techniques that provide the beneficiary with safe medical information and health advice, to ensure that everyone enjoys better health, and in this regard, the Seha application has achieved record numbers of medical consultations since the beginning of the pandemic, which we will show in the following table.

Table 03: The number of medical consultations and the number of users of the "SEHA" application during the years 2018-2019-2020

The years	2018	2019	2020
Number of medical consultations	**260 thousand**	**800 thousand**	**2.1+ million**
Number of users	**500 thousand**	**650 thousand**	**1.6+ million**

Source: Annual Report: The Transformation Continues, - The most prominent achievements of the National Transformation Program until the end of 2020, Saudi Arabia (Vision 2030), 2021, p. 66. www.vision2030.gov.sa

Through the above table, we note that, thanks to the application of "SEHA", the number of medical consultations was constantly increasing until it reached more than 2.1 million in 2020, and the number of users was constantly increasing, but with a difference of 150 thousand users between 2018 and 2019 to jump after it in 2020. To more than 1.6 million users. This has contributed to raising society's awareness about Corona disease and ways to prevent it by providing correct medical information to beneficiaries and facilitating access to it, as well as improving health services provided to citizens by reducing the time it takes to obtain medical consultations.

The electronic diagnosis system for persons with disabilities has also been launched through the electronic "SEHA" platform for the purpose of registering and classifying persons with disabilities electronically, as well as to facilitate access to health services for persons with disabilities, in a manner that guarantees them the quality levels of these services.

- **Appointment (Mawaid) service:** It is an application launched by the Ministry of Health to facilitate the procedures for booking and managing medical appointments, whereby beneficiaries can book, amend or cancel appointments immediately, using the application on smart devices or the website.

Table 04: The number of appointments and the number of beneficiaries of the "Mawaid" service during the years 2018-2019-2020

The years	2018	2019	2020
Number of beneficiaries	**4 million**	**8 million**	**14.3 million**
The number of appointments	**8 million**	**26 million**	**67 million**

Source: Annual Report: The Transformation Continues, - The most prominent achievements of the National Transformation Program until the end of 2020, Saudi Arabia (Vision 2030), 2021, p. 66. www.vision2030.gov.sa

- **The 937 application:** provides medical consultation services, notifications and booking appointments around the clock, and the center has contributed to increasing the number of beneficiaries of medical consultation services at the time of the Corona pandemic, as the calls reached 100,000 calls per day.

4.2.2Drugs Guide for Smart Devices: This guide was launched by the Ministry of Health for all health practitioners in the Ministry, with the aim of enabling doctors, pharmacists and nurses to verify the dosages of drugs before prescribing, dispensing or giving the drug to the patient. It includes a search engine for the Ministry's drug directory, Micromedics for information on internationally approved drugs, as well as easy-to-understand patient-oriented information about health care.

4.2.3The National Center for Crisis and Health Disaster Management: The center aims to raise the speed of response to disasters and crises, analyze their causes and work to prevent them, through the launch of the "Tataman" application, which aims to enhance the commitment of all those who have been directed to health isolation to continuously monitor their health status and open a direct channel of communication, And also the creation of an integrated dashboard for the health staff and their numbers based on the workplace in the Kingdom, to help decision makers in requesting support for isolation hospitals based on the doctors available in the region and according to their work classifications.

4.2.4First place in the electronic monitoring system of the World Health Organization in the Eastern Mediterranean countries: It achieved this through:

- Increasing the number of centers for monitoring influenza infection from 15 centers in 2017 to 50 specialized centers in 2019 at the district level;
- Linking the centers to the electronic monitoring system of the World Health Organization, which aims to monitor influenza cases and different types of viruses.

4.2.5 Launching the Saudi Center for Appointments and Medical Referrals: it aims to:

- Managing the movement of medical referrals, and related services for all patients referred between health institutions inside and outside the Kingdom;
- Establishing a database to know the capabilities and capabilities of hospitals;
- Providing support and assistance to doctors and health practitioners during the referral process;

4.2.6 Improving access to health services through an electronic system.

Expanding the coverage of specialized services: by improving the quality and efficiency of health services in various regions of the Kingdom through a group of centers, programs, projects and hospitals, including: The National Program for Maternal Dislocations; And inauguration of a number of specialized services at King Salman Hospital in Hail. Also, a number of hospitals were launched, such as Al-Shamal Medical Hospital in the northern border region, Al-Amal Hospital in Hail, and Oyoun Al-Jawa Hospital, with 300, 200 and 100 beds, respectively.

5. Conclusion:

The rapid changes in the business environment have forced organizations to find a way to obtain information in a short time, as digitization and digital transformation are the way to do more work with less effort and money and achieve better results. In the health sector, thanks to these electronic programs and applications, we obtained a quality health service - especially in light of the outbreak of the Corona pandemic. It is easy and convenient, by enabling beneficiaries to book, amend or even cancel appointments, as well as remote diagnosis and medical advice.

In the Kingdom of Saudi Arabia, and based on the digital transformation of the health sector and health care services, through the launch of electronic applications, such as the "wasfaty" application, "Mawaid", "Monitoring and health" and "electronic paramedic" ...etc, and developing additional services to improve health care. All this contributed to raising the level of readiness of Saudi health institutions to tackle the Corona pandemic, raising the efficiency and quality of services, and increasing the satisfaction of beneficiaries.

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